MANAGEMENT FOR PROTECTION AND SUSTAINABLE DEVELOPMENT

The Fourth International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas

Montecatini Terme, Italy
14-19 October 2008

Proceedings

Edited by Antonio Raschi and Sonia Trampetti

These proceedings are published by the support of

Regione Toscana

Ente Cassa di Risparmio di Firenze

Edited by
Antonio Raschi, CNR-Ibimet
Sonia Trampetti, CNR-Ibimet

Editorial project editor
Simone Gismondi

Editorial co-ordinator
Massimo Piccione

Photolitography and Printing
Pacini Editore Industrie Grafiche - Ospedaletto (Pisa)

Index

Management

Needs and tools

Disturbance

Local community

Conflicts

Space's analysis

Spacial knowledge

Posters

Preface

Rolling hills, chromatic extravaganzas in fields, rustic farmhouses. And cypress trees. Thus the Tuscan landscape has fascinated the world. And yet, the nature of Tuscany is more than this. The surprise of snow-covered peaks, ponds and lagoons, Mediterranean underbrush that grows right on the sea shore, woods, and a countryside still marked by millenarian cropping expertise, that is reflected in our world famous art and handycraft traditions.

To protect this heritage, of which we are proud, Tuscan region has adopted strict environmental regulations, setting up resolutely protected parks and reserves that are not oases in the desert but links in a network that covers all the environmental systems of the region: Apennines, hilly inland, wetlands, coast. The system of protected natural areas of Tuscany includes, national parks, state and sea reserves, wetlands of international importance, regional parks, provincial parks, provincial reserves, protected natural areas of local interest. In actuation of the Community "Habitat" directive (92/43/EEC), 120 sites have been identified and classified as having community importance (pSic) and 30 as areas of special protection (Zps), 15 of which correspond to pSics. These are joined by 15 sites of regional interest (Sir) and 7 sites of national interest (Sin). The totality of these areas is an integrating part of the national ecological network and, in the Community perspective, of the Nature 2000 European Network.

Tuscany, with a population of three and a half millions inhabitants, hosts every year more than 41 millions tourists overnights, that contribute to the gross domestic product by 7%. Nature based tourism in Tuscany is a very important and strategic sector, as in our heritage art and nature are strictly linked, and often impossible to distinguish. Since this region has a famous naturalistic landscape, tourist will be never disappointed by the promise of a green scenery.

Tuscan Region has therefore welcomed the proposal to organize here this 4th edition of MMV, being the first one out of Central European countries, and to do it in cooperation with CNR – IBIMET, an Institution already strongly engaged with us on projects related to environment, production, and social issues, and that is nowadays widening its research interests to tourism, also for its potentialities in underpinning rural development.

We expect that a more consistent engagement on natural tourism by the decision makers will follow this MMV4 conference. Tuscan Region will be happy to promote further initiatives to foster meeting and discussion among scientists, park managers and decision makers, and will see with favour new projects on environmental and green tourism.

Paolo Cocchi
Regional Councillor
for Culture, Tourism and Trade

Presentation

The sustainability of human activities is becoming indispensable for mankind's survival on our Planet. Natural phenomena take place according to rules that cannot be ignored, but carefully taken in account when taking decisions on how to satisfy primary and secondary needs. The ongoing climate change is one of the first consequences of an excessive use of fossil fuels, and of a market economy in which consumption is not any more the means, but has become the aim of economic activities. The progressive industrialization, that took place in the last few centuries, has in a first step satisfied the needs for affluence of huge numbers of people, creating jobs and giving origin to the welfare that has characterized the Western countries in the XX century. An acceleration of this model has lead to increase consumptions in an uncontrolled way, so to increase the economic flows on which indexes such as GDP, used to evaluate countries' economic wellness, are based. The mass media society has imposed behaviour models and systems of values driven by the market, and not by people's needs, inducing consumption mechanisms that are often incompatible with a reasonable and balanced use of limited resources. Moreover, the unsustainable behaviour models have been extended in a few decades from a few hundred millions to billions people, with undeniable consequences for the planet's health.

Tourism, as well as all human activities, is part of this matter. A glance to its origins and history shows how it responds to the human curiosity, to the desire to see new countries and different ways of life; this was true for ancient times travellers, for medieval pilgrims, for the rich British tourists that in relatively huge numbers visited Italy at the turn of XIX century, and this was often linked, in the past centuries, with trade activities that required trips to remote countries, such as the case of Florentine fabrics merchants. Tourism too, in the most recent years, has become a consumable, supporting a relevant commercial network; yet, the dominance of a mere consumption scheme has led to neglect the cultural aspects of tourism, the understanding of sites' history and of different cultures, the full appreciation of the cultural content and of the quality of typical products, thus enhancing commercial aspects at the lowest level.

Politics are nowadays more and more dependent upon economy, and the short-sighted interests of involved stakeholders are often less and less used to build up strategic plans for the future, their action being usually limited to the management of everyday problems.

For tourism, as well as for other economic fields, we need to start a reflection, through research, not only to exam its role in the light of sustainability parameters, but to bring it back to its original *raison d'être*, redeeming it from the aberrations of a slobbish consumerism.

The Ente Cassa Di Risparmio di Firenze, that together with Regione Toscana supported the publication of this volume and the organization of this Conference, has initiated a reflection about sustainability, as refereed to a number of different economic fields, such as agriculture, handicraft, energy production, and has established an Observatory of Craftjobs in art, fashion, small enterprises and tourism, aiming to promote high quality productions having a close link with local history and being based on craftsman creativity, and to support the role of local minor museums.

In the above mentioned perspective, the debate of experts from all over the world, and the gathering of contributions from researches aiming to focus the links between tourism and territory, may represent a relevant step in the construction of a new millennium, in which the real values on which human action must be based will be reconsidered and used to establish local economic growth.

Giampiero Maracchi
Chairman of Fondazione per il Clima e la Sostenibilità

Presentazione

La sostenibilità delle attività umane diviene una condizione fondamentale per la sopravvivenza del genere umano sul pianeta. Se da una parte infatti vi è la necessità di soddisfare bisogni primari e secondari di ogni uomo dall'altra è indispensabile che ciò venga fatto a partire da un esame accurato dei fenomeni naturali regolati da leggi che non possono essere ignorate pena gravi conseguenze. Il cambiamento del clima a cui stiamo assistendo è uno dei primi segnali dell'impatto delle attività umane sul pianeta, dovuto all'uso esagerato dei combustibili fossili e soprattutto a un'economia di mercato in cui i consumi sono divenuti non il mezzo ma il fine dell'attività economica.

Il graduale processo di industrializzazione degli ultimi secoli ha soddisfatto in un primo tempo l'esigenza di masse di persone che fino ad allora non avevano avuto accesso ad un relativo benessere, e nello stesso tempo ha generato occupazione dando luogo a quel "welfare" che ha caratterizzato il XX secolo nei paesi occidentali; l'accelerazione di quel modello ha però portato ad aumentare a dismisura i consumi in modo da aumentare i flussi finanziari che sono alla base di indicatori correntemente utilizzati dai governi per valutare la salute della economia come il prodotto interno lordo. La società mediatica ha imposto modelli di comportamento e sistemi di valori in cui l'elemento guida è divenuto prevalentemente il mercato e non i reali bisogni della gente. Un approccio di questo genere ingenera comportamenti spesso inconciliabili con un uso ragionevole ed equilibrato delle risorse. Questo modello inoltre che nel secolo scorso riguardava qualche centinaio di milioni di persone, viene oggi adottato da alcuni miliardi di persone con conseguenze assai gravi per il pianeta. Anche il turismo, come tutte le altre attività, non sfugge a questo schema. Uno sguardo alle origini ed alla storia del turismo ci mostra come esso risponda alla curiosità innata della natura umana di vedere paesi e civiltà diverse: questo era vero per i viaggiatori dell'antichità, per i pellegrini del medioevo e per i ricchi inglesi che visitavano l'Italia alla fine dell'ottocento. Spesso inoltre si associava alle attività commerciali come quelle dei mercanti fiorentini del 400 che per il commercio dei tessuti avevano bisogno di viaggiare in terre lontane. Anche il turismo come molte altre attività è divenuto oggi in prevalenza un bene di consumo, sul quale si basa una vasta rete commerciale che va dalle agenzie di viaggio alle compagnie aeree, dagli alberghi ai ristoranti, dai venditori di souvenir ad altre categorie del commercio. Così facendo la motivazione prima è stata deviata verso un puro schema di consumo che non tiene conto né dei contenuti culturali, né della qualità e del contenuto culturale dei prodotti, né della comprensione della storia dei luoghi e delle singole culture, e che soprattutto tende ad esaltare un aspetto commerciale di bassissimo livello. Purtroppo la politica è sempre più dipendente dall'economia e dagli interessi spesso miopi delle categorie coinvolte, ed è sempre meno capace di avere visioni strategiche del futuro limitandosi a gestire i problemi del quotidiano.

Anche per il turismo come per altri comparti è dunque necessario avviare una riflessione, attraverso la ricerca, che lo confronti con i parametri della sostenibilità, ma che più che altro lo riconduca alle motivazioni vere liberandolo dalle aberrazioni di un consumismo cialtrone e fine a se stesso. L' Ente Cassa di Risparmio di Firenze, che insieme alla Regione Toscana ha contribuito alla pubblicazione di questo volume e all'organizzazione della Conferenza, ha avviato una riflessione sul tema della sostenibilità per una serie di comparti economici quali quelli dell'energia, dell'agricoltura, dell'artigianato, con la creazione dell'Osservatorio dei Mestieri d'arte, della moda, della piccola e media industria ma anche del turismo e con la valorizzazione dei circuiti museali minori e la promozione di produzioni di qualità

che siano ancorate alla storia dei territori ed alla creatività degli operatori. Il confronto di studiosi provenienti da ogni continente su questi temi e la raccolta dei contributi derivanti da un progetto condiviso di ricerca sul turismo legato ai territori, s'inserisce in questo contesto rappresentando un momento importante della costruzione di un nuovo millennio che riconsideri con attenzione i valori fondanti dell'azione dell'uomo.

Giampiero Maracchi
Presidente Fondazione per il Clima e la Sostenibilità

Introduction

Antonio Raschi and Sonia Trampetti

MMV4 conference reflects a significant trend: management and monitoring of visitor flows in recreational and protected areas are topics of growing importance worldwide.

As the IUCN and UNEP statistics demonstrate, the global number of existing protected areas is increasing. A positive trend can be also observed in the UNESCO selection of natural world heritage sites. To these, we must add numerous smaller areas that also have special natural or cultural heritage values, but do not have a special protected status. Many of these areas do not only serve the protection of natural and cultural values or biodiversity, they are also important points of attraction for tourism and recreation. These areas must be professionally maintained and managed if they are to conserve their natural and landscape values in the future.

These proceedings reveal the increasing attention on important issues and contain contributions concerning five central themes:

1. Local community and nature based tourist, regional development, social and economic impact of recreational tourism.
2. Social perception of landscape and sustainable development. Visitor's preferences and images of nature and wildlife.
3. Impact of recreational activities and tourist use, wildlife disturbance and models of social carrying capacity.
4. Tools and needs for advancement of research in visitor monitoring methods, visitor modelling and data management, methods for simulating recreational behaviour.
5. Significance of visitor monitoring data for management, planning and policy and for visitor information.

These themes are discussed by scientists and managers from almost 30 countries and we are pleased to welcome so many to this MMV4 conference. This active participation confirm the involvement in the network of experts that has been developed to such prosperity in few years.

As far as the MMV4 topics communication's strategy is not enough prominent at this stage, but we believe this attention should be improved. This will be our suggestion for next edition.

The following proceedings contain the contributions which were accepted for presentation at the MMV4 conference. The short papers made by the invited keynote speakers are also included.

In order to guarantee scientific quality, each submitted presentation was given a blind reviewing by two international experts who read the contributions critically and commented them anonymously. Many were accepted, others were returned for a minor or major revision. As linguistic quality was not a criterion for acceptance, the contributions were edited in the compilation of the proceedings. We would like to give sincere thanks to all the reviewers for their support.

At this point we would like to recognize all those who contributed to the success of the MMV4 conference. Special thanks go the partner institutions in making this conference possible. We thank the members of the International Steering Committee for their valuable guidance and suggestions.

Last but not least we would like to thank session and workshop chairs as well as all the contributors, upon whose work the scientific quality of the MMV4 conference depends.

MMV4 PROCEEDINGS
KEYNOTES' ADDRESSES

Tourism as a conservation tool

Ralf Buckley

Abstract — Tourism and conservation interact principally through public visitation to public protected areas. In addition, however, tourism can generate funding and political support for conservation in multiple-use areas, community conservancies or private reserves. These tenures are likely to prove increasingly important for conservation under growing pressure from human population growth and anthropogenic climate change. The most successful model seems to be through up-market wildlife-watching lodges in private reserves adjacent to larger public protected areas in developing countries. Private companies such as Conservation Corporation Africa and Wilderness Safaris, operating principally in sub-Saharan Africa, have developed successful business models which do also make significant net contributions to conservation of biological diversity.

Index Terms — Connectivity, funding, ecotourism, wildlife.

1 Introduction

The tourism and conservation sectors exist independently of each other; neither exists to serve the other; and to a large degree they operate with little interaction or overlap. Where they do overlap significantly, however, the interactions between them become critical to both. The largest area of overlap is public visitation to public protected areas, the principal focus of the MMV series; and the most critical aspect of the interaction is indeed the monitoring and management of visitors to minimise their impacts on protected-area ecosystems.

My aim here, however, is to identify other areas of overlap and other types of interaction, and to examine how they may be relevant to the MMV mandate. In particular, I focus on the role of tourism as a tool rather than a threat to conservation. It is important to note at the outset, however, that whilst this role may become more significant in future, it is as yet rather small. Mainstream research in parks and recreation ecology and management, the core disciplines of most of the MMV constituency, is still the main game for tourism and conservation, and will remain so for a long time yet. My aim here is to draw attention to some new and additional directions, but this does not mean that we should neglect our traditional interests.

I shall approach my task in three main steps. The first is a brief structural overview of the tourism and conservation sectors respectively, to identify the scale, types and characteristics of major interactions, and their current and potential significance in developing and developed nations respectively.

This is intended to provide a context for the second step, where I present some examples and case studies of the various models and mechanisms used to harness tourism as a tool in conservation. Finally, I attempt to forecast how these approaches may increase or decrease in significance in future, as the global climates and economic structures continue to change.

2 Definitions, structures and interactions

Both tourism and conservation can mean different things to different people, so the first preliminary is to define what is included here. For tourism, the key definitional issue is that it includes individual leisure and holiday travel, and this in turn includes holiday visitation to

R. Buckley is with Griffith University, Australia E-mail: r.buckley@griffith.edu.au

national parks and other conservation areas. Many visitors to protected areas, however, especially for parks near to urban centres in developed nations, are local residents making day visits only. These are counted in park visitation statistics but not in tourism statistics. For conservation, the key definitional issue is that it includes all measures and efforts to conserve biodiversity and ecosystem services on all types of land and water tenure, including all private and public holdings and landscape-scale connectivity approaches as well as national parks and other public protected areas.

In numerical terms, whether counted in tourists, visits or expenditure, the bulk of the tourism sector is urban. There is a large and financially significant outdoor subsector, estimated to comprise about one fifth of the industry worldwide. This corresponds to an annual turnover of the order of one trillion dollars (US) globally, including mechanised equipment and fixed-site resorts, but not associated residential development. Most of the outdoor tourism sector, however, is adventure rather than nature-based. It includes a number of large-scale mechanised activities with high environmental impacts which are of course familiar to members of MMV. Most of the activities occur on land and water outside protected areas, but they have conservation impacts nonetheless, and some do also take place inside particular protected areas.

Contemplative nature-based tourism forms one component of the outdoor tourism subsector, smaller in economic terms than mechanised adventure activities but probably larger in the number of individual people involved, especially in older age groups. This component includes the majority of visitors to public protected areas. Ecotourism is a small segment of nature based tourism, including both commercial and non-profit operations and defined by additional management, education and conservation criteria [1].

The core of global conservation efforts consists of the formal public protected areas in the national reserve systems of individual countries, as recognised by IUCN. Since these formal reserves cover only a tenth or so of global land area, however, conservation also depends on remnant ecosystems in other land tenures, which are undergoing continuing attrition [2]. As a result, and given the increasing political difficulties in expanding formal protected area systems in countries with growing populations, conservation efforts have begun to include various landscape-scale connectivity approaches [3]; [4]. These include both community and private landholdings [5], and public forests and rangelands nominally allocated for multiple use [6]. The relative scale and significance of different land tenure types for both tourism and conservation differ greatly between continents and between developed and developing nations. In addition, there are remote wilderness areas either within or outside national jurisdictions, but with little or no infrastructure or permanent human presence, which can be highly significant for conservation irrespective of formal tenure.

Under the broad definitions as adopted above, the major interactions between tourism and conservation may be summarised as follows. Outdoor tourism as broadly defined operates largely outside protected areas; partly inside protected areas; and to a small degree in remote wilderness areas. In multiple-use areas, even though adventure tourism produces significant environmental impacts, it may sometimes help to focus land managers' attention on recreation and conservation rather than primary production [7]. In protected areas, many forms of adventure tourism produce major negative impacts on conservation and major practical difficulties for management agencies; but are tolerated either because of historical precedent or current political pressures, or in order to maintain a political constituency. In remote wilderness areas, outdoor tourism takes the form of expeditions which may help to attract public attention to conservation values and issues, but may also create impacts especially if large-scale rescues are required.

Contemplative nature-based tourism operates largely though not entirely in protected ar-

eas, private as well as public. The impacts and management of visitors to public protected areas, the fees they may be charged and the political support they may engender, are very familiar to participants in the MMV series [8], [1], [9], [10]. They need not be re-examined here, except to reiterate that these are still the principal current links, both positive and negative, between tourism and conservation. We should also note that there are commercial wildlife watching tours in other land tenures and in remote wilderness areas, and these are often significant for conservation.

My focus here is on mechanisms by which tourism can make a net positive contribution to conservation, through positive contributions large enough to outweigh negative impacts. The mechanisms may be political, social or economic, or commonly some combination of these. Tourism is often invoked as one political justification for the establishment of protected areas, for example, in both developed and developing nations. Park fees offset management costs in developed nations, and generate net foreign exchange earnings for governments in their developing counterparts. Continuing political support is needed to maintain conservation management in the face of other pressures, whether for oil drilling in Australia's Great Barrier Reef or the Arctic National Wildlife Reserve, or for clearance and subsistence agriculture in parts of Asia and Africa.

In the next section I present some examples of such models and mechanisms, and attempt to illustrate the social, environmental, economic and political dimensions in different countries. I focus on examples where I myself have some direct on-site experience; but even so, one cannot always be confident of understanding political processes, especially in countries with different languages and cultural traditions – or indeed, even in one's own local neighbourhood. That is, I present my perceptions of particular models involving tourism and conservation, but with the proviso that others with greater local experience might well see additional aspects of each case.

3 MODELS AND MECHANISMS

The approaches used to harness tourism as a tool in conservation differ considerably between continents and countries and between tour operators and organisations. There are no standard models, but a menu of approaches which may be tailored to different circumstances. Approaches which have proved successful in one set of circumstances do not necessarily work as well in another, even for the same organisation.

Possible mechanisms for tourism to contribute to conservation include: mandatory fees and voluntary contributions in cash or in kind to public protected area agencies; conversion of other public lands to conservation use through direct political lobbying by tour operators or clients; support for non-government conservation organisations to conduct such lobbying; and the conversion of private or community landholdings from primary production to conservation use through direct financial means.

Many public protected areas charge entry, camping and activity fees both for individual visitors and for commercial tour clients. In most developed countries, per capita fees are generally less than per capita costs of visitor infrastructure, so there is no net contribution to conservation. In some developing nations, park fees from international visitors do constitute a net financial contribution, but governments often appropriate these funds centrally, with no direct link to conservation. A few tour operators do also make direct voluntary in-kind contributions to conservation management in particular public protected areas. Examples include: staff salaries for park rangers and anti-poaching patrols; vehicles and radios; bounties for animal snares; and ecological monitoring [11].

Tour operators have sometimes supported non-government conservation groups. Approaches include: sponsoring transport and accommodation, as at Khutzeymateen in Canada; providing land and infrastructure, as at Walindi in Papua New Guinea [7]; running tours for conservation organisa-

tions, with cash contributions from the price paid by participants; direct cash donations from the tour operator; and donations from tour clients.

Tour operators could lobby directly on behalf of conservation, but this seems to be rare in practice. Attempts to promote tourism as a conservation alternative to whaling in Iceland [12] or to logging or hydroelectric dams in Australia, Chile, China, Indonesia or Papua New Guinea [1] rarely seem to have been successful. There seems little evidence that a nature tourism experience converts commercial clients to conservation lobbyists [13], [14]; and even if it did, there would be no net conservation benefit unless their lobbying outweighed impacts.

A number of major international environmental NGOs are indeed involved in tourism projects, sometimes with commercial tourism partners. The Worldwide Fund for Nature is reported as involved in projects in South Africa, Namibia, Belize and Greece; Conservation International in the Philippines, Indonesia, Brazil and Panama; and The Nature Conservancy in China and Mexico [11], [1]. In Australia, the Mareeba Wetlands Foundation runs tourism and conservation operations in a private reserve in the tropical north [15]. There are other examples in Chile, Ghana, the Seychelles, the United Arab Emirates and Zambia [1]. I have not visited or audited any of these in person, except for the Al Maha Oryx reserve in the UAE.

The most effective approach for tourism to contribute to conservation seems to be the most direct. Tourism generates revenue, which can be used to fund private or community conservation reserves. Examples have been described for case studies in South Africa [16], Brazil [17], Greece [18], Australia [19] and worldwide [11]. The importance of involving local residents in such efforts has been reemphasised by recent research in Nepal [20], Tanzania [21] and a number of southern African nations [22]. Some successful models of this approach are outlined below.

4 Funding private and community conservation reserves

If a reserve is funded entirely through tourism, then the service and hospitality components must generate a sufficient surplus to cover conservation management costs. In practice this is rarely possible unless the property has an icon attraction for which there is a strong demand. In most instances this is scenery and/or wildlife. In addition, since the need to cover conservation costs means that prices must be relatively high, clients will then expect a high level of service quality, and this in turn will increase prices still further. The most successful model for private conservation reserves funded by tourism hence seems to be through up-market luxury game lodges with skilled staff who can provide a particularly memorable wildlife watching experience, often with animals which are at least partially habituated, and which may be managed to maintain particular population densities.

Private conservation reserves and community conservancies funded by tourism are becoming increasingly commonplace worldwide [11], [1], [23], [24], [5], [25], [26]. The best-known and earliest examples are in southern Africa, particularly in Botswana, Namibia and South Africa itself [22]. Companies such as [27] and [28] have developed successful business models which rely on wildlife tourism to fund quite large-scale conservation efforts, including habitat restoration, anti-poaching efforts and wildlife relocation programmes (author, pers. obs. 2001-2008). Wilderness Safaris (2008), for example, has brought over a million hectares of land in Botswana and Namibia, principally community land, into conservation use. Conservation Corporation Africa (2008) (CCAfrica) has successfully established a considerable number of private conservation reserves funded through tourism, largely in South Africa, and has pioneered restoration, restocking and wildlife relocation techniques.

Tourism funds the private reserves of the Sabi Sands area, which has effectively added 65000 ha to Kruger National Park in South

Africa [11], [29], and the Madikwe private reserve adjacent to the Botswana border [23], [30]. There are many individual operators in each, including CCAfrica. In Madikwe, the individual landowners have removed internal fences and operate the entire area as a single co-managed reserve. In Sabi Sands, they have not only removed fences between private reserves, but also between these and the public national park. CCAfrica also established the Phinda private reserve which extends the St Lucia World Heritage Area in south-eastern South Africa, and the Kwandwe reserve which provides critical habitat for the endangered blue crane in the southwest. In addition, it pioneered capture, translocation and "soft release" techniques for active population management of a number of endangered wildlife species, a key step in using tourism as a conservation tool.

Similar approaches have been followed by Wilderness Safaris. Its Ongava private reserve, adjacent to Etosha Pan national park in northern Namibia, effectively extends the area of the public park and is separated from it by a "semi-permeable" fence which allows some animal species through whilst retaining others. A series of adjacent community conservancy areas leased by Wilderness Safaris and funded by tourism is gradually building a conservation corridor between the Etosha Pan ecosystems of northeastern Namibia and the arid ecosystems of the Skeleton Coast in the northwest, habitat for desert-adapted elephant. This corridor runs adjacent to the border with Angola, and once politics allow, cross-border connectivity will also be feasible. In late 2006 the tourism ministers of Angola, Botswana, Namibia, Zambia and Zimbabwe signed an MOU to set up a 5-nation Kavango-Zambezi Transfrontier Conservation Area [31]. It is intriguing that the countries concerned were represented by tourism rather than environment portfolios in such negotiations. Internal corporate goals for both CCAfrica and Wilderness Safaris include even more ambitious multi-country conservation corridors.

South of the Skeleton Coast, Wilderness Safaris leases a community conservancy which supports the largest remaining population of desert-adapted rhinoceros. It also supports extensive research on rhino populations, ecology and conservation, both directly and through an NGO, [32]. In Botswana, it funded the reintroduction of rhino, previously poached to local extinction, into the publicly owned Moremi reserve in the Okavango Delta, and leases large areas which it runs for conservation funded by tourism.

A large number of smaller companies have adopted similar models, though with fewer sites and smaller areas. Similar tourism-based models, often run by the same companies, also help to fund conservation in public conservation reserves and conservancies in east Africa and elsewhere. CCAfrica (2008), for example, operates a series of private reserves in east Africa, leased from the national governments and converted from subsistence agriculture and hunting to wildlife conservation [7]. These effectively extend the protected area of the Serengeti ecosystem. It has established a marine reserve at Mnemba Island off the coast of Zanzibar [7], similar to the private marine reserve at Chumbe Island [11]. Through a joint venture known as Taj Safaris, CCAfrica has recently built 4 tourist lodges to support tiger conservation in India. It is currently providing technical expertise to relocate gaur, the endangered Indian wild ox, as part of a continent-wide conservation program.

Critiques of the approach adopted by companies such as these have been provided recently by [22] and [30] for Madikwe and Sabi Sands in South Africa; [22] and [33] for conservancies in Namibia; [34] for the Okavango area in Botswana; and [35] for Tanzania including the Klein's Camp concession operated by CCAfrica. The focus of these authors is on community benefits rather than conservation, and they conclude that a number of local communities in these areas have indeed benefited considerably from upmarket private game lodges, though a variety of mechanisms.

5 The Future

Conservation seems likely to face increasing challenges worldwide in future [36]. The global human population continues to grow, and the greatest growth is in large newly-industrialised nations such as China and India, where protected area systems are relatively weak. In addition, both developed and newly-industrialised nations in both East and West continue to exploit natural resources in areas of high conservation value in developing nations, where conservation frameworks are even weaker and conservation impacts correspondingly more severe. These effects will also be compounded, over forthcoming decades, with those of anthropogenic climate change. This will increase pressures on existing national reserve systems, and simultaneously reduce public funding for conservation by creating other urgent social needs which will compete for public funds.

To conserve biological diversity and ecosystem services under such circumstances, existing public protected areas and landscape-scale connectivity approaches will both be critical. If the impacts of tourism in parks can be reduced through better monitoring and management of visitors, that will help to increase the resilience of protected-area ecosystems to other stresses such as those from climate change. And if the revenue-generating potential of tourism can be harnessed through social and political processes as a tool to help in off-reserve conservation, that will help to alleviate the continuing loss in remnant ecosystems outside the national reserve systems. Various mechanisms have been proposed, including an attempt to link connectivity conservation approaches across national boundaries into a single globally-branded "world wild web" able to attract major funding from carbon mitigation measures [23]. Meanwhile, models developed by tourism operators such as CCAfrica, Wilderness Safaris and their counterparts elsewhere surely deserve expansion, replication and encouragement.

At a global scale, tourism has become a significant source of funding for connectivity conservation, though currently much more prevalent in particular regions and restricted to a relatively small set of tourism operators. The tourism industry more broadly does not necessarily contribute to conservation, and indeed generates a wide range of ecological impacts; but if an adequate conservation framework is in place, tourism can generate significant funding to support it. Indeed, for a small number of leading ecotour operators whose owners are driven by conservation concerns, they may also help to establish such conservation frameworks, by providing examples of what can be achieved.

References

[1] R.C. Buckley, *Ecotourism: Principles and Practices. Oxford, CAB International, 528 pp., 2008.*

[2] A.C. Lees and C.A. Peres, "Conservation Value of Remnant Riparian Forest Corridors of Varying Quality for Amazonian Birds and Mammals," *Conservation Biology*, vol. 22, no. 2, pp. 439-449, 2008.

[3] T.M. Brooks, R.A. Mittermeier, G.A.B. da Fonseca, J. Gerlach, M. Hoffman, J.F. Lamoreux, C.G. Mittermeier, J.D. Pilgrim, and A.S.L. Rodrigues, "Global Biodiversity Conservation Priorities," *Science*, vol. 313, pp. 58-61 2006.

[4] K.R. Crooks and M. Sanjayan eds., *Connectivity Conservation*. Cambridge, University Press, 2006.

[5] D.D. Murphy and B.R. Noon, "The Role of Scientists in Conservation Planning on Private Lands," *Conservation Biology*, vol. 21, pp. 25-28, 2007.

[6] T.A. Gardner, T.I.M. Caro, E.M. Fitzherbert, T. Banda, and P. Lalbhai, "Conservation Value of Multiple-Use Areas in East Africa," *Conservation Biology*, vol. 21, no. 6, pp. 1516-1525, 2007.

[7] R.C. Buckley, *Adventure Tourism*, Oxford, CAB International, 2006.

[8] R.C. Buckley, *Environmental Impacts of Ecotourism*, Oxford, CAB International, 389 pp., 2004.

[9] A. Watson and W. Borrie, "Applying Public Purpose Marketing in the USA to Protect Relationships with Public Lands," *Nature-Based Tourism, Environment and Land Management*, R.C. Buckley, C. Pickering and D. Weaver, eds., Oxford, CAB International, pp. 25-34, 2003.

[10] M. Lockwood, G. Worboys, and A. Kothari, *Managing Protected Areas: A Global Guide*, London, Earthscan, 2006.

[11] R.C. Buckley, *Case Studies in Ecotourism*, Oxford, CAB International, 2003.

[12] E.C.M. Parsons and C. Rawles, 'The Resumption of Whaling by Iceland and the Potential Negative Impacts in Icelandic Whale-Watching Market,' *Current Issues in Tourism*, vol. 6, no. 5, pp. 444-448, 2003.

[13] N. Beaumont, 'The Conservation Benefits of Ecotourism: Does it produce Pro-Environmental Attitudes or are Ecotourists already Converted to the Cause? *Progress in Tourism and Hospitality Research : Proceedings of the Eighth Australian Toruism and Hospitality Research Conference*, Bureau of Tourism Research, Canberra, pp. 273-275, 1998.

[14] W.H. Lee and G. Moscardo, "Understanding the Impact of Ecotourism Resort Experiences on Tourists' Environmental Attitudes and Behavioural Intentions," *Journal of Sustainable Tourism,* vol. 13, pp. 546-565, 2005.

[15] T. Nevard, "The Mareeba Wetlands: Planning for Wildlife Management through Tourism," *Tourism in Parks: Australian Initiatives*, R.C. Buckley, ed., Australia, Griffith University, pp. 175-184, 2005.

[16] P.A. Lindsey, R.R. Alexander, J.T. du Toit, and M.G.L. Mills, "The potential contribution of ecotourism to African Wild Dog Lycaon pictus conservation in South Africa," *Biological Conservation,* vol. 123, pp. 339-348, 2005.

[17] J.A.P. de Oliveira, "Tourism as a Force for Establishing Protected Areas: the Case of Bahia, Brazil," *Journal of Sustainable Tourism*, vol. 13, pp. 24-49, 2005.

[18] E. Svoronou and A. Holden, "Ecotourism as a Tool for Nature Conservation: the Role of WWF Greece in the Dadia-Lefkimi-Soufli Reserve in Greece," *Journal of Sustainable Tourism*, vol. 13, pp. 456-467, 2005.

[19] C. Tisdell, C., C. Wilson, and H.S. Nantha, "Policies for Saving a Rare Australian Glider: Economics and Ecology," *Biological Conservation*, vol. 123, pp. 237-248, 2005.

[20] T. Allendorf, "Residents' Attitudes Toward Three Protected Areas in Southwestern Nepal," *Biodiversity and Conservation*, vol. 16, no. 7, pp. 2087-2102, 2007.

[21] T. Holmern, J. Nyahongo, and E. Roskaft, "Livestock Loss Caused by Predators Outside the Serengeti National Park, Tanzania," *Biological Conservation*, vol. 135, pp. 534-542, 2007.

[22] Spenceley, A. ed., *Responsible Tourism,* London, Earthscan, 373 pp. 2008.

[23] R.C. Buckley, "World Wild Web: Funding Global Connectivity Conservation," *Biodiversity and Conservation* (pending publication) 2008.

[24] O. Kruger, 'The Role of Ecotourism in Conservation: Panacea or Pandora's Box?', *Biodiversity and Conservation*, vol. 14, no. 3, pp. 579-600, 2005.

[25] J.D. Shultis and P.A. Way PA, "Changing Conceptions of Protected Areas and Conservation: Linking Conservation, Ecological Integrity and Tourism Management," *Journal of Sustainable Tourism*, vol. 14, no. 3, pp. 223-237, 2006.

[26] UNEP, *User's Manual on the CBD Guidelines on Biodiversity and Tourism Development*, 122 pp., 2007.

[27] Conservation Corporation Africa, 2008. "Reawaken Your Soul". http://www.ccafrica.com/.

[28] Wilderness Safaris, 2008. "Our Journeys Change People's Lives". http://www.wilderness-safaris.com/.

[29] A. Spenceley, A., "Impacts of Wildlife Tourism on Rural Livelihoods in Southern Africa," *Responsible Tourism*, A. Spenceley ed., London, Earthscan, London, pp. 159-186, 2008.

[30] P. Relly, "Madikwe Game Reserve, South Africa: Investment and Employment," *Responsible Tourism*, A. Spenceley, ed., London, Earthscan, pp. 267-284, 2008.

[31] H. Suich, "Tourism in Transfrontier Conservation Areas: The Kavango–Zambezi TFCA," *Responsible Tourism*, A. Spenceley, ed., London, Earthscan, 187- 204., 2008.

[32] Save the Rhino Trust, 2008. "Save the Rhino International," http://www.savetherhino.org/etargetsrinm/site/1/default.aspx.

[33] J.I. Barnes, "Community-based Tourism and Natural Resource Management in Namibia: Local and National Economic Impacts," *Responsible Tourism*, A Spenceley ed., London, Earthscan, pp. 343-360, 2008.

[34] P-J. Massyn, "Citizen Participation in the Lodge Sector of the Okavango Delta," *Responsible Tourism*, A. Spenceley, ed., London, Earthscan, pp. 225-238, 2008.

[35] F. Nelson, "Livelihoods, Conservation and Community-based Tourism in Tanzania: Potential and Performance," *Responsible Tourism*, A. Spenceley , ed., London, Earthscan, pp. 305-322.

[36] R.L. Pressey, M. Cabeza, M.E. Watts, R.M. Cowling, and K.A. Wilson. "Conservation planning in a changing world," *Trends in Ecology and Evaluation*, vol. 22, pp. 583-592, 2007.

Ralf C Buckley BA, MA (Cambridge), PhD (Australian National University). Director, International Centre for Ecotourism Research and Research Director, Climate Response Program at Griffith University, Australia. Member of World Heritage and IUCN Advisory Committees. Over 200 journal articles including Nature, Science, Ann. Rev. Ecol. Syst., J. Appl. Ecol., Ann. Tour. Res.; 12 books; >100 consultant reports. Lifetime research grants >US$5million; >200 sponsors. More info: www.griffith.edu.au/centre/icer.

Quiet struggles - conflicts between residents, visitors and protected and recreational areas' administrations

Elisabete Figueiredo

Abstract — The paper aims to discuss the conflicting situations which can occur between residents, visitors and political and administrative entities in protected and recreational areas, particularly in the ones located in remote rural spaces. Rural areas (both legally protected and without protection status) are increasingly valued in contemporary societies as environmental reserves. Consequently rural areas are progressively perceived as amenities and as objects of consumption mainly by urban or non local populations. The visitors' demands and consumptions of rural protected and recreational areas tend to prevail over the local populations' needs and aspirations in terms of socioeconomic development. The non coincidence between the desired and the lived rural environment tends to create a number of conflicts among the various stakeholders. These areas tend to become the scenario for both latent and manifest struggles, considering the contradictory perceptions, needs, interests and desires held by the different social actors. Based on empirical evidence from some Portuguese rural protected and recreational areas we will debate not only the existence of two clearly contrasting visions, but also the consequences these can have in terms of future social and economic development and environmental protection strategies.

Index Terms — remote rural areas, rural protected and recreational areas, social conflicts, social perceptions.

1. Introduction

Literature on conflicts between visitors, residents and political and administrative entities in protected and recreational areas' is not abundant. In fact, most of the literature on protected and recreational areas tends to emphasise the management of natural resources and/or to debate the need to monitor and manage visitor flows, often neglecting the prevailing species in many protected and recreational areas (especially in south European and in developing countries) – local inhabitants. Not surprisingly, the scarce literature on conflicts deals precisely with empirical evidence collected in rural areas of those same countries.

Based on data collected on some Portuguese rural protected and recreational areas, this paper aims to debate the conflicting situations which can occur among the various stakeholders, namely visitors, residents and political and administrative entities. Rural areas (either legally protected or not) are increasingly valued in contemporary societies as environmental and cultural reserves, playing important social functions to the society as a whole. Those functions are also, "recognized institutionally by political measures, programmes and policies designed for rural spaces" [1:159].

As a consequence, rural areas are more and more perceived as amenities and as objects of consumption mainly by urban populations. The visitor's demands, frequency and consumption of rural protected and recreational areas tend to confer to these areas a meaning that is not always in accordance with the perceptions of local populations. It also tends to prevail over the local popula-

Elisabete Figueiredo is with the Social, Legal and Political Sciences Department, University of Aveiro, 3810-193, Aveiro – Portugal. Email: elisa@ua.pt

tions' needs and aspirations in terms of socioeconomic development.

The non coincidence between desires and needs, between the rural demanded and the rural lived tends to create a number of conflicts, those areas becoming the scenario for latent or manifest struggles, considering the contradictory perceptions, needs, interests and desires held by the distinct stakeholders. Moreover, the different visions as well as the conflicting situations identified can have important impacts in terms of future social and economic development and environmental protection strategies.

2. RURAL PROTECTED AND RECREATIONAL AREAS AS AMENITIES AND OBJECTS OF CONSUMPTION

Due to the well known and well documented set of social and economic transformations, rural areas, particularly the remote ones, increasingly play a role of environmental and cultural reserves essentially for urban or non local populations. The functions now attributed to rural areas emerge directly from the so-called crisis of the rural world that, although dressing differently from one place to another, possess common characteristics, the most important being the loss of social and economic importance of agriculture (e.g. [2];[3]).

Rural areas tend to pass from food production spaces to areas more and more represented as moral, cultural and environmental reserves (e.g. [4]; [5]; [6];[7]). Although, "nature as long been a keystone in the social construction of rurality", [8: 272] nowadays the natural and environmental issues have gained a central role in the redefinition of the remote rural areas. This redefinition of rural and rurality is carried essentially by the populations of the more developed, industrialised and urbanised societies, that represent the rural as nature, as well as in an idyllic manner (e.g. [9]; [10]; [11]) in which once again the idealised environmental and cultural characteristics of the rural are central issues.

In this sense, one of the questions that could be raised about the growing social and institutional identification between rural areas, environment and recreation is the institution of legally protected areas (e.g. [1]). Even though one can argue that there is no direct correspondence between those two aspects, mainly for time lag reasons[1], there are several authors stating that the creation of protected areas in rural spaces is a consequence of the abovementioned identification[2]. Moreover, most protected areas within European Union are located in rural spaces[3], which means, in places that have inhabitants as well as social and economic activities[4].

The institution of protected spaces can be seen as playing an important role in the development processes of those same areas, thus constituting an important advantage. In fact protected areas generally attract numerous visitors and promote the development of recreation, leisure and tourism activities that can contribute to enhance the usually poor local communities' economy (e.g. [13]). Moreover, environmental protection plays an important role in preserving a common patrimony, often materialised in the conservation of unique and rare natural resources, wildlife species, landscapes and biodiversity. The value of protected and recreational areas is frequently determined by urban culture and it is intimately related with the perceived need for natural areas. These needs are often backed by scientific and State institutions, based on the definition of the 'common good' they attributed to rural areas. However, establishing rural areas as protected spaces implies the imposition of some regulations and restrictions that often come to collide with the practices, uses and needs of local inhab-

[1] In fact in most western countries (e.g. United States of America, France, Great Britan) the creation of protected areas occurred long before the current and widespread social interest on environmental issues and problems.
[2] For a more detailed discussion of this topic see [1].
[3] This is also a common situation in developing countries (e.g. [12])
[4] In fact, according to IUCN figures, more than 70% of protected areas worldwide are inhabited.

itants. In parallel, local population's point of view is also often neglected in the institution of their living areas as protected spaces. This situation[5] tends to provoke perverse effects both on population's practices and in natural values' conservation (e.g. [14]; [15]).

In spite of the fact that in theoretical terms the statute of protected area could act as a development mechanism, the fact is that many of those areas located in remote rural spaces could not stop the demographic, economic and social decline processes. In fact, "if one thinks that the majority of these landscapes are the result of centuries of interaction between Man and Nature, the disappearance of the traditional socio-economic uses supposes its immediate unbalance and impoverishment. These will lead (among other aspects) to changes in the vegetation dynamics and to the destruction of well rooted eco-cultural models", [16: 504] which were the primary factors that constituted those spaces as important to be protect. In addition, most of the rural protected and natural recreational areas were created accordingly with the same conservationist and naturalistic logics of not inhabited places. As Pimbert and Pretty say "the dominant ideology underpinning conservation has been that people are bad for natural resources. Policies and practice have, therefore, sought to exclude people and so discourage all forms of local participation. This style of conservation has neglected local people, their indigenous knowledge and management systems, their institutions and social organisation, and the value to them of wild resources". [14: 2]. The authors also argue that the costs of such conservationist logic have been high to environmental and natural resources itself. It is also a kind of authoritarian and external (to local people) logic and a moral imperative that local inhabitants hardly understand (e.g. [15]). This situation, in parallel with the neglecting of local people's needs, demands and aspirations can lead to important conflicts and tensions within the borders of protected areas. Moreover, as we suggest in previous works (e.g. [17]), although rural inhabitants may value natural resources in a different way from the urban populations and the State[6], the fact is that local people value and utilise natural resources in a sustainable way. Indeed, it is "when local people are excluded that degradation is more likely to occur[7]". [14: 15]. As Colchester states "the imposition of state controls on indigenous people not only leads to tensions between state agencies and local communities, but it also serves to undermine indigenous systems of resource control and management" [19: 111].

In spite of in many protected areas of the developed world, the dominant species are the visitors, in rural protected areas local population is often the prevailing group. This circumstance, along with the abovementioned arguments, clearly suggests that the demands, views and needs of local residents ought to be understand and, even more important, integrated in the measures and policies designed for those areas, both in what concerns socioeconomic development and environmental protection and conservation.

The frequent non coincidence between more global needs to protect nature and local needs of social and economic development is a powerful obstacle to managing protected and recreational areas and can as well contribute to disqualify the practices of local people, which have constructed and have been maintaining those spaces and their natural

[5] As common in developed countries, as in developing countries, in what concerns the institution of protected areas.

[6] We can say that rural inhabitants possess a more utilitarian perception of natural resources than urban populations. Those possess a more aesthetical vision of that same resources. See also the pioneer work of Dunlap and Tremblay, [18], for a better understanding of rural-urban differences towards environmental issues.

[7] In their work, Pimbert and Pretty [14] present several examples of the severe social and ecological impacts of excluding and neglecting local people from the protected territories.

resources for decades (e.g. [1]). Not take into account local population needs, perceptions and knowledge can also contribute to a new subordination of these local communities, already marginalised and vulnerable. Moreover, "many people living in and near protected areas perceived their interests as tangible and immediate and the 'common' interests as unclear and intangible. Underlying this view is the issue of distributive justice, including the widely held belief that 'common good' refers to elite special interest imposed on the rural poor". [15: 10]. This kind of argument clearly suggests that conservation and protection policies and measures need to address the perception (very common among local inhabitants) that residents on protected rural areas carry a disproportionate burden in terms of negative cultural, social and economic consequences. That argument also suggests that there are different (and often incompatible) perceptions on whether the environment can constitute an advantage or a vulnerability for rural development, and also that there are conflicting visions about what shape and content this development should assume. On one hand, local populations perceived the environmental protection of their living spaces as a constraint to economic development, as a factor of underdevelopment. On the other hand, for urban populations, for the State and for the management of protected areas, the environmental protection represents an important part of rural development itself (e.g. [20]; [13]).

3. QUIET STRUGGLES – CONFLICTS BETWEEN RESIDENTS, VISITORS AND PROTECTED AND RECREATIONAL AREAS' ADMINISTRATIONS

The abovementioned issues are common to almost every protected area in the world, in spite of the variety of its type, shape and content. In Portugal the institution of protected areas has been ruled by the same conservationist logic that tends to disaffect, symbolically but also with important material effects, the protected territories from the wider social and economic fabric as well as from the broader development processes (e.g. [1]). Consequently it excludes local populations and their needs, inducing several conflicts and tensions between different interests and legitimacies. In order to discuss and assess these conflicts, tensions and struggles, we use evidence collected from three Portuguese rural areas: the Natural Park of Montesinho (NPM) and Natural Park of Alvão (NPAL), protected areas; and Serra da Freita, listed in the Natura 2000 Network[8].

The three areas can be classified as remote rural spaces, sharing many social, demographic and economic characteristics, such as serious population losses since the 60's; a severe process of ageing; loss of agriculture economic and social significance. The areas can also be characterised as mountain areas with limited accessibilities, services, equipments and infrastructures. In spite of that (or precisely for that reason) all the three areas attract numerous visitors.

Taking into account what we argue in the previous sections, we may state that in the three areas there is a clear distinction between the rural as lived and the rural as desired and visited. Moreover, taking the status differences into account, we can identify another distinction between the rural lived and visited as protected and exceptional and the rural lived and visited as ordinary space. These differences also bring about the occurrence of distinct types of perceptions, tensions and struggles which can be summarized in the following:

- The representations and practices of the visitors often neglect the areas' productive and inhabited character;

[8] Empirical evidence was collected in the three areas through the application of questionnaires to inhabitants and visitors, using the quota sample method based on criteria such as sex, age, literacy level and profession (Nresidents= 501); Nvisitors=300). We also conducted 40 structured interviews to Natural Parks' administration; parish representatives and local development associations' coordinators. For a more detailed explanation on methodological and technical procedures underlying the studies see [1], [13], [17], [21].

- Visitors identify the three areas, regardless of their protection status with nature, although this circumstance is more evident in the two natural parks;
- Visitors frequency and consumption of the three areas are essentially related to natural and environmental qualities, disregarding the rural socioeconomic characteristics;
- Conflicts between visitors and inhabitants are more visible in the non protected area, due to the absence of regulations to control visitors practices;
- In the protected areas, conflicts tend to occur more between inhabitants and the administration bodies, due to the existence of regulations imposed on residents practices and uses;
- In the protected areas, visitors tend to agree completely with the rules in force to protect and preserve natural aspects, while inhabitants present a much higher level of disagreement with the same regulations;
- Inhabitants perspectives, views and needs are often neglected by the State and its agencies and bodies in what concerns both environmental protection and development strategies;
- In the protected areas, the majority of the inhabitants is not informed about the regulations in force, due to the absence of communication channels and strategies;
- Visitors' legitimacies tend to impose (although in a quiet form) to residents' legitimacies in conservation and development measures.

The majority of the conflicting situations in NPM and NPAL are related to construction; felling of trees, damages caused in crops by wild animals; inhabitants' perception of an unfair distribution of the benefits of the protection status and inhabitants' perception of the unequal importance attributed by Parks' administrations to natural aspects conservation vis-à-vis peoples' protection[9].

For Natural Parks' residents it is clear that the institution of their living space as protected comes to collide with their daily uses of the territory and natural resources. On the other hand, the majority of the inhabitants considers that "a bird worth more than a person[10]".

Conflicts in the non protected area are, as stated before, of a different character. In fact, they tend to occur frequently between visitors and residents, due to the recreational and leisure activities developed by the former (e.g. picnics, rallies, cross-country caravans, motocross racings, etc) which come to collide with local social and economic habits and activities.

Although the studied cases reveal several types of conflicting situations, related to the areas' different status of protection, empirical evidence permits to conclude that the major conflicts among the various stakeholders are related with differing perceptions of nature, environment and rural development. These different perceptions lead to quiet struggles[11] about what should shape the future of rural protected and recreational areas for both visitors and inhabitants. Conflicting urban and rural perceptions about nature, environment and development processes are strongly related to the socio-economic characteristics of individuals, as well as to differentiated experiences and ideologies. For local inhabitants nature and environment are mainly viewed as resources, fundamental to their daily practices and subsistence. Visitors perceive those aspects from an aesthetical point of view, also representing rural areas as open, natural spaces that

[9] A similar type of conflicting situations was identified by Finger-Stich and Ghimire [22] on the Cévennes National Park and on the Pilat Natural Regional Park, both in France.

[10] This expression is used by Ojeda-Rivera [23] about the inhabitants' perceptions on the National Park of Donaña, in Spain. In the same sense, one of the inhabitants interviewed in NPM stated that "for them [the Park administration] a boar is more important than a person".

[11] Quiet because difficult to measure, in one hand, and because most of the times, they do not materialise in concrete and clear disputes, on the other hand.

must be preserved in order to their needs, dreams and desires. Moreover, these external perceptions and needs are often transposed to institutional discourses and practices towards rural protected and recreational areas, through policies, programs and measures which neglect, at the same time, local populations points of view. One immediate consequence is that local populations, already vulnerable and suffering from a diversity of constraints imposed by their living areas' characteristics and transformation paths, consider themselves not as proud guardians of a common patrimony but instead as secondary actors (assuming the natural elements the leading roles), 'decorative elements' of rural landscapes for recreational purposes (e.g.[22]).

4. Conclusion

The constitution of rural areas as aesthetical objects of consumption, mainly due to their environmental aspects, has caused an increase of demand and frequentation of those areas mostly by urban populations. These usually have interests, needs, expectations, perceptions and desires that are in dissonance with the local inhabitants' own needs, interests, perceptions and practices. Such situation tends to provoke several types of conflicts or struggles regarding the rural and its environment as well as regarding its future development paths.

From the theoretical and empirical evidence discussed in the previous sections it is possible to conclude that there is a rural to live and a rural to visit and in the last case there is also a rural to visit as protected and extraordinary and a rural to visit as vulgar space. In fact, conflicts and struggles (although latent or quiet in the majority of the cases) occurred in a different way and for distinct motives in protected and in non protected spaces, even though their similar recreational potential and functions. In the first case conflicting situations tend to occur mainly because the absence of regulations that control visitors' practices and behaviours. In the second case, struggles occurred more often between local inhabitants and Protected Areas' managers precisely because of the existence of those regulations which are imposed to residents' daily practices and uses of local territories and natural resources.

The data analysed before bring to the fore the debate on whether environmental and natural functions of rural areas could represent a potentiality or a vulnerability. This discussion becomes more relevant if one considers that those functions mainly serve external needs and desires, not representing an asset (but rather a clear constraint in most cases) for local populations. On the contrary these functions often place rural protected and recreational areas inhabitants in a subaltern position regarding both urban populations and the broader social and economical development strategies designed by State bodies and agencies.

As we argued in previous works (e.g. [1], [13] and [17]) if, on one hand, it is not possible to deny the importance of nature conservation and environmental protection measures, as well as the relevant functions rural areas have in that matter, on the other hand it is vital to discuss the need to protect people in protected areas, exploring new and more inclusive forms and types of protection mechanisms and regulations. This is even more important when one considers that local inhabitants always have played the leading role in maintaining and preserving the resources, landscapes and characteristics nowadays valued by the society as a whole.

References

[1] E. Figueiredo, "Imagine There's No Rural – The Transformation of Rural Spaces into Places of Nature Conservation in Portugal", European Urban and Regional Studies, vol. 15, no. 2, pp. 159-171, Apr. 2008.

[2] M. Mormont, "Incertitudes et Engagements – Les Agriculteurs et L'Environnement, une Situation de Transaction", Vie Quotidienne et Démocracie – Pour une Sociologie de la Transaction Sociale, M. Blanc et al., eds., Paris, L'Harmattan, pp. 209-234, 1994.

[3] M. Jollivet, "Les Métamorphoses d'un Rural Incertain", Vers un Rural Postindustriel – Rural et Environnment en huit Pays Européens, M. Jollivet, dir. Paris, L'Harmattan, pp. 351-371, 1997.
[4] J-C. Chamboredon, "Les Usages Urbains de L'Espace Rural : du Moyen de Production ai Lieu de Recreation", Revue Française de Sociologie, 21, pp. 97-119, 1980.
[5] R.H. Butler and C.M. Hall, "Image and Reimaging of Rural Areas", Tourism and Recreation in Rural Areas, R.H. Butler et al., eds., Chichester, John Willey&Sons, pp. 115 – 122, 1998.
[6] R.H. Butler, C.M. Hall and J.M. Jenkins, "Introduction",", Tourism and Recreation in Rural Areas, R.H. Butler et al., eds., Chichester, John Willey&Sons, pp. 3 - 15, 1998.
[7] E. Cudworth, Environmental Sociology, London, Routledge, 2003.
[8] M. Woods, "Conflicting Environmental Visions of the Rural: Windfarm Development in Mid Wales", Sociologia Ruralis, vol. 43, no.3, pp. 271 -188, 2003.
[9] K. Halfacree, "Locality and Social Representation: Space, Discourse and Alternative Definitions of the Rural", Journal of Rural Studies, no. 9, pp. 1 – 15, 1993.
[10] K. Halfacree, "Talking about Rurality: Social Representations of the Rural as Expressed by Residents of six English Parishes", Jounal of Rural Studies, no. 11, pp. 1 – 20, 1995.
[11] M. Phillips et al. "Putting Together Ruralities: Towards a Symbolic Analysis of Rurality in the British Mass Media", Journal of Rural Studies, no. 17, 1 -21, 2001.
[12] K.B. Ghimire and M.P. Pimbert, eds., Social Change and Conservation, London, Earthscan Publications Ltd, 1997.
[13] E. Figueiredo, "Cómo Proteger a las Personas en las Áreas Protegidas? El Medio Ambiente como Vulnerabilidad en dos Àreas Protegidas Portuguesas", Agrosociales, accepted for publication (pending publication).
[14] M. P. Pimbert and J.N. Pretty, Parks, People and Professionals – An International Assessment for Resource Management, Policy and Research, Geneve, discussion paper 57, UNRISD/IIED/WWFN, 1995.
[15] P. R. Wilshusen et al., "Reinventing a Square Wheel: Critique of a Resurgent 'Protection Paradigm' in International Biodiversity Conservation, Society and Natural Resources, vol. 15, no. 1, pp. 15 – 40, 2002.
[16] V. C. Diéguez, "Los Espacios Naturales Protegidos: el Dilema entre la Conservación y el Desarrollo Local", Dinamismos Sócio-Económicos e (Re)Organização Territorial: Processos de Urbanização e Reestruturação Produtiva", IEG/FLUC, eds., Coimbra, pp. 501 – 510, 1996.
[17] E. Figueiredo, Um Rural para Viver, Outro para Visitar – o Ambiente nas Estratégias de Desenvolvimento para as Áreas Rurais, PhD dissertation, Univerity of Aveiro, 2003.
[18] R. E. Dunlap and K.R.Tremblay, "Rural-Urban Residence and Concern with Environmental Quality: a Replication and Extension", Rural Sociology, vol. 43, no. 3, pp. 474 – 491, 1978.
[19] M. Colchester "Salvaging Nature: Indigenous Peoples and Protected Areas", Social Change and Conservation, K.B. Ghimire and M.P. Pimbert, eds London, Earthscan Publications Ltd, pp. 97 - 130 1997.
[20] E. Figueiredo, "Struggling for Rural Environment: Conflicts between Desires and Needs in Portuguese Rural Areas", Proc. Farming in Rural Systems Research and Extension – European Farming and Society in Search for a New Social Contract – Learning to Manage Change, pp. 311 – 324, 2004.
[21] E. Figueiredo and S. Valente, "Living in Paradise - Perceptions of the Alvão Natural Park Inhabitants about the Environmental Protection status of their living area", XXI Congress of the European Society for Rural Sociology – A common European countryside?, Keszthely, Hungria, oral presentation, 2005.
[22] A. Finger-Stich and K. Ghimire, "Local Development and Parks in France", Social Change and Conservation, K.B. Ghimire and M.P. Pimbert, eds London, Earthscan Publications Ltd, pp. 158 – 186, 1997.
[23] J. Ojeda-Rivera, "Protection ou Developpement: Le Faux Dilemme du Parc Nationale de Donaña et de sa Région", Du Rural à L'Environnement – La Question de La Nature Aujourd'hui, N. Mathieu and M. Jollivet, eds., Paris, L'Harmattan, pp. 275-278, 1989.

Elisabete Figueiredo - Sociologist and PhD on Environmental Sciences. Since 1990, she is a lecturer and researcher at the University of Aveiro. Currently she is Assistant Professor at the Social, Legal and Political Sciences Department in the University of Aveiro. She is author or co-author of more than 50 papers published in journals and books as well as presented in national and international conferences. She is involved in EU and national funded research projects, mainly on the integration of social perceptions and practices in natural resources management strategies and measures. Her current research interests are related to rural and environmental sociology; social perceptions of environmental issues; rural development and rural tourism. She is member of the director board of the SPER – Portuguese Society for Rural Studies; Co-ordinator of the Environment and Society Section of the APS – Portuguese Sociological Association and member of the ESRS – European Society for Rural Sociology.

The role of agent-based simulation in recreational management and planning

Hans Skov-Petersen

Abstract — It is expected that agent-based simulation models will be increasingly implemented during planning and management of visitor landscapes. This expectation is based on a) changes of recreation towards greater visitation levels and more complex settings in terms of stake-holder interests, recreational behavior types and a higher focus on protection of biodiversity, b) technological development of digital equipment, and c) a changing approach to nature planning and management to be more open, inviting and aimed at stake-holder and public participation. Based on these three lines of sight, the paper will discuss future trends in application of ABM's in recreational management and planning.

Index Terms — Agent based models, ABM, simulation, recreational management and planning

1 Introduction

This paper is about the present and future role of agent-based simulation models (ABM's) in recreational management and planning. A founding pillar of the paper is the work carried out during the compilation of the book 'Monitoring, Simulation and Management of Visitor Landscapes' [6] co-edited by Professor Randy Gimblett of the University of Arizona and my self. I want to express my gratitude especially to Randy and also to the contributing authors for a very inspiring collaboration.

In the paper I will assess a number of issues related to ABM's in the context of visitor landscapes. I will discuss observations and express views on the present state and provide some considerations of what will – or should – be the potential directions for the future development. I would like to stress that I do not see this as only including development of the technical capabilities of the software. Further development will to a very high extent also include focus on behavioral epistemology on one hand and the human and organizational context to which the models is intended to be applied to on the other.

It is expected that there will be an increasing interest in application of ABM's in relation to recreation. Drivers for such a future development include:

- Changes in recreation due to
  - Increased pressure on nature as a consequence of population growth and urban sprawl
  - Increased participation in recreation
  - Diversification and specialization of recreational activities
  - Environmental change, for instance in relation to global climate change
- Technological enhancements
  - Computer power (CPU speed, RAM and storage)
  - Software development frameworks (Object Oriented Programming, gener-

*Hans Skov-Petersen is with forest and landscape Denmark, University of Copenhagen. Email: hsp@*life.ku.dk

al purpose ABM-platforms and libraries, and Internet based visualization, interaction, cascading etc.)
  - Monitoring and sampling devises (GPS, automatic counting, CCTV, etc.)
- Changes in planning and management paradigms
  - Multi stake holder involvement
  - Public participation
  - Environmental education and awareness

After a brief review of motivations to apply models in general - ABM's in specific - in the following section, the paper will proceed with a discussion of these three main drivers (changes in recreation, technology and management/planning paradigms) and their possible implications on future development of ABM's in relation to recreational management and planning.

2 WHY MODEL AT ALL?

One way to define the concept of 'models' – of which agent-based simulation models is a sub-category – is that they are idealized representations that takes up less 'space' than the phenomena they represent. The space can be in terms of concepts, data, processes, etc. Which components to include or excluded, and to which degree of detail they are represented will – of course – be a matter of the phenomena modeled and the issues in focus. A non-exhaustive list of reasons to embark on modeling includes:

- By simplification and idealization to focus on issues of interest and thereby gain knowledge and insight.
- To compensate for lack of data (for instance in situations where data from remote locations are hard or expensive to obtain)
- To test possible future situations (construction of scenarios)
- To use the models' idealized image of real-world phenomena as a platform for communication including environmental learning situations, behavior studies in cyber space, participatory planning processes etc.

A discussion of these broad motivations in more direct relation to recreation can be found in [10] and [18].

Agent-based models are constituted by the individual actors of the system represented. A premises is that it is the behavior, abilities, preferences and motivations of a set of individual components that is know and that it the 'reaction' of the 'system' that is of interest. For instance we assume to know the probability by which campsites will be frequented by visitors from a given entry point; the 'systems response' we are looking for could be at which locations of the path network a high frequency of encounters will take place.

3 CHANGES IN RECREATION

Whereas the earliest recreational behavior models were aimed at fairly extensively used nature areas [21] several of present day systems are developed for and applied to more urbanized settings including high use nature areas [20], urban forests, city parks and even botanical gardens [11] [1]. These types of areas are often characterized by much higher visitation levels; more diversified types of recreational activities and a higher management level including more dens and sometimes more segregated path networks. Whereas earlier models designed for less intensively used environments were based on *probabilistic agents* precoded to follow specified tracks to predefined location, this complexity calls for more focus on the underlying behavioral processes of the recreational activities. This goes for both the motivations and preferences behind activity types and user groups [7]

[1] Here in fact development of recreational simulation models meets models developed for pedestrian simulation in urban settings including street festivals [2], train stations [4] and museums [2].

and the choice processes guiding the selection of recreational destination [8] and when moving around inside the recreational area [9 and 20]. Settling motivations and choice processes enables design of *rule-based agents* which will behave in accordance with their motivation and abilities on one hand and information perceived from the environment and other agents. Rule-based agents can be *goal-oriented*, striving to fulfill a given objective (for instance to shoot a bear [15]). Often recreation – at least as part of daily life activities – is not driven by achievement of specific goals in terms of locations to go to or utilities to obtain. Frequently the time spend as enjoyable as possible is the goal by itself. In that case the focus must be on the (spatial) choices made to enhance the appreciation of the trip in accordance with preferences of the agent type in question (see for instance [9] or [20]).

Choices are based on perceived local information (for instance characteristics of optional path segments connected to a junction to the path network) and global knowledge (for instance the approximate location of the trip's point of origin). It appears that the distinction between local and global knowledge still have to mature in the modeling community. An example could be application of a route between a point of origin in a path network and a destination. Applying a generic GIS-based search for the shortest route assumes perfect, global knowledge of the agent (from e.g. a map or by knowing the area). A newcomer would have to make choices based on what appears to be the most feasible looking at options from the present junction. Another example is the search of the most appreciably route based on global knowledge of the entire area is a different situation than choosing path segment one by one, based on local information from the immediate surrounds of the actual location of the agent. Without a distinction between perceived local information and global knowledge it will be impossible to assess situation where different attitudes of well acquainted locals and 'tourists' visiting an area for the first time. Further the effect of providing 'global knowledge' to visitors (for instance in the form of leaflets, maps etc.) will be hard to model.

Overall representing knowledge is rarely considered as a specific issue in relation to simulation of recreational behavior. How perceived information is compiled to knowledge, how it is stored, applied and communicated are topics that are intensively discussed in relation to general agent-based modeling and Artificial Intelligence [1], but – as observed above – rarely in relation to recreational ABM's. Cases where representation and handling knowledge about nature areas is important include effect of:

- different signage strategies
- maps and brochures
- knowledge exchange between visitors
- knowledge exchange between stake holders

The close relation between use and disturbance is an ever present core of planning and management of recreation in nature. Simulation models of wildlife behavior on one side and visitor behavior on the other have developed separately; both in terms of the applications developed and the scientific groups involved. A range of examples exists where animal and visitor models have been loosely coupled (for instance [16]), but models that dynamically and concurrently models both wildlife and visitor behavior is yet to be seen [20].

4 TECHNOLOGICAL ENHANCEMENTS

Following Moore's law (the number of transistors that can be crammed onto an integrated circuit is doubled every 2 year [14]) almost every capability of digital equipment is increasing dramatically. This goes for CPU speed, memory capacity, digital camera resolution etc. Accordingly the size and complexity of the applications (including ABM's) that can be executed will increase. Size in term of the number of agents that can exists concur-

rently in a model, the scale, geographic size, and the number of layers of the environment that can be included; complexity in terms of different agent types and perceptive/comprehensive/reactive capabilities agents can be given. Further more options will be given to program agent's learning/memory/communicative capabilities. The massive development of Internet applications – not the least in the direction of geographic capabilities (for instance GoogleMaps [22]) raises expectations of more communicative and end-user oriented development of ABM's.

The number of simulation systems or platforms for developing ABM's is still increasing; both in terms of toolkits and more or less complete applications. Toolkits include well known systems like SWARM and Repast, but also an incredible number of other options. The toolkits are supplied as libraries and API's and requires a substantial amount of programming knowledge and effort. The advantage is a much higher control over the systems capabilities, than in cases of more fully developed systems. Another advantage is that toolkits allow for further integration with other toolkits for instance GIS-packages. On the other hand a number of open source/freeware ABM packages, including StarLogo and NetLogo, are available serving as general purpose platforms, with limited development potentials.

For a more comprehensive discussion of available software options relevant to ABM development, refer to [3].

Packages/systems presently in use for recreational simulation include

- RBSim (Recreation Behavior Simulator) [5], developed by Randy Gimbeltt and Robert Itami, has in various versions been applied to a range of case studies throughout North America and Australia over the last decade.
- MASOOR (Multi Agent Simulation of Outdoor Recreation) [9] developed by Alterra of Wageningen University and Research Centre (Holland), has been used for studies of recreational behavior in high visited nature areas in a number of Western European countries.
- iRAS (Intelligent Recreational Agent Simulator) [11], based on the commercial software JACK™, developed by the University of Melbourne. Applications include a model of the Royal Botanical Gardens in Melbourne.
- Extend [10] has been used for modeling visitor behavior in North American parks. It is a commercially available, generalized simulation software, which in this case can be applied to ABM.
- Kvintus.org is developed by a team at the University of Copenhagen (Denmark) [20]. It is based on the simulation toolkit Repast and is a present applied to a number of Danish nature areas of high use levels.

All examples mentioned above are based on visitors' movement along a predefined transport network (which most frequently represents a path- or road network). In cases where animal behavior and/or off track visitor behavior is included in the model this vector-based core has to be extended to include a raster representation of the landscape in general. In Kvinuts.org raster-based behavior is applied to roe deer and will be developed further to enable visitors' off track movement. If wildlife disturbance is to be an issue in future simulation models such raster/vector integration is a mandatory point of development.

The technological development also includes a range of new equipment for monitoring/tracking: GPS both as dedicated devises and integrated in other electronic devises (for instance mobile telephones) appear to be among the most promising. In applications reported to date tracks obtained from GPS-equipment has been used entirely for qualification model results (i.e. visitor loads on path segments registered by GPS has been used to validate results of simulation models, see e.g. [9]). It can be expected in the future where a greater amount of tracks through visitor landscapes can be obtained, that e.g. choice

and preference parameters can be revealed and applied to ABM's. The expectation of access to greater volumes of tracking data is based on reduction of the price of equipment and/or data handling, or by access to 'tracks' of visitor' mobile telephones.

For a comprehensive assessment of devises and methods applied to visitor monitoring and simulation refer to [19] and [23].

5 CHANGES IN PLANNING AND MANAGEMENT PARADIGMS

Managing and planning nature is no longer just an endeavor of the legal managers or owners of the land. Nature conservation and public access to enjoy nature is a matter of great public interest. Further the way nature is managed often has a significant impact on other issues of physical planning including economy (timber production), ground water protection, CO_2 demobilization, protection of biodiversity, protection of indigenous peoples' right etc. Accordingly the tools applied to optimize resources and to resolve conflicts must be more than just deterministic 'machines', leaving no space for debate or alternative views. There is an expectation of ABM's to have a major potential in relation to planning processes. This is mainly due to this model types' transparency due to its basics on the individual agent. It is relatively easy to accept the models outcome if the behavior of the premises of the individual agent is accepted. Pröbst et al [17] lists 11 key factors that has shown to be important for the potential success of ABM application. Including (non exhaustive):

- Complexity of the management tasks
- Diversity of factors determining visitor behavior
- Size and type of area
- Number of anticipated/planned changes
- Planning process diversity

In general it is concluded that the more diverse a physical setting, the behavioral factors, planning themes and process, the more likely it is that the application of ABM's will be successful [17].

Model builders – including those constructing GIS-models for spatial decision systems – are often wondering why so few of the expected end-users are actually picking up the new 'toys'. Macmillan [12] for example, wonders why so few urban planners actually use the analytical capabilities of GIS while millions of copies of PC programs like SimCity can be sold. He concludes that 'It is a nice irony that as modelling has fallen out of favour with academic greybeards, children have taken up the challenge'. While focusing on individual behaviour commonly associated with ABM's, they closely resemble the functionality of computer games. Accordingly there is an expectation that the comprehensiveness of ABM's can be accepted to a higher extent than more aggregated models used in the past to support planning. Further it is apparent that ABM's could play a role in the future to aid learning processes – both in schools and colleges, and as part of professional training and public awareness campaigns[13]. Students or planning participants could be allowed to 'play' with the future and thereby not only search for solutions to present or future challenges, but also immediately see the 'global' effects of local actions. The agent-based approach would allow for assessment of global effects of individual actions. For instance school children could ask: 'What would this area look like in ten years, if I threw five pieces of litter every time I visited it, and everybody else the same?'. Or motor enthusiasts could ask: 'How many hikers will be disturbed if I and 10 other parties per weekend would be allowed to ride our ATV's on the AT?'.

6 CONCLUSIONS AND PERSPECTIVES

The technological capacity of computing is increasing at a breathtaking speed. Parallel to these rapid technological changes is our

growing understanding of the complexes of motivations, preferences, choices etc. behind visitor behavior in recreation settings. Finally key planning and management concepts – at least in the developed and democratic parts of the World – are openness and participation, especially in relation to local planning and management. Stake holders and laypersons are to a much higher extent than earlier invited to play an active role when management- and strategic plans are formulated.

Agent-based simulation models are highly capable of handling complex behavioral phenomena, and at the same time well suited for open and participatory problem solving and have been shown to lead to a more thorough understanding of ecological and social processes. Driven by these three concurrent forces there is a *tremendous opportunity now and in the near future* to further develop and apply ABM to facilitate recreational planning, management and protection of the natural resource. No matter how much our computational power will evolve, how much we invest in the understanding of complexities of behavioral psychological theory, and how much time is spent applying this technology, a measure of success will be achieved only if computer scientists, geographers, biologists, behavioralists, planning process specialists and of course planners and land managers work together towards a common goal.

It appears that assessment of the quality of ABM's to date has been focused on how well aggregate model results corresponds to real-world monitoring data. If – as expected – there will be an increased focus on the communicative and participatory potentials of simulation model, we must in research to come, set the scene to enable structured and systematic assessment of the quality of the systems in terms of benefits they provide to the planning processes they are applied to, and ultimately the quality of the resulting plans and management strategies.

References

[1] Artificial intelligence. http://en.wikipedia.org/wiki/Artificial_intelligence. Last accessed August 2008.

[2] Batty, M. 2003. Agent-based pedestrian modelling. In Longley, P. and Batty, M. 2003. Advanced Spatial Analysis. ESRI Press.

[3] Castle, C.,J.,E. and Crooks, A.,T. 2006. Principles and concepts of agent-based modeling for developing geospatial simulations. CASA, University college London. 59 pp. URL: http://www.casa.ucl.ac.uk/publications/workingPaperDetail.asp?ID=110. Last access July 2008.

[4] Catsle, C.J.E. 2006. Developing a prototype agent-based pedestrian evacuation model to explore the evacuation of King's Cross St. Pancras Underground Station. CASA working paper nr. 108. URL: http://www.casa.ucl.ac.uk/working_papers/paper108.pdf. Last accessed July 2007.

[5] Gimblett, H.R., Richards, M.T. and Itami, R.M. 2001. RBSim: Geographic simulation of wilderness recreation behavior. Journal of forestry. 99(4): 36-42.

[6] Gimblett, R. and Skov-Petersen, H. 2008. Monitoring, Simulation, and Management of Visitor Landscapes, The University of Arizona Press.

[7] Elands, B and van Marwijk, R. 2008. Keep an Eye on Nature Experiences: From Theory to Implications for Management and Simulation

[8] Hunt, L. 2008. Choice models: Estimation, evolution, limitations and potential application for simulation modeling. In [6]

[9] Jochem, R. van Marwijk, R. Pouwel, R and Pitt, D. 2008 MASOOR: modeling the transaction of people and environment on dense trail networks in natural resource settings. In [6].

[10] Lawson, S.R., Hallo, J.C. and Manning, R.E. 2008. Measuring, Monitoring and Managing Visitor Use in Parks and Protected Areas Using Computer-Based Simulation Modeling. In [6].

[11] Loiterton, D. and Bishop, I. 2008. Simulation, calibration and validation of recreational agents in an urban park environment. In [6].

[12] Macmillan, B. 1996. Fun and games: seroious toys fro city modelling in a GIS environment. In Longley, P and Batty, M. (eds) Spatial analysis: Modelling in a GIS environment. Geoinformation International.

[13] Manning, R.E. and Potter, F.I. 1984. Computer simulation as a tool in teaching park and wilderness management. Journal of environmental education. 15(3): 3-9.

[14] Moore's law: http://en.wikipedia.org/wiki/Moore%27s_law. Last accessed August 2008.

[15] Nelson, R. Sharp, C. Prew, C. and Gimblett, R. 2008. Balancing Increased Visitor Use and Wilderness Character using Simulation Modeling in Misty Fjords National Monument. In [6].

[16] Pouwels, R. Jochem, R. and Opdam, P. 2008. Linking ecological and recreation models for management and planning. In [6]
[17] Pröbstl, U, Visschedijk, P. and Skov-Petersen, H. 2008. . Agent-based Modeling – views from the management perspective. In [6]
[18] Skov-Petersen, H. and Gimblett, R. 2008. Introduction. In [6]
[19] Skov-Petersen, H. 2005. Feeding the agents – collecting parameters for agent-based models. Computers in Urban Planning and Urban Management (CUPUM). http://128.40.59.163/cupum/searchPapers/papers/paper60.pdf
[20] Skov-Petersen, H., Kefaloukos, P. and Snizek, B. 2008. Kvintus.org - a choice based agent-based simulation model integrated with Google Maps. Reseedings for MMV4 (in the present volume).
[21] Van Wagtendonk, J.W. and Cole, D.N. 2005. Historical development of simulation models of recreation use. In Cole, D. (compiler), 2005. Computer simulation modeling of recreation use: Current status, case studies, and future directions. USDA. Forest service. Rockey mountain research station. General technical report RMRS-GTR-143. 75 pp.
[22] www.google.maps, last accessed august 2008.
[23] Xia, j. and Arrowsmith, C.A. 2008. Techniques for counting and tracling the spatial and temporal movement of visitors. In [6].

Hans Skov-Petersen Ph.D. Geography (2002), M.Sc. Horticulture (1989). County of Funen (1989-1990), CADPOINT inc. (1990-1992), Land Use Planning Project, Bhutan (1992-1995), Forest and Landscape Denmark (1995-date). Editor in charge: Perspektiv (Danish GIS-Magazine). 23 international papers (14 with review). Books: Visitor monitoring in nature areas – a manual based on experiences from the Nordic and Baltic countries (2007). Forest recreation monitoring – a European perspective (2008). Monitoring, Simulation and Management of Visitor Landscapes (2008). Interests: GIS, Spatial/temporal analysis, recreational monitoring and modeling.

Monitoring visitor-flows in Tuscany's forests: preliminary results and clues

Giovanni Sanesi, Marco Fiore, G. Colangelo and Raffaele Lafortezza

Abstract — In 2006, the Tuscany Region through its Agency for Agriculture and Forestry (ARSIA) has lunched a tool supporting the process of planning and managing forest areas within the region: RAFT – "RApporto sullo stato delle Foreste in Toscana" – Report on the status of Tuscany forests. The RAFT aims to monitor the status of forests and their main functions and services in relation to ecological and social aspects. This monitoring process has now reached its third year. Within the theme of "Environment and society", the RAFT has analysed a number of indicators (following the P-S-R framework) related to the flows of visitors in Tuscany's forests. Analyses show the relevance of forest areas in the region especially within protected areas. In this paper, we report a brief description of the RAFT and the some preliminary results related to the analysis of past and current flows of visitors in protected areas and hunting sites. We discuss the main strengths and the weaknesses associated with the past and current policies for managing visitors' flows and propose new strategies to disseminate information and attract visitors during different seasons.

Index Terms — Protected area – Forest resources – Environmental indicators – Forest Information System – Tuscany Region

1 Introduction

Since 2006, the Tuscany Region through the Agency for Agriculture and Forestry (ARSIA – Regione Toscana: http://www.arsia.toscana.it) has lunched a tool supporting the process of planning and managing forests and protected areas within the region: RAFT *RApporto sullo stato delle Foreste in Toscana – Report on the status of Tuscany forests*.

As a main goal the RAFT aims to monitor the status of forests and their functions and services in relation to ecological and social aspects. This monitoring process has now reached the third year and, for the first time in Italy, the RAFT has involved a wide range of stakeholders (160 people in total) coming from research, industry, policy, NGOs and co-operatives. In addition, the RAFT has allowed promoting a multiple and sustainable use of forests, thus emphasizing the cultural heritage associated with these resources.

In the first issue, eleven working groups have been established on the basis of the following themes:

- Legislation and policy
- Regional forest programs
- Forest management
- Arboriculture
- Forest diseases
- Forest fires
- Industry and forest jobs
- Wood products
- Non-wood products
- Environment and society
- Regional forest information system.

Each theme has been analysed through various steps, such as:

- Brief introduction
- State of the art
- Comparison with the other regions
- Results of the previous forest policies

G. Sanesi, M. Fiore, G. Colangelo, and R. Lafortezza are with the University of Bari, Department of Crop Production Science. via Amendola 165 - 70100 BARI ITALY. E-mail: sanesi@agr.uniba.it

- Current activities
- Main strengths and weaknesses.

In the second issue, the RAFT maintained the same approach and themes with few minor changes and improvements. The number of people involved in the definition of the various themes increased from 160 to 210.

2 VISITOR-FLOWS IN TUSCANY FOREST

2.1 Methods and statistics

Within the theme of "Environment and society", the RAFT has considered some indicators related to visitor-flows in Tuscany forest. Specifically, the working group in charge of this task has set a number of requirements such as the need to select indicators describing the Status (S) of forest resources; the Pressures (P) placed by visitors on forest areas; and the Response (R) of the policy sector for preserving the current status of forests. This type of indicators system (P-S-R) is well known and widely used in the public sector, such as reports on the status of the environment.

As an additional requirement, the working group has discussed the need of communicating the status of Tuscany forests to visitors and (potential users).

One of the main indicators of Status is related to the protected areas in terms of number, extent and typology. [Tab. 1] This is because protected areas have been identified as one of the main attractors of visitor-flows. Besides protected areas a number of hunting sites have been included.

As for the indicators of Pressure, the working group has considered the number of people visiting protected areas and hunting sites per year [Tab. 2]. Another indicator of Pressure is the number of authorizations issued by the Tuscany Region to collect mushrooms and truffles [Tab. 3].

The indicators of Response have been defined in terms of infrastructures that support this type of tourism. In particular, the following indicators have been analysed:

- Regional hiking network (Rete Escursionistica Toscana - RET) in terms of extension (Km) and density [Tab. 4] [Tab. 5];
- Number of visitor centres of the protected areas [Tab. 6] [Tab. 7];
- Number of environmental education centres of the protected areas [Tab. 6] [Tab. 7];
- Number of environmental guides of the protected areas [Tab. 6] [Tab. 7];

The above mentioned information have been provided by the information centres or through the Tuscany Region. In the last few years, the Region has implemented a Geographic Information System (GIS) to collect and manage environmental data including those of public interest related to forest resources.

2.2 Preliminary results

The analysis of the two previous RAFT allows drawing a picture of the tourism in the Tuscany forests, with particular emphasis to protected areas. Statistics show the relevance of forest resources in terms of extension and numbers especially within protected areas.

TABLE 1

AREAS OF FOREST INTEREST WITHIN THE PROTECTED AREA SYSTEM IN TUSCANY

Protected area Cat.	Num.	Total Area	Forest areas	
		ha	ha	%
National Parks	3	42.613	31.440	74,78
Regional Parks	3	86.900[1]	49.712	57,21
Provincial Parks	3	9.183	8.720	94.95
Provincial Reserve	41	30.874	20.525	66,48
ANPIL	48	87.161	36.799	42,22
Total	**98**	**256.731**	**147.196**	**57,33**

Note: (1) Referred to RAFT 2005, the Regional Parks Area increased from 44.000 ha to 87.000 ha. In this number has been also counted the 40.000 ha of continuous land used to determine the forest areas.

TABLE 2

NUMBER OF OFFICIAL HUNTERS PER PROVINCE AND THEIR NUMERIC VARIATION IN 2005-2006

Province	Hunters 2005 (n.)	Hunters 2006 (n.)	Variation	
			n.	%
Arezzo	13.467	13.226	-241	-1,79
Firenze	30.256	26.556	-3.700	-12,23
Grosseto	10.664	12.057	1.393	13,06
Livorno	8.301	5.718	-2.583	-31,12
Lucca	10.957	9.333	-1.624	-14,82
Massa-Carrara	4.565	3.916	-649	-14,22
Pisa	12.682	14.399	1.717	13,54
Pistoia	8.616	7.072	-1.544	-17,92
Siena	12.385	14.431	2.046	16,52
Total	**111.893**	**106.708**	**-5.185**	**-4,63**

TABLE 3

MUSHROOMS AND TRUFFLE COLLECTION: ASSOCIATIONS AND MEMBERS

Activities	Associations (n.)		Members(n.)		Province members cards (n.)	
	2005	2006	2005	2006	2005	2006
Truffles collection	10	10	1.272	1.283	3.496	4.061

TABLE 4

"RET" DENSITY WITHIN FOREST AND NON-FOREST AREAS

Areas		Km	%
Forest areas	Forest - Wood	5.336,38	89,00
	Assimilated area	123,38	2,05
	Total	5.459,77	91,05
Non-forest areas		536,40	8,95
RET - totals		5.996,17	100,00

TABLE 5

RET DENSITY PER TYPOLOGY OF PROTECTED AREA IN PARF

		Km	%
Protected area system	National Parks	515,80	8,60
	Regional Parks	515,32	8,59
	Provincial Parks	4,63	0,08
	Provincial Reserve	144,89	2,42
	ANPIL	227,64	3,80
	Total	1.408,28	23,49
PAFR		1.350,81	22,53
Others protected areas		2.391,84	39,89
Other		845,24	14,09
Total development of the RET		5.996,17	100,00

The average percentage of forest within protected areas is 57.33% with peaks of 74.78 % in national parks and 94.95% in provincial parks. Of particular importance is the relation between RET and forests: the 91.05% of the hiking tracks is within forest areas. The Regional forest heritage is therefore of great importance and connected to the protection of the regional landscape.

In this context visitor-flows are growing consistently mainly within protected areas of national, regional, and provincial relevance. Visitor-flows demonstrate the existence of a specialised tourism that is alternative to the conventional one that is mainly concentred on cities of art, coastal zones, and thermal baths. On the other side the number of visitors of hunting sites is decreasing as it is occurring at national scale.

TABLE 6

RESPONSE AND PRESSURES INDICATORS: THEIR VARIATION IN TUSCANY PARKS

Company	Visitor Centre (n.)	Environmental Education Centre (n.)	Environmental Guides (n.)	Visitors (n.)		
				2005	2006	Variation
NATIONAL PARKS						
Foreste Casentinesi Monte Falterona e Campigna (Tuscany side)	6 (13 total)	2	20(1)	30.134 (55.683 total)	22.919 (45.060 total)	- 7.215 (- 10.623 total)
Arcipelago Toscano	3	1(2)	10	Not registered	Not registered	Not registered
Appennino Tosco-Emiliano	3	2	12	23.000	30.000	+ 7.000
REGIONAL PARKS						
Maremma	3	1	30	64.810	64.058	- 752
Migliarino San Rososre Massaciuccoli	6	1(3)	37	18.259	49.000	+ 30.741
Alpi Apuane	3	1	46	15.378	82.000(4)	+ 66.622

Notes: (1) Park Official guides and GAE guides; **(2)** work in progress; **(3)** both Environmental Education Centre and Visitor Centre; **(4)** This Park does not have an access ticket or neither access point. Visitors can be divided as: "Centro Visite di Castelnuovo": 17.000 visitors; "Grotta del Vento" 50.000 visitors; "L'Antro del Corchia" 15.000 visitors even though these numbers are not officials.

TABLE 7

RESPONCE AND PRESSURES INDICATORS AND THEIR VARIATION IN TUSCANY AREAS MANAGED BY LIPU 2006 (ITALIAN ASSOCIATION FOR BIRDS PRESERVATION)

Protected Area	LIPU Oasi's	Visitor Centre (n.)	Environmental Education Centre (n.)	Environmental Guides - permanent + seasonal (n.)	Visitors (n.)		
					2005	2006	Variation
Natural reserve of Chiarone	Massaciuccoli (LU)	1	1(1)	3+13	11.100	26.500	15.400
Natural reserve of Lago di Montepulciano	Montepulciano (SI)	1	1(1)	1+1	2.500	2.000	-500
Natural reserve of Lago di Santa Luce	Santa Luce (PI)	1	1(1)	2+1	3.400	1.450	-1.950
Natural reserve of Monte Roccandagia	Campocatino (LU)	1	1(1)	1+3	1.200	3.500 (estimated)	2.300

Note: (1) Within the Visitor Centre.

3 Conclusions

These preliminary results do not consider data coming from some of the protected areas (of local interest) because of the absence of a monitoring system. Others tourism typologies (such as cycling tourism – mountain-biking) have been considered in just few protected areas. From the above, the Tuscany forest heritage appears as a fundamental resource for tourism attracting a wide range of visitor-flows over the year and through the seasons. At the same time the RAFT allowed highlighting some points of weakness such as:

- An heterogeneous distribution of visitor within the protected areas (few areas attract the largest portion of flows);
- A limited dissemination of data and information.

Another consideration could be made on the way these resources are promoted within the tourism network (National and European). This problem becomes relevant when comparing Tuscany forests with other European regions where promotion and dissemination are part of the management system i.e. the ASTA database in Finland. [4]

For this reason, the upcoming issue of the RAFT (2007) will consider new themes related to the promotion, and dissemination of forest data and statistics on the basis of the European experience in the sector.

References

[1] Regione Toscana. RaFT 2005: Rapporto sullo stato delle foreste in Toscana. AREZZO: Compagnia delle Foreste (ITALY). In Sherwood n. 124 (7/06), supplemento n. 2 pp. 128. 2007.

[2] Regione Toscana. Rapporto sullo stato delle foreste in Toscana 2006. AREZZO: Compagnia delle Foreste.

[3] G.P. Mondino, G. Bernetti. Boschi e macchie di Toscana. Regione Toscana. 1998

[4] Kajala, L., Almik, A., Dahl, R., Dikšait , L, Erkkonen, J., Fredman, P., Jensen, F. Søndergaard, Karoles, K., Sievänen, T., Skov-Petersen, H., Vistad, O. I. and Wallsten, P. 2007. Visitor monitoring in nature areas – a manual based on experiences from the Nordic and Baltic countries. TemaNord 2007:534. ISBN 91-620-1258-4

G. Sanesi Associate Professor of Silviculture at the Agricultural University of Bari. He has joined the Department of "Crop Production Science" (DSPV) in 2000. Member of the *Georgofili Accademy* and the *Italian Academy of Forestry Science*. Elected member of the Italian University Council. Member of Scientific Board of the review "Arboriculture and Urban Forestry" (ISA-Arbor). His research interests: Urban forestry, Ecological landscape planning, and Landscape ecology.

MMV4 PROCEEDINGS
RECREATION ECOLOGY

The future of recreation ecology in Canada: go big or go home?

Michael J. Campbell and David Walker

Abstract - In Canada, tension between the reaction to the declining number of visitors to protected areas and the potential for unmitigated impacts of the attendant attempts to increase visitation, highlights the need for an expansion of the role of recreation ecology from merely chronicling impacts to, what might hopefully be termed, "optimizing" them. Despite over four decades of significant growth and development internationally, recreation ecology remains a somewhat obscure discipline in Canada. At MMV-3 Marion (1) identified a small group of "active" recreation ecology researchers in Canada many of whose work was an extension of their primary research purpose. Indeed most researchers working in recreation ecology in Canada are unlikely to view themselves as recreational ecologists, but in terms of their source disciplines (Botany, Zoology, Ecology, Geography). As such, recreation ecology in Canada is often an avocation reflecting the intersection of the researchers' primary interest with an opportunity presented or identified by park managers. One result of this has been an almost exclusive focus on impacts with all its attendant negative associations. Impacts associated with outdoor recreation have been recognized as inevitable (2). I would argue that they are also necessary and that much outdoor recreation cannot take place without impacts. Recent research on recreational habitats in remote areas of northern Canada highlighted the importance of impacted nodes and corridors to recreational activity (3). The rearguard action we have been engaged in with the focus on previously impacted sites has prevented the effective application of recreation ecology to as yet "undiscovered" recreation areas and the optimization of impacts for recreation. Doing so will require an investment in "big science" incorporating multi-disciplinary teams. This will be challenging given that recreation ecology has struggled to be funded even at "small science" levels, particularly so in Canada, where it falls between the cracks of the national granting councils.

Index Terms – Big science and multi disciplinary teams**,** necessity and inevitability of impacts**,** recreation ecology, recreation habitats

1 Introduction

Recreational ecology as an identifiable field of inquiry is, to a large degree, unknown in Canada. That is, many of its practitioners would not necessarily identify themselves as such. Furthermore the consumers of recreation ecology research would be less likely still to identify recreation ecology as the discipline providing them with information. Indeed, at MMV-3 in Rapperswill, the first author was gratified to finally be able to put a name to his area of research. Despite, this relative obscurity in name, recreation ecology is nevertheless widely practised in Canada under the disciplines of ecology, recreation management, leisure, geography, environmental science, and environmental studies among others. A cursory review of the literature reveals that a good deal of recreation ecology literature in Canada is disseminated through the proceedings of SAMPA (www.sampaa.org), an organization devoted to the application of science in the management of protected areas. The proceedings reflect a small cadre of researchers who focus on recreation ecology often working inde-

Michael J. Campbell is Associate Professor in the Faculty of Kinesiology and Recreation Management, University of Manitoba, Winnipeg Manitoba R3T-2N2 Email: campblm@cc.umanitoba.ca
David Walker is Assistant Professor in the Clayton H. Riddell Faculty of Earth, Environment and Resources at the University of Manitoba Winnipeg Manitoba R3T-2N2. Email: djwalkr@cc.umanitoba.ca

pendently, distributed across the country (e.g. 4, 5, 6, 7, 8) Precursors to SAMPA, The Canadian National Parks: today and tomorrow conferences of 1968 and 1977 saw perhaps the first attempt to develop recreation ecology in Canada. More recently, several provinces including Ontario, Manitoba, British Columbia and Alberta have established Parks and Protected Areas Research Forums and act as regional hubs for the application of science and research in managing parks and protected areas, linking researchers and land managers.

2 The changing canadian environment

Canadian protected areas managers are becoming increasingly concerned about the decline in visitation to parks and protected areas across the country. With the exception of a few iconic national parks, visitation is stagnant or declining in most parks and protected areas. Reasons for the decline have been postulated to include the changing nature of Canadian society in general as reflected in increased growth through immigration, aging of the baby boom generation, the urbanization of Canadian society, and the increased role of technology in Canadian leisure. Regardless of the reasons for the reduced interest in natural areas in Canada, the effect has created a unique problem for Canadian parks and protected areas managers and indeed recreation ecology researchers who have focussed to a very large extent on identifying, managing and mitigating impacts of a perceived increase in recreational use of parks and protected areas.

Reasons for these perceptions have not been examined formally but it is posited here to be due to the strength of influence of what is happening in the United States, where recreation ecology is perhaps best developed and understood. Furthermore the pervasive influence of the larger body of work emanating from our southern neighbours appears to colour managers' perceptions regarding what is happening in their own parks. For example managers in Riding Mountain National Park in Canada, commissioned researchers to develop a backcountry impact monitoring programme due to concerns that use was increasing. Results of the study indicated that not only were impacts largely contained but also that visitor numbers were not increasing and had in fact been stable or decreasing (9, 10). Subsequent research identified a significant trend towards day use of backcountry trails (11) suggesting that the influences identified above were already in process. The concept of wilderness adds another dimension to the management issues faced by Canadian park managers, with the view that the problems of US parks are the problems of Canadian parks. Yet 'wilderness' is largely an imported concept. Wilderness is not the focus of this discussion but sets the stage: in Canada there are large intact forests that by many definitions would be considered 'wilderness' and yet these are 'working landscapes' and would not fit some conventional definitions. This American concept could be considered a recreational classification and indeed is by the tenets of the U.S. Wilderness Act, and thus management and controlling impact is exceedingly important. However, when we transfer this concept to Canada (and most likely other areas) a number of problems, including conflicts among stakeholder groups arise. It should be noted that much of the Canadian 'wilderness' is not within parks and therefore largely outside the responsibility of park planners. Recreation within Crown lands is not prohibited, but unplanned. Instead large area planning is often the responsibility of major resource industries such as forestry. In these instances 'wilderness' recreation and planning occurs to the extent required for forest certification or to meet the requirements of Provincial management targets.

Finally and certainly not least is the issue of climate change/variability and how this impacts upon ecosystems in general and parks and protected areas in particular. By and large parks in Canada, while among some of the largest in the world, are not of sufficient size, nor adequately connected

to “adapt” to changing climatic conditions. What this means for parks management and responses to perceived threats to ecological integrity is still not clear. However, it adds a significant element of uncertainty to Parks Canada’s legislated mandate of maintaining “ecological integrity” (where ecological integrity is defined by the National Parks Act as “a condition that is determined to be characteristic of its natural region and likely to persist, including abiotic components and the composition and abundance of native species and biological communities, rates of change and supporting processes”). In a changing environment what is “persistent”, and if adaptation occurs as a result, what is then “characteristic”? These questions are only now being asked and their implications for management within parks and protected areas have yet to be addressed by policies. How the recreational ‘ecosystem’ might respond and be managed on a changing landscape is at this point largely guesswork.

3 The role of impacts

The importance of identifying and monitoring impacts should not be minimized and it is not my intention to do so. However, often monitoring is the drudge work (12) of research and more often still rarely published as has been noted at past meetings of this type. Monitoring and impact assessment has provided a sound base from which to move forward to planning in areas previously without impact with a proviso that we recognize that impacts are not only inevitable (1) but also quite possibly necessary.

In addition, monitoring has, by and large, been conducted at a site level with minimal attempts to integrate it into a larger system. Some attempts to expand monitoring beyond the site level to surrounding communities/ landscapes have been undertaken (13) but still not at the system level. Most ecosystems are nested hierarchies as has been recognized in ecology and in national ecological mapping frameworks (http://www.ec.gc.ca/soer-ree/English/Framework/) and impacts may have multiscale effects. Site level impacts may have repercussions emergent at the landscape scale. For example, a study recently initiated by the second author is examining the impact of recreational snowmobile trails on wolf movements. These trails are seasonal, low density and low use, often established in open country and at the site-level are arguably innocuous. However, there is sufficient anecdotal evidence that indicates that wolves use these trails to depredate southern populations of woodland caribou, a species identified as threatened federally. In this instance it is a linear recreation corridor at the landscape-level and only seasonally that creates potential conflicts with wildlife. Spatial and temporal scales are absolutely critical in recreation ecology when considering use-based impacts. Impacts are not necessarily simply the end result of recreation on the landscape. During the course of research by the authors to assess the viability of identifying recreational habitat indices and using these for planning, it was observed that in many situations impact was a necessary pre-condition for outdoor recreation. In particular, canoe tripping requires at a minimum sites that are flat and relatively free of ground cover in order to camp. Ideally, the sites will also provide ease of landing and launching, a scenic vista, and be exposed to a breeze (to reduce nuisance insects). In the boreal forest/Canadian shield ecozone these features are found almost exclusively in ecosite 2 (14). In the absence of this ecosite, many sites are the result of human impact. In contrast in the Taiga ecozone, it was found that most campsites were located on eskers, most often in locations where migrating caribou had denuded the ground cover. Upon leaving the region of eskers, camping sites were impossible to find as banks were thickets of unimpacted willow and alder. Similarly, ATV recreationists often co-opt existing trails, resource and utility corridors and roads. Ironically, firebreaks used to preserve forests often become a conduit for environmental degradation by ATVs at both the site-level (e.g. stream crossings impact

fish habitat) and landscape level (e.g. invasive species using these as corridors to spread). Clearly, recreation can lead to impacts that are dynamic, emergent and self catalyzing.

The role of recreational impacts on long-term ecosystem dynamics is also poorly researched. Despite being the world's largest industry, recreation and recreational ecological models and planning fall far behind other resource-based industries. In forestry scenario planning, constraint-based patch and landscape models have been used to examine the impact of forestry on viewsheds adjacent to and in recreational areas [e.g. 15]. These models can simulate several cutting rotations and the approximate condition of the landscape as observed from a variety of vantage points. Simulations can be run for periods of several centuries although usually only medium-term 50-100 yrs are used in planning. From this temporal perspective foresters are becoming more sensitive to recreationists needs (and possibly impacts) than managers of parks and other outdoor recreation environments. Clearly industries such as forestry, which are extractive, are often the target of policies that require long-term landscape-level planning and therefore have to include recreation for certification. As we have argued, impact and/or disturbance are inevitably part of recreating on any landscape. While strictly speaking this may not be extractive, it does affect landscape change and one could argue that it should be treated as such and given higher priority in the discipline. Indeed, the recognition that impacts are, in many cases, necessary suggests that that might be optimized and planned for. That said, the cumulative effects of recreation are often not considered, except in terms of back-casting, and certainly not over a time scale of centuries. Perhaps this is an unfortunate side-effect of the 'museum mentality' that is often pervasive in park planning and management, that assumes that left alone the landscape will remain "as is." But this assumption is one that should be strictly avoided in the development of theory and practice in recreation ecology.

4 Challenges

Before recreation ecologists can begin to address some of these issues a number of challenges will have to be overcome. One of the greatest challenges facing recreation ecologists in Canada (beyond identifying themselves as such) is their dispersal across the country. In most cases individuals work in isolation and represent the lone RE in their respective province. In keeping with the significance of scale in recreation ecology, the enormous physical distances between researchers makes regular interaction between practitioners in what is a highly field based area of study problematic. In Canada forums such as PRFO, PPARFM, BCPARF and PRFA provide an annual opportunity for regional meetings of researchers, while SAMPA provides a triennial opportunity for Canadian and international recreational ecologists to meet. To date however, these have not generated the kind of large-scale (big science) opportunities needed to move the discipline forward. the spatial dispersion of recreation ecologists and the scale of Canadian parks and 'wilderness' inflate the costs of both the research itself and the dissemination of the results. Funding continues to be a significant issue for recreation ecology researchers in Canada. By and large recreation ecology falls between the cracks of Canada's major funding agencies (NSERC an SSHRC) and must be considered under the "Interdisciplinary" category and then vetted through a committee of discipline specific adjudicators. In committee, proposals are often criticized for their failure to advance theory[1] (often of a disciplinary nature). Recently efforts have been undertaken to establish a Canadian Network centre of Excellence in Human Dimensions of Parks and Protected Areas, an attempt to establish "big science" and overcome the challenges posed by the highly dispersed nature of Canadian recreation ecologists.

[1] This echoes Cole's comment at MMV3 noting the need for a stronger theoretical basis and to increase predictive capabilities (15).

Much publication of Canadian recreation ecology research occurs in conference proceedings. This may, in part, reflect the concern that there is little theoretical foundation and that much of the work is strongly biased towards monitoring and application. Additionally, it may reflect that much of the work is completed at the behest of park management agencies, under tight timelines and with limited budgets. Finally, there is no dedicated venue for recreation ecology research dissemination outside of SAMPA, GW, MMV, PPARFM etc. with the result that the output, where published, is widely dispersed (much like recreation ecologists). The Recreation Ecology Research Network provides a valuable point of contact for managers and researchers to discuss developments in the field and to share ideas but does not fill the role of a dedicated journal or peer-reviewed publication.

5 Conclusion

As noted earlier much recreation research in Canada has been conducted by individuals working alone and with limited budget and has focused upon identifying and measuring impacts. While this may be appropriate to existing parks and protected areas it is not nearly as useful in supporting the management of large tracts of crown land such as those currently under consideration for World Heritage Status in the eastern boreal of Manitoba. These areas will require the application of Big Science much like that undertaken in the Bow Valley Study (15). Recreation Ecology should be central in the planning, development and implementation of such science. However, to be included in such a process will require that recreation ecology enhance its profile through expanding upon current initiatives like RERN, MMV, SAMPA, the PRFs and providing opportunities for increased linkages between these organizations. Finally, perhaps it is time for the development of a dedicated publication for recreation ecology research.

References

[1] J. L. Marion, “Recreation Ecology research in the Americas,” *Proc. Third International Conference on Monitoring and Managing Visitor Flows in Recreational and Protected Areas*, pp. 93-97, 2006. (Conference Proceedings)

[2] J. L. Marion recreation research findings: Implications for wilderness and park managers *Proceedings of the National Outdoor Ethics Conference*. 1998.

[3] B. D. Smid, J.M. Campbell, D. J. Walker and R. Baydack , The human recreation species and affinity to nature: tools for sustainable forest management. *Proc 11th International Symposium on Society and Resource Management*, June 16-19, 2005.

[4] S. McCormick, W. Haider, D. Anderson, T. Elliot. “Estimating wildlife and visitor encounter norms in the backcountry with a multivariate approach: a discrete choice experiment in Kluane National Park & Reserve, Yukon, Canada, *Proc. Fifth International Conference on Science and the Management of Protected Areas Conference*, Victoria, BC, May, 2003

[5] J. M. Campbell, “How long past is long enough: looking to past channel changes to determine the integrity of the Bow. Proc. Fourth International Conference on Science and the Management of Protected Areas, pp.474-482, 2001. (Conference Proceedings)

[6] R.J. Payne, The human element in ecosystem management: backcountry recreation and environmental impacts in Kejimkujik National Park Nova Scotia. *Proc. Fifth International Conference on Science* and the Management of Protected Areas Conference, Victoria, BC, May, 2003

[7] P. Dearden, Bennett, M., & Rollins, R. Perceptions of diving impacts and implications for reef conservation. *Coastal Management*. 35: 305-317, 2007

[8] Eagles, Paul F., McCool, S. and C. Haynes, *Sustainable Tourism in Protected Areas: Guidelines for Planning and Management*. United Nations Environment Programme, World Tourism Organization and World Conservation Union. 183 pp. 2002

[9] A.J. Bath and J.Enck. 2003. *Wildlife-human interactions in Canadian and U.S. national parks.* Report submitted to National Park Social Science Series publication. Washington: U.S. National Park Service.

[10] M. Needham, R. Rollins and P. Dearden, Indicators and standards for summertime use at ski hils: Implementing a multi-stakeholder approach at Whistler Mountain B.C. Proc. Tenth Canadian Leisure Congress, pp/234-238, 2002

[11] J. M. Campbell and K. J. MacKay, The role of people, place and process in implementing a

successful backcountry monitoring program: the case in Riding Mountain National Park. *Environments* 32(1*)* 31-45, 2008

[12] K. J. MacKay,and J. M. Campbell, An integrated approach for measuring environmental impacts in nature based tourism and outdoor recreation settings. *Journal of Tourism Analysis* 9(3) 141-152, 2004

[13] J. Gardner and J.M. Campbell. (2002). A century of research in Banff and surrounding national parks. *Proceedings of the 4th International Conference on Science and Management of Protected Areas* (SAMPAA IV). Waterloo, ON. May 14-19, 2000. 234-243.

[14] R.K. Jones and DW. Andinson Sustainable Forest Management: From Concepts To Practice In Two Canadian Model Forests. XII World Forestry, 2003

[15] David Cole, Recreational ecology: learning from the past, *Proc. Third International Conference on Monitoring and Managing Visitor Flows in Recreational and Protected Areas*, pp. 89-90, 2006. (Conference Proceedings)

The significance of recreation impacts: The importance of scale

David N. Cole

Abstract — Recreation managers often consider the ecological impacts of recreation to be serious problems that need to be mitigated. Conversely, protected area ecologists often consider such impacts to be trivial. Such differences of opinion result from applying divergent evaluative criteria to assessing the significance of recreation impacts. It reflects lack of attention to questions of significance and, in particular, inadequate exploration of scale issues in recreation ecology. Impacts might be considered significant if they represent a substantial loss of ecological integrity or if they are perceived by recreation users to be highly disagreeable. Although not mutually exclusive, impacts on ecological integrity and human perception provide different criteria for evaluating significance. Cole and Landres [1] propose that the ecological significance of an impact is a function of both impact and attribute characteristics. Significance increases with the areal extent, intensity and longevity of the impact and with the rarity and irreplaceability of the impacted attribute. To be significant, from the perspective of human perception, the impacts have to be noticeable. In addition, the most disagreeable impacts are one's that result from what is considered inappropriate behavior. Given these relevant criteria, this paper explores research that can help in assessing the significance of ecological impacts and suggests which impacts are likely to be most critically important. In particular, the paper reviews what is known about the spatial scale of impacts, since this is relevant to assessing both the areal extent of impacts and how noticeable impacts are. The impacts that are most significant perceptually are often quite different from the impacts that are ecologically most significant.

Index Terms — Recreation ecology, special scale, ecological impact

References

[1] Cole, DN and PB Landres. 1996. Threats to wilderness ecosystems: impacts and research needs. Ecological Applications 6:168-184)

David Cole is with the Aldo Leopold Wilderness Research Institute, Missoula MT 59801. E-mail: dcole@fs.fed.us

Does recreation ecology have a place in East Asia? Some insights from Taiwan

Yu-Fai Leung, Yi-Chung Hsu, Chi-Chuan Lue, Dau-Jye Lu

Abstract — The significance of East Asian protected areas to support biodiversity conservation and nature-based tourism is increasingly recognized, so is the tension between these two objectives. Recreation ecology, the scientific study of visitor impacts in protected areas and their effective management, seems to have a role to play in resolving this conflict. At the last MMV conference, the general status of recreation ecology research in East Asia was summarized (Leung 2006). Three major developmental stages of this area of research development and some key challenges were identified. This presentation at MMV4 is intended to follow up with this line of dialogue by examining recreation ecology research on Taiwan Island as a case example. In Taiwan, the common occurrence of visitor impacts in forest recreation areas has long been acknowledged by managers and researchers. There were significant concerns about extensive soil and water conservation problems associated with recreation facility development in sensitive mountain areas in the 1980s. Such concerns led to focused research efforts carried out by several researchers since the 1990s. However, the diversity of topics and research methodology remained low and many of these earlier studies had a weak connection to management practice. Many studies were short-term investigations with limited management utility, mirroring the nature of research funding mechanism. Despite the constraints, several recent projects are showing signs that some protected area administrators may be more receptive of the role of recreation ecology research and long-term impact monitoring in supporting a more proactive approach to visitor management in protected areas. These projects, the trends they may represent, and the implications to the East Asian region in regard to challenges and opportunities will be highlighted

Index Terms — Recreation ecology, nature-based tourism, East Asia, visitor impact.

Yu-Fai Leung is with the Department of Parks, Recreation & Tourism Management, North Carolina State University, Raleigh, NC 27695-7106, USA
Email: Leung@ncsu.edu

Yi-Chung Hsu is with the Graduate Institute of Tourism & Recreation Management, National Dong Hwa University, Hualien, Taiwan ROC
Email: ychsu@mail.ndhu.edu.tw

Chi-Chuan Lue is with the Department of Sports & Leisure Studies, National Dong Hwa University, Hualien, Taiwan ROC
Email: cclue@mail.ndhu.edu.tw

Dau-Jye Lu is with the School of Forestry & Resource Conservation, National Taiwan University, Taipei, Taiwan ROC
Email: djlu@ntu.edu.tw

Finding a balance: applied ecology is not a second-class research

Teresa C. Magro, Cristina do M. Santiago and Maria de J. Robim

Abstract — Nevertheless the recreation ecology research provides answers to current environmental and social problems; we need a challenge to gains social recognition. The consequences of not been positively evaluated in academic circles and in governmental financing agencies is that the research institutions staff who also have charge of protected areas are not being able to request financial support for research.

Index Terms — Applied research, recreation ecology, research financial support

Extended Abstract

Research that provides answers to current environmental and social challenges is important and gains social recognition. Nevertheless, we still notice some resistance to valuing applied research in academic circles and in governmental financing agencies. As a result, in some research institutions staff who also have charge of protected areas find it hard to request from their fellow researchers studies aimed directly at solving practical problems.

That is mirrored in the lack of consistent data, skills and tools that would enable adequate management of protected areas. For example, models utilized in Brazil for the management of visitor impact to protected areas are adapted from those used in other countries where environmental and socio-economic conditions are distinct from those found in tropical regions.

Recreation Ecology researchers have difficulty evidencing the relevance of the aspects that may be dealt with in that field of research. We need more botanists interested in studying the effects of visitor activities as we need more ichthyologists studying fishes in water environments where recreational or educational activities are allowed.

Sporadic studies are beginning to be conducted, which may represent an advancing perspective. However, a more careful look demonstrates that part of those studies did not advance with more relevant results mainly due to limited access to financial resources.

Another problem related to that approach to ecology is scientific recognition. Here as well, we find a growing distance between basic ecology researchers and those who work with applied research. We actually need strategies to reclaim part of the former researchers and show them that applied research can be attractive and yield valuable scientific articles.

In order to improve the dialogue between researchers who direct their studies according to the best possibilities as far as financing and scientific visibility are concerned, the Instituto Florestal de São Paulo (São Paulo Forest Institute) has brought part of its team of scientists together for a meeting. The Division of State Reserves and Parks gathered staff who double their function as researchers and managers of protected areas and those who work with basic ecology. The purpose of the gathering was to set guidelines to research and monitoring that will ultimately aid in procedures for planning, development and monitoring recreation in protected areas in the state of São Paulo and that will lead to the creation and implementation of public conservation policies.

Teresa C. Magro got her undergraduate degree in Forestry in 1983. Her Master Degree she received in 1987 and the PhD Title in 1999. As a Professor at Department of Forest Science, University of São Paulo, she works with the environmental and cultural effects of recreation and tourism in Protected Areas.

Cristina de Marco Santiago got her undergraduate degree in Forestry 1986 and is PhD studentship of Human Geography. As a Scientific Researcher at Division of State Parks and Reserves, Forestry Institute of São Paulo, her work is more related to management of protected lawfully areas of importance natural and cultural with focus for the development and evaluation of public policies.

Maria de Jesus Robim got her undergraduate degree in Biological Science in 1981. Her PhD Title received in 1999. As a Scientific Researcher at Division of State Parks and Reserves, Forestry Institute of São Paulo, she works with planning and management of public use and environmental education in protected areas. Now, more specifically, studying the ecological and social impacts indicators of ecotourism. Since 2001 she has worked as a guest Professor at Master of Environmental Science Program, University of Taubaté.

What is the place of democracy in recreation ecology?

Susan A. Moore

Abstract — What should be monitored and who decides has been debated for as long as recreation ecology has been with us. The early work on planning frameworks advocates consulting with visitors to determine what conditions are important to them and then derive resource and social indicators from this information. Any associated standards are then similarly set with visitors' input. At the same time, recreation ecologists have selected indicators that allow measurement and predictions regarding the relationships between resource and social conditions and levels of visitor use. Where are we now regarding these choices? A democratic perspective would argue that visitors should have significant influence on indicator selection and the standards that might accompany them. But what role does this leave for scientists and institutionally derived scientific knowledge in recreation ecology? In this paper I argue that we are morally and societally bound to embrace a democratic approach to recreation ecology with scientists and managers working with visitors, and others with a vested interest in protected areas, to develop 'practical wisdom' that can be evoked as a central tenet of recreation ecology.

Index Terms — democracy, practical wisdom, public, recreation ecology, visitors.

1 Introduction

Work began in earnest on the selection and measurement of indicators for determining human impacts on the natural environment in the wilderness areas of north America in the late 1970s and early 1980s [1], [2], [3]. These indicators were concerned with the ecological consequences of human use. At the same time research was underway determining the social impacts of visitor use, mainly the impacts of visitors on each other. This line of inquiry focused on crowding and included numbers of other individuals and parties seen and/or heard while on the trail or camping [4]. These two sources of information on visitor impacts and what might be monitored to detect impacts came together in approaches to developing carrying capacities. This concept was cleverly reconceptualised to deal with the practicalities and complexities of protected area management as the limits of acceptable change [5]. Here the wants and needs of visitors, and potential concerns regarding whose voices and concerns were heard and considered in protected area management, clearly intersected with recreation ecology.

This intersection between society and science in the selection of indicators has become increasingly evident over the last decade. Development of sustainability indicators (a much broader task than resource and social indicators for protected areas which are the focus on this paper) has been accompanied by concerns that their selection could be dominated by scientific and technical elites [6]. Another burgeoning area of related interest is developing indicators to assist in evaluating the effectiveness of protected area management [7], [8].

2 Background

The limits approach was developed and first applied by the staff from the United States

S.A. Moore is with the School of Environmental Science, Murdoch University, Murdoch WA 6150 AUSTRALIA E-mail: S.Moore@murdoch.edu.au.

Forest Service (on the Flathead Forest) and researchers from the Forest Service, Aldo Leopold Wilderness Research Institute and the University of Montana. It was applied to the Bob Marshall Wilderness Complex, an area of 1.5 m acres, which includes extensive horse use and extended hiking opportunities. This planning process used both ecological indicators (such as trail erosion, extent of bare ground, exposed tree roots) and social indicators (such as the number of parties camped within sight and sound, number of trail encounters) [9].

In this planning process, an advisory committee had a say in what indicators were selected and what levels were set for acceptable impacts. They were provided with guidance by managers and scientists, and the indicators selected mirrored the research indicators of interest at the time.

Given this brief background, this paper explores four related issues:

1. Who provides the indicators?
2. Who is involved in selecting indicators and how are those persons selected?
3. How can choices regarding indicators be made?
4. How could practical wisdom work for recreation ecology?

The intention in exploring these issues is to stimulate thoughts for discussion rather than provide definitive solutions. The context for this discussion is protected areas with a mandate for both protection of ecological and other natural assets and providing for visitor use and appreciation, now and in the future.

3 Issues

3.1 Who provides the indicators – The role of scientists

Indicators have been provided by both recreation ecologists and social scientists. Those involved in planning for protected areas usually have these indicators provided by agency staff drawing on previous scientific research. Anecdotal evidence suggests that visitors don't notice and are often not concerned about recreation ecology indicators, such as bare ground and exposed tree roots, until they are shown and the ecological consequences explained. Then, they become more concerned. The question then becomes – what to monitor? Similar queries are evident regarding social indicators with increasing discussion about whether crowding really is a useful surrogate for the visitor experience. An associated social concern is how can the interests of those not currently visiting, but deeply interested in a protected area or areas, be involved in decisions about indicators?

These questions suggest an opportunity for dialogue between the public (including visitors), with an interest in protected areas, and scientists regarding what is important to the public and what is important to scientists. A number of commentators (e.g. [6]) have cautioned against restricting the selection of indicators to those with predominantly scientific and technical interests, suggesting this may bias indicator selection to ones favored by scientists but not necessarily reflecting broader societal values and concerns.

3.2 Who is involved and how are they selected?

In the previous sections the term 'the public' was used to flag the interest of those beyond but including visitors. Contemporary writings talk of stakeholders where these are individuals or groups that have either direct or indirect interests in protected areas [10]. This definition can be clarified further by referring to the 'demos' associated with protected areas. Dahl [11] defined the demos as all adults subject to the binding decisions of their group. He noted that anyone not included will be unable to represent or defend their interests. Using this definition suggests that all those persons likely to be affected by indicator selection and the associated standards should be involved in the associated decision-making.

As such, engagement might include those who live adjacent to protected areas and

those visiting and using such areas (geographical communities) [12], plus the more difficult to locate and engage, such as those appreciating the intrinsic values of such areas but rarely if ever visiting them (community of interest) [13]. There is also a third 'community' – the interests of future generations and others unable to speak for themselves (e.g., economically or politically disadvantaged peoples). Scholars such Dobson [14] suggest that environmental groups provide good proxies for these less tangible and accessible interests.

3.3 How are choices made?

Choices regarding indicators are ideally made through some engagement process over time that involves scientists (and/or managers) and the interested public. Such interactions allow knowledge to be shared and, more importantly, developed by those involved. These interactions are likely to be highly variable depending on the location of the various publics and their intensity of interest. Interactions could include working groups for those most involved, through to occasional points of interaction for those further away and/or with less intense concerns.

Interactions are critical because they will allow the public to critique, better understand and request new and more meaningful indicators as necessary. They will allow scientists to explain and explore the practicalities of various indicators. They will also allow discussions and development of understanding regarding the uncertainty associated with some of the causal assumptions that accompany recreation ecology. These assumptions and concerns regarding poor causality between levels of use and impacts are well known to recreation ecologists, but not necessarily to the public.

3.4 How can practical wisdom work for recreation ecology?

Recently, reference has been made in fields as diverse as public administration [15], fisheries management [16] and health care [17] to the need for practical wisdom. In fisheries management, Jentoft [16] suggests the need to draw on three kinds of knowledge: *episteme* (science, e.g., recreation ecology), *techne* (practical know-how, e.g., from the public) and *phronesis* (practical wisdom). Practical wisdom is experience-based knowledge particularly concerned with ethical and moral judgment. Rooney and McKenna [15], also drawing on the writings of Aristotle, comment that wise organizational practice rests on *techne*, *phronesis*, virtue and aesthetics.

For health care, Edmondson and Pearce [17] have a slightly different interpretation, drawing attention to the need to consider the capacities of the self (e.g., expertise of recreation ecologists), others (e.g., the public) and the aspects of the situation/problem itself (e.g., the protected area context). Jentoft [16] also emphasizes the absolute importance of being attuned to the socio-ecological context in fisheries management. The same would seem to apply to the selection and application of indicators as part of protected area management.

From this recent work, a simple model for considering practical wisdom in the context of recreation ecology is proposed (Fig. 1). The desired outcome of this triadic arrangement is practical wisdom. Such wisdom should be able to draw on the various forms of knowledge available to protected area management through this process. At one point of the triangle recreation ecologists provide the scientific and technical expertise needed as part of the development of practical wisdom. Edmondson and Pearce [17] note that the reasoning associated with wisdom may take time to evolve. As such, scientists (such as recreation ecologists) may have to tolerate ambiguity, refrain from forcing their views on others and search for flexible solutions [17].

The second point of the triangle is the public and here the notion of the demos becomes critical. The search for practical wisdom depends for its success on including all those with an interest or likely to be affected

by indicator choices. Jentoft [16] notes that democracy facilitates phronesis (practical wisdom). So choices about the demos, how it is engaged in dialogue and how its views are considered in indicator selection can influence the achievement or otherwise of practical wisdom.

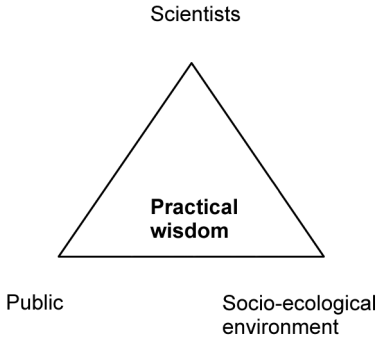


Fig. 1. Triadic approach to recreation ecology

The third part of the triangle is the environment – what social, political or economic influences are there on the protected area and what is being expected from its management? The answers to these questions will contribute to the development and form of practical wisdom. Work from public administration [15], fisheries [16] and health care [17] all emphasizes the importance of these contextual influences in shaping practical wisdom.

4 Conclusion

Managing protected areas, of which the selection and monitoring of indicators is an essential part, is a collaborative journey. This paper suggests that the notion of the demos should be used to identify the travelling companions. Companions are likely to include recreation ecologists, and various publics with affiliations, both strong and weak, with protected areas. The purpose of the journey is attaining or at least seeking practical wisdom, through including the top and left hand points of the triangle (Fig. 1) while being aware of the socio-ecological landscape through which the travellers are passing.

By pursuing practical wisdom, as indicated in Fig. 1, the science of recreation ecology has the opportunity to be a pivotal player in influencing the future sustainability of protected areas, because sustainability has ecological and social dimensions. Such wisdom provides sound judgment and sensitivity in a practical setting [16]. It can also assist in exercising ethical and moral judgment. Such judgment comes into play in recreation ecology where the choice of indicators and especially standards can advantage some while disadvantaging others. Practical wisdom may help tread this path in ways that are fair and just for all involved.

References

[1] D.N. Cole, “Managing Ecological Impacts at Wilderness Campsites: An Evaluation of Techniques,” *Journal of Forestry*, vol. 79, pp. 86-89, 1981.

[2] D.N. Cole, “Monitoring the Condition of Wilderness Campsites,” Research Paper INT-302, USDA Forest Service Intermountain Forest and Range Experiment Station, Ogden, Utah, 1983.

[3] D.N. Cole, “Assessing and Monitoring Backcountry Trail Conditions,” Research Paper INT-303, USDA Forest Service Intermountain Forest and Range Experiment Station, Ogden, Utah, 1983.

[4] J.C. Hendee, G.H. Stankey and R.C. Lucas, *Wilderness Management*. Golden, Colorado: North American Press, 1990.

[5] G.H. Stankey, D.N. Cole, R.C. Lucas, M.E. Petersen and S. Frissell, “The Limits of Acceptable Change (LAC) System for Wilderness Planning,” General Technical Report INT-176, USDA Forest Service, Intermountain Forest and Range Experiment Station, Ogden, Utah, 1985.

[6] S.F. McCool and G.H. Stankey, “Indicators of Sustainability: Challenges and Opportunities at the Interface of Science and Policy,” *Environmental Management*, vol. 33, issue 3, pp. 294-305, 2004.

[7] M. Hockings, S. Stolton and N. Dudley, *Evaluating Effectiveness: A Framework for Assessing the Management of Protected Areas.* Gland, Switzerland and Cambridge, UK: IUCN, 2000.

[8] M. Hockings, S. Stolton and N. Dudley, “Management Effectiveness: Assessing Management of Protected Areas?” *Journal of Environmental Policy and Planning,* vol. 6, issue 2, pp. 157-174, 2004.

[9] Anon., “Bob Marshall Great Bear Scapegoat Wildernesses Action Plan for Managing Recreation

(The Limits of Acceptable Change)," USDA Forest Service Flathead National Forest, Missoula, Montana, 1985.
[10] D. Newsome, S.A. Moore and R.K. Dowling, *Natural Area Tourism: Ecology, Impacts and Management*. Clevedon, England: Channel View Publications, 2002.
[11] R.A. Dahl, *Democracy and its Critics*. New Haven and London: Yale University Press, 1989.
[12] J. Ife, *Community Development: Community-Based Alternatives in an Age of Globalisation*. Frenchs Forest, NSW: Pearson Education, 2006.
[13] F. Steiner, "*Human Ecology: Following Nature's Lead.* Washington, D.C.: Island Press, 2002.
[14] A. Dobson, "Representative Democracy and the Environment," *Democracy and the Environment: Problems and Prospects*, W.M. Lafferty and J. Meadowcroft, eds., Cheltenham, UK: Edward Elgar, pp. 124-139, 1996.
[15] D. Ronney and B. McKenna, "Wisdom in Public Administration: Looking for a Sociology of Wise Practice," *Public Administration Review*, July/August 2008, pp. 709-721, 2008.
[16] S. Jentoft, "Beyond Fisheries Management: The *Phronetic* Dimension," *Marine Policy*, vol. 30, pp. 671-680, 2006.
[17] R. Edmondson and J. Pearce, "The Practice of Health Care: Wisdom as a Model," *Medicine, Health Care and Philosophy*, vol. 10, pp. 233-244, 2007.

Susan A. Moore B Nat Res (Hons 1) UNE 1981, PhD U Wash 1995. A/Prof in Environmental Policy, Murdoch University AUSTRALIA. Expertise in natural area tourism and biodiversity conservation policy. More than 100 publications in journals, books and as reports.

MMV4 PROCEEDINGS
BEYOND CROWDING

Comparison of motivations and crowding preferences between Austrian and Japanese urban forest visitors

Tetsuya Aikoh, Arne Arnberger, Yasushi Shoji, Taro Mieno

Abstract — Do Japanese urban forest visitors have the same crowding perceptions than European visitors? Traditionally, it has been considered that an Asian is more tolerant of congestion compared to Western people, because of their different cultural backgrounds and living conditions. However, in many Asian countries, life style has been rapidly westernized, and many Asian people travel or immigrate to Western countries. Our purpose is to investigate the differences of recreation motives and crowding preferences of urban forest visitors between Austria and Japan. We compared motivations and crowding perceptions of on-site forest visitors using the same questionnaires, asked in 2006. Visitors to the Viennese part of the Danube Floodplains National Park, Austria (N = 312) and visitors to the Nopporo Forest Park in Sapporo, Japan (N = 302) were asked to rate 15 motivation items and to choose preferred scenarios of computer-generated choice set images of a discrete choice experiment. Among 15 motivation items, a statistic significant difference was found in 14 items. Both Austrian and Japanese respondents assigned high importance scores to health and nature observation. The Austrians rated highly the motives exercise/sport, quietness and recreation, whereas Japanese visitors placed more importance on experiencing nature and family. We found four motivation factors: Landscape, Solitude, Nature and Health. Results of the choice model showed that Austrian respondents preferred less walkers and dog walkers, whereas Japanese preferred less bikers, joggers and plant pickers. Japanese visitors scored higher on nature observation, and fewer bikers are in this urban forest. Conflicts with dog walkers have been one of the main management issues in the Austrian forest. We found that visitors' crowding preferences are related to current trail use conditions, and to their motivations. Tourism and recreation become more and more globalized, and this information about differences and similarities of visitor attitudes based on different backgrounds will be helpful for urban forest management.

Index Terms — crowding, motivation, urban forest visitor, choice model.

Tetsuya Aikoh is with the Hokkaido University, Japan

Arne Arnberger is with University of Natural Resources and Applied Life Sciences, Austria

Yasushi Shoji is with the Hokkaido University, Japan

Taro Mieno is with University of Illinois, U.S.A.

Over- and undercrowding in the urban context: A comparison among Viennese green spaces

Arne Arnberger, Renate Eder

Abstract — Urban green spaces are essential natural environments for densely populated areas and offer refuges from the hectic city life and work environments. They constitute spaces that provide relatively low levels of social contacts, at the same time they are settings for social gathering. High-use levels as well as too low use levels in urban recreational areas may also be associated with negative effects due to overcrowding, safety concerns or too low social stimulation levels. Given the prominence of urban recreation areas in our daily life, it is surprising that so far rather little research has focused on the crowding perceptions and the social carrying capacities of urban park users, particularly in Europe. In eight different green spaces in Vienna, about 1700 on-site visitors were interviewed on randomly selected eight sampling days in 2006. Green spaces were heavily used small inner urban parks, various historical gardens and forests, and peri-urban recreation areas with a large area size and with low visitation. Interviews lasted between 15 and 20 minutes in most cases. One or two interviewers were used per study site. Crowding issues were asked in three separate questions using bi-polar measures: Visitors were asked about their crowding perceptions of the respective recreation area for both Sundays and workdays, using a 7-point scale ranging from a too lonely situation to an overcrowded situation (global measures of crowding). Actual crowding at the time of the interview was investigated using the same 7-point scale (actual measure of crowding). Crowding expectations and perceived development of use levels since the first visit were also asked. Overcrowding and undercrowding perceptions were expressed. About 47% of respondents expressed overcrowding perceptions for Sundays, while for workdays mostly pleasant crowding perceptions were reported. All crowding measures differed significantly, and significant differences were found across the green spaces. Research was supported by the Austrian Science Fund (FWF).

Index Terms — Crowding, perception, urban recreation, urban park users.

Arne Arnberger is with University of Natural Resources and Applied Life Sciences, Austria

Renate Eder is with University of Natural Resources and Applied Life Sciences, Austria.

Crowding in European forests: Status quo and implications for forest management and research

Carsten Mann Arne Arnberger

Abstract — Providing forests on a sustainable basis include knowledge about recreation quality of forest visitors and perceived impacts. While ecological impacts have been a central topic for forest recreation research, social impacts such as use-conflict and crowding were rarely investigated. This paper analyses research attempts in European forests dealing with visitors' crowding perceptions at a first time. For data collection, the Cost Action E33 "Forest for recreation and nature tourism" network, as well as a focused literature research was used. Compared to recreation research in the United States, where crowding is a prominent topic, only 16 European crowding studies were identified since the 1980s, predominantly carried out in Central and Northern Europe. Reported crowding-perceptions ranged from 1064%. Among these, correlations between use-levels and crowding perceptions were yielded, as well as manifold significant influences of setting attributes and visitor characteristics. Most studies used a theoretical foundation oriented towards the US recreation crowding literature, but differ in their methods of measuring crowding. As a result, the use of different scales and data collection methods, restrict a nation-and European-wide comparisons. In most Southern, Eastern and several Central European countries, crowding is not recognized as an issue for forest recreation research and management. Besides less political willingness and financial constraints, general access rights to forests, and the lack of legal requirements are considered among the main obstacles of putting more emphasis on recreation crowding research. Due to the ongoing societal demands for outdoor recreation together with trends to concentrate uses on fewer paths and areas for ecological reasons crowding may be of higher importance in the future. A need for standardized crowding research is stated to gain more insights of cultural differences and commonalities. Changes of the recreation systems, its uses and users can be better recognized for a sustainable, future-oriented forest recreation management.

Index Terms — Crowding; Europe; forest recreation; methods, scales, social impacts.

Carsten Mann is with the UMR Métafort: Dynamics of Activities, Spaces and Organisation forms in Rural Areas, Cemagref, Aubière, France.
Email: carsten.mann@cemagref.fr

Arne Arnberger is with Institute of Landscape Development, Recreation and Conservation Planning, BOKU -University of Natural Resources and Applied Life Sciences, Vienna, Austria.
Email: arne.arnberger@boku.ac.at

MMV4 PROCEEDINGS
PAN PARKS

The role of destination management in facing the challenges for protected area tourism development

Niek Beunders

Abstract — These are PAN Parks introduced a holistic approach to protected area management, integrating standards for conservation and management practices, visitor management, sustainable tourism strategies and partnerships. It has been field tested successfully in 10 protected areas. Simultaneously tourism in protected areas became the focus of a growing number of publications. Common ground can be identified in a predominance of strategic, process oriented approaches to tourism. Key issues: planning, visitor management, linkages with the tourism industry, community involvement. Results of the first decade: 1. A more structured and focused co-operation between PA and local stakeholders. Research shows positive results in awareness and co-operation 2. Multi-stakeholder approaches have proven to be effective in formulating tourism strategies 3. Tourism became an integrated part of protected area management, including a more pro-active, strategic approach. 4. The model works in diverse cultural, institutional and political contexts 4. PAN Parks has been a laboratory for sustainable tourism development for protected areas. Five main challenges can be identified: 1. Loading the brand: make value added of PAN Parks tangible for tourist. How can conservation benefits, distinctiveness and quality of the experience be guaranteed? 2. Identify success factors for development, marketing and management of competitive destinations 3. Consequently the brand lacks a decisive impact on the holiday decision making process. Economic stakeholder value is still limited 4. Leverage of local economic activities (synergy with other sectors) 5. Mind shift from process orientation (development) to focus on output (marketing, management). Suggestions for a research agenda for the next decade are listed here: Economic sustainability remains a concern for conservation based tourism development. Local stakeholders, regional economy and tour operators need healthy business perspectives. Eco-tourism markets are highly competitive. Distinctiveness and competitiveness of destinations require market oriented approaches. The positioning of protected areas as (part of) destinations requires research. Expertise must be developed for destination -development and -management. Innovative approaches for local supply chain development should strengthen the role of protected area tourism in regional development. Quality standards for destinations and local providers should be elaborated. Destination management could be the umbrella to integrating these fields of expertise. Probably a “paradigm shift” from sustainable tourism development approaches to a destination perspective is needed.

Index Terms — Innovative approach, visitor management, Pan Parks, sustainable tourism management.

Niek Beunders is a Senior lecturer and consultant for the Centre for Sustainable Tourism and Transport, Breda University of Applied Sciences, Breda, The Netherlands
Email: Beunders.n@nhtv.nl

Perceptions, attitudes and perceived benefits of local residents about tourism development in and around European Protected Area Network Parks

Stuart P. Cottrell

Abstract — This paper presents the European Protected Area Network (PAN Parks) approach (mixed methods) for monitoring resident beliefs about the benefits of PAN Parks status and satisfaction with tourism development. Comparison of results and lessons learned from studies done in Poland, Bulgaria, and Finland are given. Hypothesizes imply that economic, socio-cultural, ecological, and institutional dimensions of sustainable tourism influence perceived benefits of PAN Park status and satisfaction with tourism development. As residents' satisfaction with the economic, socio-cultural, institutional and ecological aspects of sustainable tourism increase, so do beliefs about the benefits of PAN Park status and satisfaction with tourism development in the PAN Park regions.

Index Terms — Sustainability, tourism, indicators, monitoring.

1 Introductions

Monitoring the role of PAN Parks (Protected Area Network) in community development via sustainable tourism is a goal of the PAN Parks foundation [1]. In 2005, the PAN Parks Foundation implemented a research methodology to examine the success of the PAN Parks certification program. PAN Parks argues that apart from improved protection and management practice, local businesses and communities profit from PAN Park's status as well. Yet, the socio-economic benefits are less visible than those for conservation.

S.C. is with the Human Dimensions of Natural Resource Department, Colorado State University, Fort Collins, CO 80523.
E-mail: cottrell@ cnr.colostate.edu.

An important part of the PAN Parks concept is cooperation with local stakeholders on implementation of sustainable tourism, in other words, the socio-economic aspects [2]. These aspects are examined by the PAN Parks research network. The ecological aspects are not the focus of the network since the National Parks involved in PAN Parks conduct much of the scientific research related to biodiversity.

A sustainability framework provides the theoretical lens to guide the research process [3]. Figure 1 shows those dimensions important to a holistic approach to sustainable development.

This presentation examines the relative contribution of four sustainability dimensions in predicting residents' beliefs about the benefits of PAN Park status at PAN Park locations in Finland, Bulgaria, and Poland and satisfaction with tourism development as determined from three studies using a similar methodol-

ogy. It is hypothesized that economic, socio-cultural, ecological, and institutional dimensions of sustainable tourism would influence perceived benefits of PAN Park status and satisfaction with tourism development. The *ecological dimension* emphasizes the need to reduce pressure on the physical environment. The *economic dimension* considers human needs for material welfare (e.g., employment) in a framework that is competitive and stable. The *social dimension* refers to individuals' skills, dedication, experiences and resulting behavior. The *institutional dimension* calls for strengthening people's participation in political governance. Dimension indices were based on 5-10 survey items with reliability coefficients ranging from .66 to .91 for each of the studies.

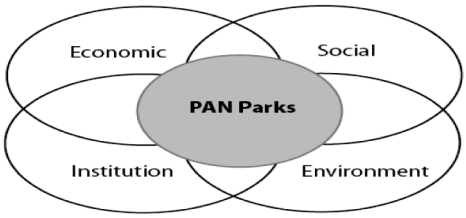


Fig. 1. Sustainability Framework [3]

2 METHODS

2.1 Techniques

A mixed methodology including a 4-page questionnaire and a 10 question semi-structured interview protocol was developed as the basis of the research method. In 2005, the methodology was pilot tested at Bieszczady National Park in Poland using a Polish translation. A PAN Parks methods manual [5] was written as a guide to conduct similar studies in all certified PAN Parks. Baseline studies among all of the parks using a similar methodology will allow the PAN Parks Foundation to compare data between parks and to help learn from the different studies. The methodology will be repeated over the years to measure change in beliefs, opinions, attitudes, values and impacts over time.

To date, the research has been done at Bieszczady NP in Poland (as a pilot test) [4], Retezat NP in Romania, Central Balkan NP in Bulgaria and Oulanka NP in Finland [4].

The PAN Parks methodology is a tool used to gain insight into who the protected area stakeholders are, in what way they are involved in tourism development, and in what way they perceive the four dimensions of sustainability. Several sub-questions are included to measure general feelings about tourism development, PAN Park benefit to local businesses, local communities, and sustainable development. In addition, questions address social change and perceptions of those changes, company involvement in the decision making processes in the park region, and economic benefits for local entrepreneurs. Both PAN Park partners and non-partners are included in the study which consists of two phases as a mixed methods approach.

2.2 Sampling Technique

Sample methods include onsite self-administered surveys and mail surveys with follow-up mailings (e.g., post card reminder).

An onsite self-administered survey was conducted in Poland and partially in Bulgaria and in Finland, and was primarily directed towards PAN Park's partners and tourism stakeholders that participated in the interviews as well. This was done as a means to corroborate findings between the questionnaire and stakeholder interviews. A mail survey with a postage paid self-return envelope was done in Romania, Bulgaria and Finland. An 80% response rate was received from a convenience sample (n=92) in the Central Balkan NP region of Bulgaria [6]. In Finland, we received a 31% response rate from a random sample of households in the summer of 2007 [5]. This is a moderate response level considering the post card reminder with its drawing for prizes; however the modified mail survey approach (2 mailings versus 3 or 4)

resulted in a response rate equivalent to other studies using a mail survey and postcard reminder only. In Romania only a few returns were received with most of the surveys done onsite.

The studies at both Retezat NP in Romania and Central Balkan NP in Bulgaria were done by Masters students and would be considered pilot studies with small samples. The study recently completed at Oulanka NP in Finland is the first study with a relatively robust sample and serves as a model approach for future studies [5]. Researchers from the Oulanka Research Station, PAN Parks Foundation, and Colorado State University conducted the study as an interdisciplinary team and represents the ideal approach sought for future studies.

Semi-structured interviews tend to provide the most insightful knowledge about the effectiveness of PAN Parks. There have been modifications to the questions given at each study site due to the type of interviewees, cultural context and experience of the interviewer. Interviews were conducted in Romania and Poland using onsite native speakers as the interviewers with direct translation into English at some point following the interview. In Bulgaria, the researcher was a Bulgarian while both Finnish and English speakers conducted the interviews in Finland. Interviews are meant to be voice recorded, however as was the case in Romania, interviewees were much more open to talk when the voice recorder was turned off. Although a standard interview protocol is available, onsite conditions such as language, terminology, and interviewer experience are always considered.

Statistical analysis for the studies include descriptives and multivariate analysis (e.g., regression, analysis of variance, and structural equation modeling. Textual analysis is used for the qualitative data.

3 Results & Discussion

Results are presented as implications for sustainable tourism development, park managment and PAN Parks[1].

3.1 Sustainable tourism development

People living around protected areas expect the park to serve as a magnet for tourists. Is tourism marketing the park's responsibility for the region? Local expectations are often too high with short term expectations. The study in Poland showed that local businesses expected an increase in domestic and international visitors to the park since its verification in 2002. Obviously unrealistic, such expectations led to local dissatisfaction and disillusion with PAN Parks.

Direct contact between local stakeholders and park management is necessary for the Sustainable Tourism Development Strategy's[2] (STDS) to work effectively. All stakeholders feel better informed and more committed to achieving the set goals, and the process contributes to the feeling of having a say in the decision making process.

Indicators and standards for sustainable tourism: Survey questions measuring the four dimensions of sustainability (see Fig. 1) in essence represent potential sustainable tourism indicators. Indicators are measurable and manageable variables that reflect the essence or meaning of management objectives. Study items have been consistent across research locations validating the application of a sustainability framework to monitor resident beliefs in the value of PAN Parks, benefits derived and feelings about sustainable tourism development. The next step is to create standards for the indicators. Standards are the minimum acceptable condition for each indicator variable. For example, what percent of local residents need to be satisfied with each dimension to claim that PAN Parks has made a positive contribution to the local region? Development of indicator specific standards is only possible with continued monitoring of tourism development.

[1] Actual data are not presented from the Polish, Bulgarian, and Finnish studies due to space limitations (see [2], [5], [6]).

[2] Parks must develop an STDS with representatives of the various interest groups (e.g., tourism, local community).

3.2 Park management

The various studies provide insight and understanding of the local situation and provide data that may be useful for park management and tourism development in the region. Although, most of the results are park or site specific, findings show that people find it important to be informed about issues and to be involved in decision-making processes. Often opportunities exist for local participation, yet awareness of or familiarity with those opportunities is limited. The need for improved communication from park representatives to local communities has been a key recommendation in many of the studies.

All over the world, people living close to protected areas tend to be less satisfied with tourism development. The Oulanka NP study revealed similar findings in a location well noted for quality management, nature protection, and tourism development. This alludes to the importance of communication strategies and the goals of the areas STDS – which forces parks to look externally to the buffer zones and local regions while thinking internally.

3.3 PAN Parks

At this point, local knowledge about PAN Parks is very limited, as you might expect for any initiative in its infancy. People know about PAN Parks but are not familiar with what the concept actually represents; this will take more time. However, in all the studies done, local expectations are quite positive, especially as it pertains to the environmental contribution of the PAN Parks certification as well as the socio-cultural contributions.

Although cause-effect is not claimed, research consistently shows that when familiarity with PAN Parks increases, satisfaction and positive feelings about tourism development in the region is higher than in those respondents not familiar with PAN Parks. As beliefs in the benefits of PAN Parks increases, so do the positive feelings about the various aspects of sustainable tourism in the PAN Parks regions. We cannot claim that increases in satisfaction with tourism development and the various aspects of sustainability are solely because of PAN Parks certification; however, study results allude to potential attitudinal changes which support the need for further research.

Local people tend to have limited knowledge about the activities the Foundation engages in to support their region. Improved communication and cooperation with the park are key aspects of the Foundation's criteria: the Sustainable Tourism Development Strategy and the work with local businesses. This work is done behind the scenes and will not be seen by local people as an outcome of the PAN Parks partnership. Although not important, this may deter local beliefs in the benefits or value of PAN Parks contribution to local and/or regional development.

4 Conclusions

Findings suggest that as residents' satisfaction with the economic, socio-cultural, institutional and ecological aspects of sustainable tourism increase, so will their beliefs about the overall benefits of PAN Park status as well as their subsequent satisfaction with tourism development in the PAN Park regions. Results allude to the importance of achieving resident satisfaction with each dimension and the importance of the institutional dimension to achieve sustainable tourism development. As resident familiarity with PAN Park's increases, resident satisfaction with tourism development and beliefs in the benefits of PAN Park status increase. Implications for monitoring sustainable tourism development in European protected areas are given.

The PAN Parks research process has only just begun and results encourage PAN Parks to seek more knowledge: What is the situation in the other parks and should we focus on similar aspects in those parks? It will take time to determine if PAN Parks benefits sustainable development in PAN Park locations and initial results provide benchmarks for further study. Based on this research, valuable information is produced for potential

investors, to satisfy board members and to guide management of certified PAN Parks.

Although cause effect (PAN Park concept) cannot be claimed, perhaps those stakeholders familiar with the ideals supported by PAN Parks have a better understanding of what sustainable tourism involves; consequently they tend to value the importance of the various aspects of sustainability more than those people not informed about PAN Parks. PAN Parks primary benefit tends to be environmental sustainability, yet there is evidence that it contributes to aspects of socio-cultural sustainability as well. Institutional benefits regard the development of a sustainable tourism network via linking park policy and activities to that of local businesses and communities. Stakeholders value the PAN Park concept and this will improve and spread to other stakeholders in the future.

PAN Parks with its sustainable tourism development strategy process is viewed as a driving force for sustainable development combining protected area concern for environmental protection with active involvement of tourism businesses. The PAN Parks Foundation continues to examine the benefits of PAN Park certification with studies at park locations in Bulgaria and Italy in 2008. Similar results found at Central Balkan National Park in Bulgaria and Retezat National Park in Romania imply that PAN Park status enhances resident involvement in tourism development, improved park management and belief in the value of nature conservation due to international recognition.

References

[1] C. van den Berg, F. van Bree, and S.P. Cottrell, "PAN Parks principles: cross-cultural comparison - Poland/ Slovakia," *Proc. 2nd Ann. Visitor Flows and Monitoring Conf.* Pp. 227–234, http://www.metla.fi/julkaisut/workingpapers/2004/mwp002-32.pdf. 2004.

[2] S.P. Cottrell and J. Raadik, "Socio-cultural benefits of PAN Parks at Bieszscady National Park, Poland," *Finnish Journal of Tourism Research,* vol. 4, no. 1, pp. 56–67, 2008.

[3] M. Eden, L. Falkheden and B. Malbert, "Interface. The Built Environment and Sustainable Development: Research Meets Practice in a Scandinavian Context," *Planning Theory & Practice* vol. 1, no. 2, pp. 259- 284, 2000.

[4] S.P. Cottrell, "*PAN Parks Methods and Techniques Manual. Monitoring Socio-Economic Aspects of PAN Parks*," Technical Report, Human Dimensions of Natural Resources. Colorado State University, 2006.

[5] S.P. Cottrell, M. van der Donk, and P. Siikamäki, "*Results of Questionnaire Study 2007. Report 1 of Socio-Economic Analysis of PAN Parks: Oulanka National Park, Finland,"* Technical Report, PAN Parks, http://www.panparks.org/Projects/Research/Downloadablestudies/S2, 2008.

[6] P. Mateev, "*Analysis of the Benefits of PAN Parks: Central Balkan National Park, Bulgaria*," Unpublished Master's Thesis, Wageningen University, The Netherlands.

Stuart P. Cottrell is an Associate Professor of Human Dimensions of Natural Resources at Colorado State University where he teaches eco/sustainable tourism, and conducts sustainable tourism research. His PhD is from Penn State University (1993), MS from Florida International University (1987) and BS from Western Illinois University (1981). He has taught at Wageningen University, NL and Christopher Newport University, Virginia USA. He is an active member of the PAN Parks Research Network.

Ten years of experience in providing wilderness experience opportunities in Europe's certified PAN Parks

Mylène van der Donk

Abstract — Today ten years ago, the first steps were taken to realise a marriage between conservation and the tourism industry in the most important wilderness areas of Europe. This initiative awards wilderness areas that meet the highest standards of management for conservation and sustainable tourism development strategies with the PAN Parks quality seal. It can be considered as a gold standard for well- managed protected areas. Based on the PAN Parks principles and criteria and the verification reports, park managers are encouraged to increase the management effectiveness of their protected areas and to plan, provide and maintain high quality recreation opportunities inside the park. Five principles make up the PAN Parks verification scheme, three of which deal with visitor experiences: Visitor management (principle 3), Sustainable Tourism Development Strategy (Principle 4), and Partnerships (Principle 5). Tourism development is used as a means to give economic value to wilderness areas and to create support for conservation. By creating unique and high quality opportunities for wilderness-based recreation, the marriage has proven to be successful as it results in benefits for nature, for communities in and around the protected area and in unique experience opportunities for visitors. This is measured by using mixed methodologies in the Analysis of Perceptions and Attitudes (APA) studies done in 3 of the certified areas. After ten years of working on the development and implementation of the concept in different European countries that cope with different and similar opportunities and obstacles, we can draw interesting lessons learned. Among them: The value of the network and the certificate to the park, local businesses and local people, the principles and criteria as management tools for planning and managing of tourism, providing the (certified) European wilderness experience for different types of tourists, generating revenues through tourism, communication and cooperation with stakeholders

Index Terms — Wilderness, network, experiences, Europe, tourism.

Mylène van der Donk Marketing and Research manager at PAN Parks Foundation/Lecturer at NHTV, Breda University of Applied Sciences.

Role of Oulanka PAN Park in Local Community Development in Northeastern Finland

Riikka Puhakka, Stuart P. Cottrell, and Pirkko Siikamäki

Abstract — As a result of the growth of nature-based tourism, national parks have become important tourist attractions in Finland, and they have an increasing role as tools for regional development especially in the northern peripheries of the country. Meanwhile, new international initiatives to develop sustainable nature-based tourism have been introduced in Finland. PAN (Protected Area Network) Parks Foundation is a non-profit organization aimed to balance the needs of wilderness protection and community development by facilitating sustainable tourism development in European parks. This study examines the socio-cultural sustainability of tourism in Oulanka National Park perceived by local stakeholders. The central question concerns the role of PAN Parks certification in community and tourism development. Does it benefit socio-cultural development in the region, and does it have some disadvantages from the perspective of local people? The study is based on a mixed methods approach including a questionnaire (n=314) and semi-structured interviews (n=40) conducted in Oulanka region in 2007 for representatives of NGOs, tourism and other businesses, municipalities and public sector, and local residents. Findings show that most of the stakeholders have a positive attitude towards tourism development in Oulanka. The economic benefits of PAN Parks status have not yet been realized, but locals expect the benefits will grow while tourists' familiarity with PAN Parks increases. Local residents' knowledge of PAN Parks is still weak. Although nature-based tourism benefits community in various ways, locals also perceive disadvantages caused by the park. The biggest problems identified in the study are related to participation possibilities and contradictions with traditional subsistence economies (e.g., fishing, hunting and reindeer herding). Thus, it is essential to pay attention to the distribution of benefits and burdens of the park development – also to those which are not related to monetary interests. Increasing co-operation with local stakeholders could improve the mutual relations.

Index Terms — certification, national parks, PAN Parks, sustainable tourism

1 Introduction

National parks have become important tourist attractions and tools for regional development in Europe, including northern peripheral areas of Finland [1], [2], [3]. Co-ordinating conservation and the utilization of nature is seen as advantageous for both conservation and regional development [4], [5]. As expectations of benefits are fulfilled, local support for park development is enhanced [6], [7]. Various international initiatives and certification programmes play an increasing role in encouraging synergy between conservation and tourism in protected areas [8]. In 1997, World Wildlife Fund (WWF) and the Dutch leisure company, Molecaten, founded PAN (Protected Area Network) Parks Foundation, which is a non-profit organization aimed to balance the needs of wilderness protection and community development by facilitating sustainable tourism develop-

Riikka Puhakka is with Oulanka Research Station/ Thule Institute, University of Oulu, Finland. E-mail: riikka.puhakka@oulu.fi.
S.P. Cottrell is with the Department of Human Dimensions of Natural Resources, Colorado State University, Fort Collins, USA. E-mail: cottrell@cnr.colostate.edu.
Pirkko Siikamäki is with Oulanka Research Station/ Thule Institute, University of Oulu, Finland. E-mail: pirkko.siikamaki@oulu.fi.

ment [9]. At present there are eleven certified PAN Parks in nine European countries, including Oulanka National Park (ONP) in northeastern Finland.

This paper examines the socio-cultural sustainability of tourism in ONP perceived by local stakeholders. The central question concerns the role of PAN Parks status in community and tourism development: does it benefit socio-cultural development in the region, and does it have some disadvantages from the perspective of local people? The paper is based on the main results of a questionnaire study with interviews corroborating and supplementing the survey findings [10], [11].

2 Methods and materials

Mixed methods were used to gain a holistic understanding of local stakeholders' ideas and perceptions of tourism and park development in ONP. The questionnaire study was conducted in 2007 with a total sample of 314 respondents. An initial survey was sent to a random sample of 908 households in Oulanka region with a return of 273 (30% response rate). In addition, 34 surveys were completed by stakeholders who participated in semi-structured interviews, and seven surveys were completed by others onsite. Based on a holistic approach to sustainable development [12], the questionnaire solicited responses about familiarity with PAN Parks, PAN Parks status of ONP, participation in tourism planning, tourism to ONP, satisfaction with tourism development, and socio-demographics.

Moreover, the research material includes 40 semi-structured interviews of local stakeholders conducted in the surrounding region of ONP, in Kuusamo and Salla municipalities. The interviews ranged from 15 minutes to 2 hours with 28 in Finnish and 12 in English. The questions were applied from *PAN Parks Methods and Techniques Manual* [13]. They were posed to determine feelings about tourism development and its sustainability in Oulanka region, the role of ONP and businesses in promoting tourism, and the effects of the national park and PAN Parks on local businesses, communities and sustainable development.

3 Study area

Oulanka National Park is located in Oulu and Lapland provinces of Finland, adjacent to the Russian border and close by the Arctic Circle. This sparsely populated region has traditionally been dependent on forestry, reindeer herding, hunting and fishing. The park was established in 1956 after a multiphase and partly conflicting process. It is managed by Metsähallitus, which administers the land and water areas of the state, and it covers an area of approximately 28 000 hectares. ONP is one of the most popular parks in Finland. In 2007, there were 185 500 visits to the park [14], which tripled since 1992. Thirty partnership companies organize recreation services in the park, and around twenty accommodation companies are located close by; 13 companies are local partners of PAN Parks. ONP plays an important socio-economic development role in Kuusamo–Salla region which is, with its ski resort Ruka, one of the most attractive tourist destinations in Finland.

ONP was certified as a PAN Park in 2002. The minimum size of the parks is 20 000 hectares with a wilderness/core zone of at least 10 000 hectares in an essentially natural state and only slightly modified by humans. PAN Parks criteria aim to forbid extractive uses in the core zone [15].

4 Results

In the questionnaire study, the sample of respondents represents a group of almost 50% working (of these 25% employed in tourism), 43% retired and 8% unemployed. There were more men (65%) than female (35%) respondents, and 66 % are over 50 years old with only 13% under 40. The sample shows a relatively low educated

population with 48% having finished primary school and 5% percent with university degree. Fifty-five percent have lived in the region for over 40 years. In the interview study, minimum of three representatives were selected from each target group: NGOs (fishing, hunting and conservation organizations), tourism companies familiar with PAN Parks (certified partners), other tourism companies, non-tourism companies, municipalities and public sector, and local people. Interviewees were 28–76 years old with 24 men and 16 women.

A slight majority (66%) of respondents knew ONP was a certified PAN Park, but 56% did not know at all or only very little about what it meant. Only 15% knew to a greater extent what the concept stood for. The interviews confirm that local residents are not yet familiar with PAN Parks and think open communication should be increased.

Stakeholders mostly have a positive perception of PAN Parks, yet critical aspects were also discussed in the interviews. Sixty-seven percent of respondents agreed that PAN Parks status increased the value of the tourist experience while 76% believed it would attract more tourists to the area. Although the economic benefits have not yet been widely realized, interviewees expected the benefits would grow while tourists' familiarity with PAN Parks increased. A majority (75%) of respondents agreed the status contributes to nature conservation; meanwhile, 47% did not feel that tourism is a threat to conservation. Stakeholders responded neutral to the statement that the status increased the quality of life in the area while 24% disagreed and 28% agreed. In the interviews, particularly local residents, representatives of NGOs and entrepreneurs who do not work in the tourism sector and are not very familiar with PAN Parks perceived disadvantages caused by the national park and PAN Parks. The park has restricted traditional use of nature (e.g. fishing, hunting and reindeer herding); these stakeholders aim to maintain local rights to the region for subsistence and recreational use.

Of 36 aspects of sustainable tourism, respondents ranked the economic and environmental dimensions as the most important. They were not, however, totally satisfied with the current situation in ONP since they rated the performance of the statements lower than the importance. Overall, respondents were most satisfied with the environmental and economic situation. The lowest scores were found among statements related to the institutional (regarding communication and involvement) and social (regarding information and educational opportunities) statements. Although all aspects got acceptable performance scores, none of the economic and institutional received high scores (above 4) and the social and environmental aspects only once. Special attention needs to be paid to the statements rated high in importance with low satisfaction; they were related to communication, benefits to local people and negative impacts on nature. In the interviews, stakeholders criticized, for example, the lack of trust and cooperation, minor consideration of local culture and continual growth of tourism in the park.

Moreover, local participation in tourism planning is considered important; respondents rated residents' opportunity to be involved in tourism decision making high in importance. Nevertheless, the perception of actually being able to enter the decision making process is limited with only 9% stating they could access this process. On the other hand, respondents did not find it important for themselves to be involved. The communication about the decision making process was perceived satisfactorily by only 21%; the majority had no opinion and 18% rated it negatively. Some interviewed stakeholders stressed the importance of participation opportunities where as those not having strong interests towards the park might even say that the decision making of the park was not part of residents' business.

5 Conclusion

The study indicates that local stakeholders mostly have a positive perception of tourism development and PAN Parks in Oulanka region, and tourism benefits community in several ways, but it cannot be concluded whether the park facilitates development in a sustainable manner or not. While monitoring socio-cultural sustainability, it is important to cover a wide range of opinions from the local level; four discourses can be identified from interviewees' speech [11]. It is essential to pay attention to the distribution of the benefits and burdens of park development, also to those which are not related to monetary interests. In this study, the interviews supplemented the results of the quantitative analysis by discussing issues not asked in the survey. The main problems identified are contradictions with traditional subsistence economies and the lack of participation opportunities, which have been noticed in other PAN Parks as well and need further research [9], [12].

References

[1] R. Puhakka, "Increasing Role of Tourism in Finnish National Parks," *Fennia*, submitted for publication.

[2] J. Saarinen, "Tourism in the Northern Wildernesses: Wilderness Discourses and the Development of Nature-Based Tourism in Northern Finland," *Nature-Based Tourism in Peripheral Areas,* C.M. Hall and S. Boyd, eds., Clevedon: Channel View Publications, pp. 36-49, 2005.

[3] A. Törn, P. Siikamäki, A. Tolvanen, P. Kauppila, and J. Rämet, "Local People, Nature Conservation and Tourism in Northeastern Finland," *Ecology and Society*, vol. 13, no. 1, p. 8, available at http://www.ecologyandsociety.org/vol13/iss1/art8/, 2008.

[4] T. Hammer, I. Mose, D. Siegrist, and N. Weixlbaumer, "Protected Areas and Regional Development in Europe: Towards a New Model for the 21st Century," *Protected Areas and Regional Development in Europe. Towards a New Model for the 21st Century*, I. Mose, ed., Aldershot: Ashgate, pp. 233-246, 2007.

[5] S.F. McCool and M.E. Patterson, "Trends in Recreation, Tourism and Protected Area Planning," *Trends in Outdoor Recreation, Leisure and Tourism*, W.C. Gartner and D.W. Lime, eds., Wallingford: CAB International, pp. 111-119, 2000.

[6] R. Bushell and S.F. McCool, "Tourism as a Tool for Conservation and Support of Protected Areas: Setting the Agenda,"*Tourism and Protected areas: Benefits beyond Boundaries*, R. Bushell and P. Eagles, eds., Wallingford: CAB International, pp. 12-26, 2007.

[7] P.F.J. Eagles and S.F. McCool, *Tourism in National Parks and Protected Areas. Planning and Management*. Wallingford: CABI Publishing, 2002.

[8] M. Honey, "The Role of Certification and Accreditation in Ensuring Tourism Contribute to Conservation," *Tourism and Protected Areas: Benefits beyond Boundaries*, R. Bushell and P. Eagles, eds., Wallingford: CAB International, pp. 168-190, 2007.

[9] X. Font and J. Clark, "Certification of Protected Areas: The Case of PAN Parks in Europe," *Quality Control and Certification in Ecotourism*, R. Black and A. Crabtree, eds., Wallingford: CABI Publishing, pp. 299-315, 2006.

[10] S.P. Cottrell, M. van der Donk, and P. Siikamäki, *Results of Questionnaire Study 2007. Report 1 of Socio-Economic Analysis of PAN Parks: Oulanka National Park*. Available at http://www.panparks.org/ Projects/Research/Downloadablestudies/S2, 2008.

[11] R. Puhakka, S. Sarkki, S.P. Cottrell, and P. Siikamäki, "Local Discourses and International Initiatives: Socio-Cultural Sustainability of Tourism in Oulanka National Park, Finland," *Journal of Sustainable Tourism*, submitted for publication.

[12] S.P. Cottrell and J. Raadik, "Socio-cultural benefits of PAN Parks at Bieszscady National Park, Poland," *Finnish Journal of Tourism Research*, vol. 4, no. 1, pp. 56-67, 2008.

[13] S.P. Cottrell, *PAN Parks Methods and Techniques Manual. Monitoring Socio-Economic Aspects of PAN Parks*. Fort Collins: Colorado State University, 2006.

[14] Metsähallitus, "Käyntimäärät kansallispuistoittain 2007," in Finnish, http://www.metsa.fi/page.asp?Section=2842. 2008.

[15] PAN Parks, *Verification Manual. Principles and Criteria 1–3*. Endorsed by the Supervisory Board, available at http://www.panparks.org/Introduction/ Verification/Principles, 2006.

Riikka Puhakka is a post doc researcher in Oulanka Research Station at the Thule Institute/University of Oulu in Finland. She works in the research project "Sustainable Nature-Based Tourism and Adaptive Management of Protected Areas" funded by the Academy of Finland. Her PhD (2007) and MS (2002) are from the University of Joensuu, Department of Geography. In her PhD study, she examined the role of tourism in Finnish national parks. Her current research

interests include socio-cultural sustainability of tourism, and tourists' expectations on national parks and interest towards ecolabels.

Stuart P. Cottrell is an Associate Professor of Human Dimensions of Natural Resources at Colorado State University where he teaches eco/sustainable tourism, and conducts sustainable tourism research. His PhD is from Penn State University (1993), MS from Florida International University (1987) and BS from Western Illinois University (1981).

Pirkko Siikamäki is the director of Oulanka Research Station at the Thule Institute/University of Oulu in Finland. Her PhD (1995) and MS (1992) are from the University of Jyväskylä. Currently she is the leader of the research project "Sustainable Nature-Based Tourism and Adaptive Management of Protected Areas".

MMV4 PROCEEDINGS
SPORTS

Climbing impact on the relief and vegetation of the Tatra National Park

Miłosz Jodłowski, Lukasz Depta, Przemysław Wójcik

Abstract — The Tatra Mts. are the only high-mountain range in Poland, protected as a national park since 1954. The environment of rock cliffs, and especially the vegetation is unique within the mountain ecosystem. However, harsh environmental conditions result in high level of ecosystem vulnerability. In the Tatra National Park climbing activity encompasses all of its disciplines: sport climbing on equipped routes, both short and multi-pitched, traditional climbing as well as the alpine climbing. Recently, new climbing disciplines, such as dry-tooling and bouldering, have also became popular. The climbing impact has been a subject to competitive debate between national park managers, naturalists and climbers, although it has been relatively weakly studied. This study focuses on the landscape changes resulting from climbing activities on the cliff ecosystems located in forest, subalpine and alpine geoecological belts, both on carbonate and crystalline substrate. Within some crags climbing activity is permitted by law, however the others are a subject to illegal exploration. The basis for this study was surveying the existing climbing routes (and state of protection. e.g. bolts and pitons) as well as monitoring of the climbing intensity on specific crags. The landscape changes were identified by geomorphic mapping of cliffs and adjacent slopes as well as botanical studies. Observed landscape changes caused by climbers result mainly in mechanical damage of vegetation, growing instability of slope covers, and micro-relief alteration. The impact significantly differs with reference to climbing disciplines and geological substrate. The largest changes encompassing complete removal of vegetation layer and soil cover result from dry-tooling on limestone cliffs, whereas sport climbing on granite cliffs causes only limited removal of weathered rocks and restraining of lichens succession.

Index Terms — Tatra National Park, climbing impact, relief, vegetation.

Miłosz Jodłowski, Lukasz Depta are with the Institute of Geography and Spatial Management, Jagiellonian University, Gronostajowa 7, 30-387 Kraków, Poland. E-mail: m.jodlowski@.uj.edu.pl.

Przemysław Wójcik is with the Institute of Geography, Pedagogical University, Podchorążych 2, 30-084 Kraków, Poland

A comparative study of offers for recreation in nature parks in Germany and in recreation forests in Korea

Ju-Hyoung Lee, Renate Bürger-Arndt

Abstract — This comparative study was designed to search for the difference in recreational use and recreational offers between German Nature Parks and Korean Recreational Forests. To review current recreational offers, a complete search of the websites of all German Nature Parks and 50% of Korean Recreation Forests was undertaken. The result is compared per category of offers. Hiking is offered as a recreational forest activity in nearly all Nature Parks in Germany (95%) and Recreation Forests in Korea (98%). Apart from hiking, biking (92%) and horse riding (71%) were offered by most of the German Nature Parks whereas Walking (96%) and Fitness trail (76%) activities were mostly offered in Korea. Swimming (66%), canoeing (62%), fishing (43%) and sailing (38%) were very famous water activities in German Nature Parks. However, there are very few water activities except swimming (74%) in Korean Recreation Forests. Environmental education plays an important role in nature friendly recreation. In terms of quantity and quality, there were better offers in environmental education in Germany than in Korea. Nature educational trails were offered by 68% of German Nature Parks compared to 26% of Recreation Forests in Korea. Various environmental education programs for children were 63% in German and only 40% in Korea. Furthermore, there were more offers in German Nature Park, for example environmental guide (56%), environmental education program (47%) and environmental touring (26%). There were nine tour themes in German Nature Parks with the largest proportion (66%) dedicated to experience with nature and 8% for the disabled people. On the other hand, the Korean Recreation Forest has not so many tour themes as in German Nature Parks. Nevertheless, the activities comprise of nature experience (80%), cultural history (72%) and wellness (32%). The demand of recreation users on Infrastructures is very high, therefore almost all of Korean Recreation Forests have Toilet (94%), Kitchen & Water (80%) and shower rooms (68%). They exhibit passive recreation and the environmental education program is less compared to that of German Nature Park, but the infrastructure plays a very important role in nature recreation of Koreans. It sums that, German Nature Parks have more of almost all kinds of recreational offers than Korean Recreation Forests.

Key words: comparative study, German Nature Park, internet search, Korean Recreation Forest, recreation, recreational offer, recreational use

1 Introduction and method

The occident and orient had very different culture and history. Because of differing understanding of nature, they had also high contrast with nature using forms. To review current different recreation use in nature, German Nature Parks and Korean Recreation Forests were compared since both are founded not only for nature protection, but also for recreational use. The recreational offer reflect on exact expectations of recreation users, therefore the different recreational use type of both countries can be recognize through this study.

To review recreational offers, services and infrastructure, a complete search of the websites of all German Nature Parks and

Ju-Hyoung Lee is with the Department of Forest Science and Forest Ecology, Goettingen University, 37077 Germany. E-mail: foersterlee@gmail.com.
Renate Bürger-Arndt is with the Department of Forest Science and Forest Ecology, Goettingen University, 37077 Germany. E-mail: rbuerge@gwdg.de.

50% of Korean Recreation Forest was conducted in 2007.

2 RESULT

The two countries have other direction in environmental education. Installation and furnishing plays an important role in Korean Recreation Forest, whereas programs (including environmental guide, program for children, environmental program, etc) and their contents are the most important in German Nature Park. There are no environmental education activities in only 12% of German Nature Parks as opposed to 24% of Korean Recreation Forests.

There are variable and many activities in German Nature Parks than in Korean Recreation Forests. The activities in Korea is mostly hiking, walking, fitness trail and team sport as well as soft and passive activities, but the offers in German Nature Parks are more active, variety and hard.

There is much difference in the water- and winter activities, because in Korea almost all of the Recreation Forest areas are on the mountains.

TABLE 1

ENVIRONMENTAL EDUCATION (%)

	Germany	Korea
Nature Experience Trail & Nature Educational Trail	68	26
Environmental Education Programs for Children and Youth	63	40
Educational Guide	56	2
Environmental Education Program	47	
Environmental Touring	29	
Nature Research & Nature Observation	18	22
Wild Flower Garden, Plants Garden, Wild Animal Park	15	28
Environmental Education Center, Nature Friend's House	8	2
No Environmental Education	12	24

TABLE 2

ACTIVITIES (%)

	Germany		Korea	
Forest Activity	Hiking	95	Hiking	98
	Biking	92	Walking	96
	Horse Riding	71	Fitness Trail	76
	MTB	37	Team Sport	64
	Nordic Walking	34	MTB	10
	Golf	32	Survival Game	8
	Paragliding	25	Traditional Sport	6
	Inline Skating	21	Youth Fitness	6
	Climbing	20	Bow Sport	4 4
	Tennis	15	Paragliding	4
	Bosseln	8	Gateball	
	Hunting	7		
Water Activity	Swimming	66	Swimming	74
	Canoeing	62	Fishing	4
	Fishing	43		
	Sailing	38		
	Rowing	38		
	Surfing	31		
	Diving	14		
Winter Activity	Cross Country	41	Snow Sledging	18
	Ski &Snowboaring	27		
	Snow Sledging	19		
	Skating	11		
	Curling	8		
	Ice Sailing	1		

TABLE 3

INFRASTRUCTURE OF KOREAN RECREATION FORESTS (%)

Info. office & Parking place	100	Restaurant	20
		Observatory	16
Toilet	94	Stage	16
Kitchen & Water	80	Multifunctional Venue	8
Shower room	68		
Pavilion	58	Traditional large Stool	4
Campfire place	40		
Seminar room	32		

The demand of recreation users on Infrastructures is very high, therefore almost all of Korean Recreation Forests have Toilet (94%), Kitchen & Water (80%) and shower rooms (68%).

TABLE 4

TOURING (%)

Theme	Germany	Korea
Nature Experience	66	80
Hiking	62	
Cultural History	58	72
Biking	54	
Sport	41	18
Environmental Education	38	4
Wellness and Cure	32	32
Suitable for the Family	30	
Ship Cruise	26	
Culinary Food	20	
Horse Riding	12	
City Sightseeing	12	
For Disabled People	8	

3 CONCLUSION

In summary, Korean recreation is characterised by passive activities, few and furnished environmental education with simple tour themes. The reason of this condition is, there is less amount of holiday periods in Korea than in Germany, leading to less experience with Nature in a conurbation life style. In the case of the German Nature Parks, there are variable and many activities, very good offers and few demand on comfortable furnishing.

REFERENCES

[1] The Homepage of Association German Nature Parks (VDN), http://www.naturparks.de
[2] The Homepage of National Korean Recreation Forests, http://www.huyang.go.kr
[3] R. Bürger-Arndt, "Sanfter Tourismus und Erholungsvorsorge im Harz", Schriften Regionalverband Harz, Bd.3, pp. 75-80, 2001.
[4] R. Zundel, "Ergebnisse der Walderholungs-forschung", 91 pp, 2002.
[5] P. Elsasser, "Struktur, Besuchsmotive und Erwartungen von Waldbesuchern - Eine empirische Studie in der Region Hamburg", Arbeitsbericht des Instituts für Ökonomie, 96/1, 19 pp, 1996.

M.Sc. Ju-Hyoung Lee (Korea) Ph.D Student at the University of Goettingen, Germany. Nature protection and recreational use, Nature use and history, International comparative study

Prof. Dr. Renate Bürger-Arndt Professor at the University of Goettingen, Germany. Protection of biodiversity, Nature and landscape conservation, Nature protection and recreational use.

Extended vulnerability of ski tourism to global change

Tobias Luthe, Ralf Roth

Abstract — The current and forecasted outcomes of global change put ski destinations under different stresses. Climate change is the most discussed and the most obvious factor that directly affects the economic success of ski areas. Latest since the last OECD report a broad discussion about such ski areas that will lose from climate change, namely the lower and smaller ones, and those potentially winning being the higher and bigger ski areas, got started. This discussion has been focusing on the main vulnerability factors elevation, size and snow making capacity. Technical snow making is the main kind of adaptation to climate change being discussed and applied. But in addition to climate change there are socioeconomic and demographic developments that lead to other grades of vulnerability for ski tourism. In the research project SkiSustain we aim to develop a sustainability management framework for ski destinations responding to global change. In the supply side part we did personal qualitative interviews in thirty six ski areas of four Alpine countries after the extremely warm winter of 2006/07. Ski areas were picked for interviews as the main drivers of investments and employment in ski destinations. Research questions were about the perception of vulnerability to global change and strategies and possibilities of adaptive capacity. In the interviews ski area managements were confronted with recent results from the customer demand survey Save-Snow to find out about the possibilities to drive changes to chances, for example by softer means of adaptation and more mitigation and partnering more with the customer. Results show that the view on vulnerability of ski destinations needs to be extended from a current climate change and elevation focused view to a much more diverse one. Current means of adaptation will not be suitable to tackle the sum of challenges from global change.

Index Terms — Extended Vulnerability Factors, Global Change, Ski tourism, Sustainable Adaptation

1 Introduction

Climate change is seen as the main threat to ski tourism. The main impact is the rise in average temperatures with a decrease in natural snow reliability especially in lower elevations [1], [2], [3], [4], [5]. The main kind of adaptation applied is the technical production of snow. Ski areas in lower elevations and of smaller size are seen as losing from the impacts because of less snow making potential and investment opportunities. Higher and bigger ski areas are seen as the winning ones [6]. Forecasts for the future development of ski tourism focus on direct impacts of climate change and of technical adaptation, mainly snow making, expansion and landscaping. Higher and bigger areas thus are forecasted to remain, smaller and lower ones to disappear [4]. After the winter 2006/07 we examined the experiences and perceptions of twenty ski area managements in four Alpine countries. The winter 2006/07 was the warmest in records and can be taken as an analogy for future winters becoming more frequent with similar temperatures [11].

T. Luthe is with German Sport University. Cologne Lindenallee 34 D-82041 Deisenhofen. E-mail: info@tobiasluthe.de
R. Roth is with German Sport University. Cologne Lindenallee 34 D-82041 Deisenhofen.

2 Research questions and goals

On the supply side of ski tourism we picture the destination as a system but focus on the

ski area and there on the ropeways companies as the main driving forces and the main threatened stakeholders. The interviews reflect the experiences of the unusually warm winter 2006/07. The main questions we focus on centre around the experiences of ski area managements after this analogue winter:

- How do ski areas perceive global change after their experiences of an analogue winter for future developments?
- How vulnerable do they think to be and which are sensitivity elements?
- How do they estimate their adaptive capacity and what are their adaptation strategies?
- Where do ski areas see the need for action, and where do they see chances in global change?
- What is their willingness for mitigation and would ski areas believe and invest in sustainable ski tourism?

We seek to address a number of ski areas being representative for the various kinds of existing ski areas in the main Alpine countries.

3 Methods

The research objectives of the supply side part of this study asked for a qualitative approach with the advantages of receiving more individual and in-depth information than it would have been possible with a quantitative survey. The goal here was not to get representative results of the ski areas in the Alps. It was rather to discuss the experiences of the analogue winter 06/07 in more depth and to include the personal experiences and visions of the ski area managers. In such a discussion it is possible to inductively adapt and develop the topics according to the personal experiences and visions of the interview partner to discover topics or issues the scientist might not have thought about in advance [7].

In order to include advantages of both kinds we chose to follow semi-structured interview plans that were guide-lined by a lined-up set of topics and questions that left enough space for going more in-depth in the one or the other topic. We thus were able to be open for the individually different experiences and situations of the interviewed partner and still came to comparable results that would be structured enough to be analyzed and compared with each other.

Our method of choice was thus the qualitative semi-structured guide-lined personal expert interview with a planned duration of about one hour of time each.

3.1 Data Analysis

The interview data was analyzed with qualitative content analysis [8], [9], [10]. We were using content analysis software MAXqda2 for the coding and the handling of the transcriptions and text bits.

3.2 Selection of Ski Areas

The ski areas were selected in order to find an even distribution in the four main Alpine countries Austria, Switzerland, France and Italy, furthermore by five categories to represent an average of ski areas in the Alps and to cover the main existing kinds of ski areas. The selection criteria were elevation, size, access, if glacier skiing is offered and the image of the destination. We combined these factors to four categories of selection:

- Low and small
- Low and big
- High and rather small
- High and big

We matched these categories with the two classes of a world leading destination (12 ski areas) and a destination of local or regional importance (8 ski areas) within the four countries.

4 RESULTS

The results show that indeed those ski areas in higher elevations suffered much less, if at all, from the lack of snow, because of their potential of snow making. The lower ski areas had huge losses due to either not enough snow making capacity and/or too high temperatures for snow making. Thus, for coping with the direct impacts of climate change technical adaptation is adequate. But, the majority of higher areas instead experienced problems of social kinds, being indirect impacts of climate change and other aspects of a broader development referred to as global change. These effects are seen as being of even greater importance in the future requiring an extended view on vulnerability. The current focus on technical adaptation proofed to be not appropriate in this case and even unsustainable. Even more, the limits of technical adaptation from a resource point of view and the looping accelerating feedbacks on climate change and general environmental degradation demand for a more systematic adaptive toolbox with a shift to different kinds of behavioural adaptation including mitigation aspects with technical adaptation remaining an important integral part of it.

Major aspects in increasing adaptive capacity are more diversity of operations and in seasons, pro-active communication with the customer, also through the media, and strategic partnerships inside and outside the destination. Hereby thorough market research, benchmarking of quality and of services need to be improved. More data on the customer and more data on the outcomes of global change should help to decrease the uncertainty that makes adaptation even more difficult.

A “Model Europe” of ski destination and ski area governance is being described and shall be of strong future interest. The North American resort structure can serve as an example that needs to be adapted to the European conditions. We found the model of Dolomiti Super Ski as a good example in a more open direction of strategic partnerships on a regional scale that needs to be filled with solutions on a local and an individual level. More diversification of the ski area operations and ownerships and more partnering with the destination will be of key interest. Massive concentration processes are ongoing and a shrinking number of ski areas will result.

The international scope of this qualitative study reveals very little differences in countries. The Germanic speaking countries are very close and equal in their perceptions, opinions and strategies, as the interviewed ones in the Italian Dolomites are. In France there are some more different opinions, more classic, more conservative views on vulnerability and adaptation strategies. Classic alpine skiing remains the main focus, the French system of governance of ski areas by single companies with centralized steering as it is now may not be the model that copes best with the challenges.

5 CONCLUSIONS

This extended view on vulnerability of ski tourism and adaptive capacity opens up chances too, such as developing new market niches and new partnerships. One example is the growing market of sustainable consumption, of going green. For a ski area this could open up new ways of operations, of costs savings, of efficiency and of “soft” adaptation, of mitigation and of new partnerships with the customer. Sustainable tourism is a way of sustainable adaptation and a market of the future ski areas will address. It is seen as a niche though for smaller ski areas and a complementary aspect on top of the basic services such as snow reliability, modern lifts and high quality ski runs. Sustainability as a strategic approach is expected to become mandatory for ski tourism. Still there is no substantial data on the market of demand for sustainable ski tourism we can base assumptions on.

REFERENCES

[1] C. Schneider and J. Schönbein „Klimatologische Analyse der Schneesicherheit und Beschneibarkeit von Wintersportgebieten in deutschen

Mittelgebirgen". *Schriftenreihe der Deutschen Sporthochschule Köln, Institut für Natursport und Ökologie,* 19. 2006.

[2] W. Seiler „Der Klimawandel im Alpenraum. Trends, Auswirkungen und Herausforderungen". *Vortrag im Rahmen der 31. Sitzung des Ständigen Ausschusses der Alpenkonferenz.* Galtür, Austria. 2006.

[3] M. Zemp et al "Alpine glaciers to disappear within decades"? *Geophysical Research Letters,* 33. 2006.

[4] OECD "*Climate Change in the European Alps: Adapting Winter Tourism and Natural Hazards Management."* Organisation for Economic Co-operation and Development OECD, 2007.

[5] IPCC "Climate Change 2007: Impacts, Adaptation and Vulnerability". IN II, I. W. G. (Ed.) Fourth Assessment Report of the IPCC. 2007.

[6] H. Elsasser and R. Bürki „Auswirkungen von Umweltveränderungen auf den Tourismus – dargestellt am Beispiel der Klimaänderung im Alpenraum". IN BECKER/HOPFINGER/STEINECKE (Ed.) 2003. *Geographie der Freizeit und des Tourismus – Bilanz und Ausblick.* München-Wien, Oldenbourg Verlag.

[7] A. Bogner „Das Experteninterview". Wiesbaden, Verlag für Sozialwissenschaften. 2005.

[8] P. Mayring "Qualitative Inhaltsanalyse". Forum Qualitative Social Research. 2000.

[9] P. Mayring "Einführung in die qualitative Sozialforschung. Eine Anleitung zum qualitativem Denken". Weinheim & Basel: Beitz Verlag. 2002.

[10] P. Mayring "Qualitative Inhaltsanalyse. Grundlagen und Techniken". Weinheim, Basel, Beltz. 2003.

[11] M. Beniston "Entering into the "greenhouse century": recent record temperatures in Switzerland are comparable to the upper temperature quantiles in a greenhouse climate". *Geophysical Research Letters,* 34. 2007.

Tobias Luthe Diplom Forstwirt, University of Freiburg (2001), M.A. Education and Environment, University of Rostock (2005), PhD studies in Human-Environment Systems, German Sport University Cologne (2008). 2003-2008 Sustainability Coordinator German Ski Federation.

Ralf Roth Dr. rer. nat., full Professor and head of the Institute of Outdoor Sports and Environmental Science, German Sport University Cologne. Head of the Board of Environment and Sustainable Snow Sports Development, German Ski Federation.

Climate change and ski areas in Trentino region, Italy

Antonio Raschi, Alfonso Crisci, Sara Mikicic

Abstract — The existence of an ongoing climate change cannot be denied, or hidden, and tourism is going to be affected by it to a large extent. The analysis of current trends in the response of tourism to climate change, in conjunction with the forecast of future climate scenaries, can help us in focusing the possible solutions to future possible problems. This work focused on the existing trends in winter tourism in the Trentino region (Italian Alps), by analysing, for the years 1981/1982 to 2007/2008, the climate data from six meteo stations located in ski resorts characterized by different height and geographical position. Data analysis showed that the number of the days with more than 20 cm of snow, minimum level for permitting skiing, is reducing, and interannual variability is increasing. The trend is particularly evident for lower altitude areas. The average, minimum and maximum temperatures of above mentioned winter periods was compared with tourist arrivals suggesting an inverse correlation, with a marked decrease in tourists arrivals in higher temperature periods. The results support the conclusion that the tourists will be obliged to reach higher ski areas with lower temperature and adequate snow level, while a further increase in temperatures will lead the lower ski areas to disappear, and the high seasonal variability will put at risk winter tourism itself in many areas. The further perspective of research, on tourism trends in summer season, will also be outlined.

Index Terms — Climate change, meteo, ski, winter tourism

Antonio Raschi, Alfonso Crisci are with CNR – IBIMET, Firenze, Italy.

Sara Mikicic is a student of University of Primorska, Faculty of Humanities, Koper, Slovenia.

The role of sport activities in Alpine summer tourism

Veronika Wirth, Ulrike Pröbstl and Wolfgang Haider

Abstract – Throughout the Alps, natural integrity, outstanding landscape beauty, and the opportunity to pursue various sport activities are key elements of the tourism product, and influence the choice of destinations. This paper focuses on the role of sports activities in the choice of Alpine destinations. The data were collected from a representative random sample of German tourists. The core element of the survey is a stated choice survey in which respondents had to make repeated choices between two hypothetical alpine destinations which were disguised as web sites with changing characteristics and landscape features. The results of the discrete choice experiment show that the sport activities contribute significantly to the destination choice, and that the respondents are rather heterogeneous, leading to the identification of different segments in a latent class segmentation. The largest segment is comprised of the social and activity oriented tourists (55%), followed by nature and alpine oriented tourists (31%), and finally by tourists interested predominantly in relaxing (14%). Their divergent preferences and expectations will be described below. The importance of this research is that these segments have been identified directly from the choice responses, instead of from some attitudinal or motivational set of questions. The findings indicate that sport activities play an important role in the destination choice for alpine summer holidays, but their significance differs between segments. For marketing and management purposes these results highlight that the target groups and related marketing campaigns must be adapted to new trends and societal changes. To attract and enlarge the less active tourism segment the Alps should be positioned as silent place where relaxing in a healthy environment and outstanding landscape is possible.

Index Terms – Alps, destination choice, discrete choice experiment, sport activities, summer tourism

1 Introduction

The alpine region has always been one of the major destinations for summer tourism in Europe. The natural integrity, the options for special sport activities and the outstanding landscape beauty are key elements of the tourism product.

For visitors, destination choice is a complex decision process. A holiday is a high value purchase and usually high expectations are associated with it. The decision is also risky, especially for first time visitors who cannot test or inspect the product [3], [4]. The interaction among the crucial elements mentioned above in this decision process is not yet thoroughly investigated. In this paper we will focus on the role of various sports activities in destination choice.

Firstly, it is assumed that activities generally have a very high influence on the destination choice in the Alps. Secondly, it is assumed that activities that rely on specific alpine or mountainous features have more influence on the destination choice than activities that can be experienced in any landscape.

V. Wirth, Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Applied Life Sciences, Vienna, E-mail: veronika.wirth@boku.ac.at.
U. Pröbstl, Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Applied Life Sciences, Vienna, E-mail: ulrike.proebstl@ boku.ac.at.
W. Haider, School of Resource and Environmental Management, Simon Fraser University, Burnaby, B.C., Canada, E-mail: whaider @sfu.ca.

2 METHODS

2.1 Sampling

The study is based on a representative random sample of German tourists, who constitute the major source of tourists for alpine summer tourism [5]. An online survey, investigating the choice for summer vacations in the Alps was run in February and March 2008. The sampling was conducted via an online panel. The survey consisted of 34 questions, reduced to 24 for non-alpine interested persons. With a return rate of 54% a total of 1,153 completed questionnaires were obtained.

2.2 Discrete choice experiment

A discrete choice experiment (DCE) was designed to investigate the complex destination choice process. Discrete choice experiments are a stated preference research method. In a DCE, two alternatives, varying in different attributes are contrasted. Thus, the alternatives are evaluated as a whole [6].

In this study respondents choose between two different alpine destinations or they were offered the opportunity to travel elsewhere. To make the choice task more realistic the alternatives were designed so they appeared like actual websites of holiday destinations, and varied in different attributes: several types of alpine landscapes and protected areas, different village sizes and various activity and cultural offers.

Altogether 17 attributes with 3 attribute levels each were used in the design, leading to 3^{17}, i.e. 129,140,163 possible combinations. An orthogonal fractional factorial design was used to select a small number of these combinations for the survey instrument [7], [8]. Only 72 choice sets were required to estimate all main effects and select interactions effects. One respondent evaluated six choice sets, so that the 1,006 respondents supplied a total of 6,036 choices.

For the analysis Latent Gold Choice 4.0 [9] was used, which produces a regular multinomial logit model, as well as a latent class segmentation [10], [11]. Latent classes are characterized by maximizing homogeneity within classes and maximizing differences between classes and will be described below.

The following activities were offered by each of our summer destinations: Hiking, swimming, mountain biking, rock climbing/ fixed rope routes, horseback riding, golfing, and (unspecified) indoor offers [12], [13]. It turned out that for the analysis it was most efficient to combine some of these activities in the following manner: mountain biking and rock climbing/fixed rope routes as both represent recent trend sports and are fairly dependent on the alpine environment; horseback riding and golfing, both representing prestige sports which are fairly independent of specific landscapes; finally, hiking, swimming and indoor offers were investigated as separate variables.

3 SELECTED RESULTS

In a rating task, the most important motives for spending summer holidays in the Alps were “resting and relaxing” and “experiencing nature and landscape”. Interestingly, “physical fitness and sports” was rated fairly low in comparison.

In the choice experiment all activities are evaluated at once, and the various sport activities played a significant role in the destination choice but there are large differences.

To account for heterogeneity, three segments have been identified by latent class segmentation: social and activity oriented tourists (55%), nature and alpine oriented tourists (31%) and relaxing oriented tourists (14%) (the parameter estimates for each of the activity related variables are presented in Fig. 1-5, where the y-axis shows the part-worth utility, and the x-axis the availability of the respective activity; when activities were combined, then the number of stars were simply added up).

The group of social and activity oriented tourists is the youngest segment. For mem-

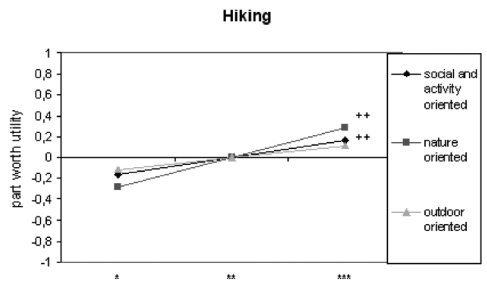


Fig. 1. Part worth utility of hiking in the destination choice in the Alps plotted against quality of the offer (n=1006) ++ p<0,01, + p<0,05, (+) p<0,1

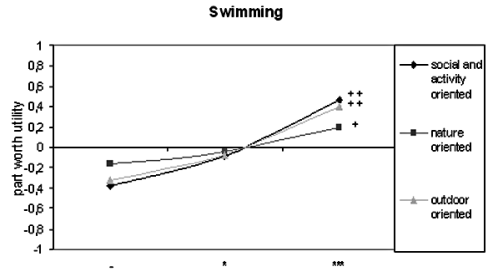


Fig. 2. Part worth utility of swimming in the destination choice in the Alps plotted against quality of the offer (n=1006), ++ p<0,01, + p<0,05, (+) p<0,1. In the current study the alpine interested respondents of the overall sample had to make a choice between two different alpine destinations or travelling elsewhere. Websites of holiday destinations were simulated in the study to make the choice task more realistic. The destinations varied in different attributes: various alpine landscapes and types of protected areas, different village sizes, cultural offers and various sport activities. Here, sport activities offered in alpine destinations have been selected [11], [12]: Hiking/mountaineering, mountain biking, climbing/fixed rope routes, swimming, horse-riding, golfing and indoor offers.

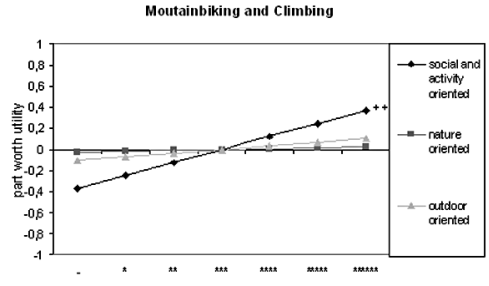


Fig. 3. Part worth utility of mountain biking and climbing in the destination choice in the Alps plotted against quality of the offer (n=1006) ++ p<0,01, + p<0,05, (+) p<0,1

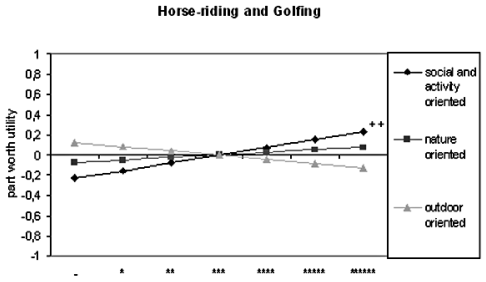


Fig. 4. Part worth utility of horse-riding and golfing in the destination choice in the Alps plotted against quality of the offer (n=1006) ++ p<0,01, + p<0,05, (+) p<0,1. In the choice experiment combining different attributes like landscape character, cultural, sport and educational offers, the sport activities played a significant role for the destination choice as assumed. Three groups have been identified by latent class segmentation: social and activity oriented tourists (55%), nature oriented tourists (31%) and outdoor oriented tourists (14%). There are some common characteristics and also several differences.

Fig. 5. Part worth utility of indoor offers in the destination choice in the Alps plotted against quality of the offer (n=1006) ++ p<0,01, + p<0,05, (+) p<0,1

bers of this segment it is important to experience sports in a group. In their destination choice all activity types, the alpine trend sports, the alpine independent prestige sports and hiking and swimming are significant.

The nature and alpine oriented tourists constitutes the oldest segment. For this group it is important to experience nature and solitude. Members of this group have above average knowledge of protected areas, and they have a special interest the Alps. For them only hiking as the classical alpine activity and swimming are significant in the destination choice (see Fig. 1 and 2).

The third group, the relaxing oriented tourists are also composed of mostly older tourists. For this group sport activities play a very subordinate role (see Fig. 3 and 4). In their destination choice only swimming and indoor offers are relevant.

So both hypotheses prove only partly true. Sport activities play an important role in the destination choice for alpine summer holidays, but their significance differs between segments.

Hiking as core alpine summer sport activity plays an important role for the vast majority of visitors, regardless of segment. Alpine related trend sports (climbing/fixed rope routes and mountain biking) are only slightly more important in the destination choice than sports independent of the Alps (golfing, horse-riding, indoor). The most important activity proves to be swimming that can be experienced in many alpine destinations as well as in other landscapes.

4 Conclusions and Outlook

Tourism marketing for the Alpine area is in most cases illustrated with pictures of very active recreationists, like climbers, hikers or mountainbikers. Against the results of this study this tradition must be reconsidered. Overall the motive "physical fitness and sports" is ranked fairly low as a motive for spending summer holidays in the Alps. About 45% of the respondents are interested in little or no activities. Within this group of less active tourists there is a segment of 14% which perceives sport activities as not important in the destination choice for the Alpine area. The rest of this group is interested in hiking and swimming only. This segment might gain more importance in the future with an increasingly ageing society. Nevertheless for one segment sport activities proved to be an important decision criterion in the investigation of destination choice in the Alps.

The types of alpine visitors have always changed over time. These findings indicate that the target groups and related marketing campaigns must be adapted to new trends and societal changes. To attract and enlarge the less active tourism segment the Alps should be positioned as silent place where relaxing in a healthy environment and outstanding landscape is possible. This theme might also get gain more prominence in the context of climate change [14] as longer periods of heat can be expected in lowland areas and in Mediterranean destinations.

When interpreting our data it should also be considered that these results include both the decision behaviour of alpine tourists as well as of potential new alpine tourists who indicated some interest, but so far have little or no alpine experience.

5 Acknowledgements

The authors wish to thank Dr. Vogel, Berchtesgaden National Park, Germany, for providing funding for this study.

References

[1] Forschungsgemeinschaft Urlaub und Reisen: Reiseanalyse 2004, Hamburg, 2004.

[2] European Travel Commission "Tourismustrends für Europa." <http://www.etc-corporate.org/modules. php?name=Content&pa=showpage&pid=100&ac=5 >, 2006 [cited 2007-11-22].

[3] A. C. Liping, "Cooperative Branding For Rural Destinations", Annals of Tourism Research, vol. 29, no. 3, pp. 720–742, 2002.

[4] J. Swarbrooke and S. Horner, "Consumer behaviour in Tourism", Butterworth-Heinemann, Oxford, 1999.

[5] Statistik Austria, „Tourismus in Zahlen. Österreich 2006/07", http://www.statistik.at/web_de/statistiken/ tourismus/beherbergung/index.html, 2007 [cited 30 April 2008].

[6] Ben Akiva, M. and S. R Lerman, "Discrete Choice Analysis: Theory and Application to Travel Demand". MIT Press, Massachusetts, 1997.

[7] Louviere, J., Hensher, D. A. und J. Swait, "Stated Choice Methods. Analysis and Application". Cambridge University Press, Cambridge, 2000.

[8] Montgomery, D. C., "Design and Analysis of Experiments". Wiley, New York. 5. Ed., 2001.

[9] Vermunt, J. K. und Magidson, J. "Latent GOLD 4.0 User's Guide". Statistical Innovations Inc, Belmont, Massachusetts, 2005.

[10] Train, K. E., “Discrete Choice Methods with Simulation”. Cambridge University Press, Cambridge, 2002.
[11] Boxall, P. C. und Adamowicz, W. L. (2002): Understanding Heterogeneous Preferences in Random Utility Models: A Latent Class Approach. Environmental and Resource Economics 23(4), 421-446.
[12] ÖsterreichWerbung. “Tourismus Monitor Austria. Urlauber in Österreich. Sommer 2006.” <http://www.austriatourism.com/xxl/_site/int-de/_area/465219/_subArea/465252/_subArea2/657910/_id/702883/marktforschung-tourismus-studien2007.html>, 2006 [cited 2007-10-30].
[13] Schlich, R., Simma, A. und Axhausen, K. W.: „Zielwahl im Freizeitverkehr“. Arbeitsbericht Verkehrs-und Raumplanung Eidgenössische Technische Hochschule Zürich, Institut für Verkehrsplanung und Transportsystem, 2002.
[14] Müller, H.-R., Weber, F., und E. Thalmann, „Tourismus“. In: OcCC / ProClim (Hg.) Klimaänderung und die Schweiz 2050. Erwartete Auswirkungen auf Umwelt, Gesellschaft und Wirtschaft, Bern. 79-94., 2007.

Veronika Wirth, DI, studied landscape planning in Weihenstephan, Germany. She is a research assistant and a PhD candidate at the Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Applied Life Sciences, Vienna. Her current research interests are recreation and conservation planning, as well as nature based tourism and possible adaptation to climate change.

Ulrike Pröbstl, Univ. Prof. Dr. DI., studied landscape planning in Munich, Germany. After her PhD in forestry in 1988 she was the director of a planning and research office in Germany. She holds the chair of Landscape Development, Recreation and Tourism at the BOKU University of Natural Resources and Applied Life Sciences, Vienna, Austria. She is member of several national and international professional bodies. She published 6 books and more than 20 papers; current research interests deal with conservation planning, landscape development, adaptation to climate change, and nature based tourism.

Wolfgang Haider, Assoc. Prof., Dr., M.Sc., M.A., studied geography in Vienna, Austria and Carleton University, Canada. After his PhD at McGill University he worked as Social Research Scientist at the Centre for Northern Forest Ecosystem Research in Thunder Bay. Now he is at the School of Resource and Environmental Management at Simon Fraser University in Burnaby, B.C., Canada. He has published over 40 peer reviewed papers. His current research interests include social science survey methods and discrete choice experiments, with applications in outdoor recreation and tourism as well as other directions of human dimensions research.

MMV4 PROCEEDINGS
VISITOR MANAGEMENT

A reassessment of the encounter – norm – crowding relationship for reservoir-based recreation

James D. Absher, Alan R. Graefe, Gerard T. Kyle

Abstract — It is generally accepted that recreation capacity decisions rely heavily on an evaluative component, especially those related to crowding. However, there are many unresolved issues in measurement and recreational capacity management arising from such an approach (e.g., Vaske & Donnelley, 2002; Manning, et al., 1999). This paper reviews the research that supports a normative approach and analyzes data from seven reservoirs in the US (California, Arizona, Nevada and Texas; n= 4,682). For each lake similar preference, expectation, and evaluative measurements were obtained. The seven lakes serve a variety of boating interests including daily launch (trailer access), marina slip, and rental boating. For this analysis we compare expectations-based norms and differences in evaluative standards and effect size indicators that are appropriate to boating recreation on these lakes. Separately we also address type of access, craft, and setting specific crowding indicators (e.g. at launch site, on open water). Crowding is measured using the now standard 9-point scale (Vaske & Shelby, 2008). Analyses rely on simple comparative tests: t-test, effect size and ANOVA. Overall, the results show that for reservoir boating there is evidence for a generalized encounter-norm relationship and further demonstrate that self reports of crowding are useful to gauge variation attributable to particular uses and settings. The paper concludes with implications for further development of the notion of carrying capacity and its reliance on crowding measures as robust social indicators useful to boating management decisions

Index Terms — Carrying capacity, recreational capacity management, reservoir-based recreation.

James D. Absher is with the US Forest Service.

Alan R. Graefe is with the Pennsylvania State University.

Gerard T. Kyle is with the Texas A&M University..

Valais excellence: a system to better manage visitor flows during sport events

Christophe Clivaz, Nancy Favre

Abstract — The tourist areas seek more and more to organize (outdoor) sport events. These events generate many impacts from the point of view of sustainable development. Often proceeding in rural and/or protected landscapes, their environmental impact must be managed in an optimal way by the organizers. In the same time, these events have to maximize their social and economic benefits for the host area. This paper presents the management system "Valais excellence" developed in Switzerland and discusses its contribution to a sustainable management of the various impacts of sport events.

Index Terms — Impact analysis, Management system, Sport events.

1 Introduction

The tourist areas seek more and more to organize (outdoor) sport events in order to attract people out of the peak season and to profile themselves as dynamic destinations on the tourist market [1]. These events (running races, mountain bike races, ski races, etc.) attract thousands of spectators in addition to the participants. They generate many impacts from the point of view of sustainable development [2]. Often proceeding in rural and/or protected landscapes, their environmental impact must be managed in an optimal way by the organizers. In the same time, these events have to maximize their social and economic benefits for the host area.

In this context, this paper presents the management system "Valais excellence" developed in Switzerland and discusses its contribution to a sustainable management of the various impacts of sport events. A special attention is dedicated to the environmental impacts and the management of visitor flows.

2 Valais Excellence Management System®

Valais excellence (www.valais-excellence.ch) is an innovative approach which introduces sustainable management into the heart of SME's (small and middle size enterprises). Starting from the idea that the success of a company depends on the professionalism and the excellence of the offered services, Valais excellence has the objective to support the installation of integrated management systems (environment - quality - safety - finances - human resources) in the companies in order to meet of customers request. This system proposes instruments in order to facilitate the integration of these management systems. Operating partly on Intranet and Internet, it makes it possible to determine the company processes and to link them together. The final objective is the certification of the processes

Christophe Clivaz, University Institute Kurt Bösch (IUKB), Case postale 4176, 1950 Sion 4, Switzerland E-mail: christophe.clivaz@iukb.ch
Nancy Favre, Swiss Graduate School of Public Administration (IDHEAP), Route de la Maladière 21, 1022 Chavannes-près-Renens, Switzerland E-mail: nancy.favre@idheap.unil.ch.

according to ISO 9001 & 14001 (International Organization for Standardization) and OHSAS 18000 (Occupational Health and Safety Assessment Series) standards.

By the installation of the integrated management system Valais excellence, a real synergy is created between the participating companies which can have access to examples of good practices (databases of processes, activities, indicators, environmental and safety aspects, charters of companies, etc) thanks to a platform of experience sharing. The tool of benchmark proposed by the system give the companies the possibility to compare their performances with the ones of other companies of the same branch, this in the five fields (environment - quality - safety - finances - human resources).

The project Valais excellence was launched eight years ago in the canton of Valais (Switzerland). In the beginning intended for the tourist sector, it since was extended to all the economic sectors. It gathers today more than 100 companies and institutions which can communicate under the label Valais excellence. This label "was conceived to be a sign of recognition for the companies which are managed according to the principles of sustainable development and continuous improvement. To have the label must allow a differentiation and a better positioning at the competing level. It is also a hyphen between the area and the companies. The image diffused by the label Valais excellence is directly dependent on the quality of the labellized companies. (…) The ambition of the label Valais excellence is to become the symbol of a Valais which evolves, as well as the symbol of a model of sustainable development and quality centered on people. Its mission is to create a new and exemplary dynamics in Valais by taking support on the most innovating and dynamic actors of the area." [3]

Concretely, to obtain the right to use the label Valais excellence, the companies or institutions have to be certified ISO 9001 & 14001, then after one year of exploitation of the certified management system, to successfully pass a specific procedure of audit for the label Valais excellence. This procedure is done on the basis of a checklist which contains three blocks of indicators (see Fig. 1) noted on a rating scale of 5 levels for the "performance degree" and of 3 levels for the "relevance degree". It is carried out by accredited organizations whose certifiers are especially trained for this purpose. A performance degree of 3 out of 5 for each block of indicators is necessary to obtain the label.

3 THE "EVENT SOLUTION" OF VALAIS EXCELLENCE MANAGEMENT SYSTEM®

To optimize the operation of companies, Valais excellence is adapted in the various branches of the tourist and economic sectors (hotels, ski lifts, transports, tourism offices, wine companies, etc). "Event" is one of these branches.

The difference between a company and an event is important. A sport event is more interested in athletic performance than in profitability and he employs many volunteers. Another specificity of a sport event refers to its "stakeholders", which includes participants, spectators, journalists, sponsors and communities, all with different needs. The activities of an event, who takes place once a year, are also different. But an event also involves environmental impacts and takes into account the security aspect. The logic of excellence is similar and the events must go through a professionalization of their organization. The principles of Total Quality Management (management of financial resources, human resources management, environmental management, quality management and security management) on which the system Valais Excellence is based have been adapted for sports events [4]. It means processes and activities defined specifically for the events, considering the various stakeholders and the phases of an event (before the event, during the event, after the event). It also means security and environmental tools adapted to measure the impact of events.

	Blocks of indicators and questions	Performance degree	Relevance degree
1	**Social indicators**		
1.1	Origin of the collaborators		
1.2	Qualification of the collaborators		
1.3	Training of the collaborators		
1.4	Satisfaction of the collaborators		
1.5	Work conditions		
1.6	Health and safety at work		
1.7	Implication of the company / of the collaborators in Valais		
2	**Economic indicators**		
2.1	Added value in Valais		
2.2	Link with the Valais identity		
2.3	Relations with the companies		
2.4	Satisfaction of the customers		
2.5	Viability and economic perenniality of the company		
2.6	Implication of the company in Valais		
3	**Environmental indicators**		
3.1	Respect of the standards		
3.2	Implication of the company on the exploitation level		
3.3	Implication of the company on the collaborators level		
3.4	Implication of the company on the customers level		
3.5	Implication of the company in Valais		
	Mean performance degree		

Fig. 1. Indicators of Valais excellence Management System®.

As an example, Fig. 2 shows the environmental analysis a mountain bike event using Valais excellence Management System has to carry out. It is not possible to explain here all the elements of this environmental analysis. One can nevertheless stress that the question of the displacement of participants and spectators is taken into account. Noting that the majority of participants and spectators go on the competition sites being often alone in their vehicle, which brings air pollution and, to a lesser extent, problems of noise, the direction of the race decided to support co-conveyance for the next editions.

Processus / Aspect [*]	Situation Normale [*]	Situation Non-Maîtrisée [*]	Maîtrise Operationelle [*]	Suivi Performance [*]	Priorités d'améliorations [*]	Date
Marketing - Communication - Information [R] [*]						
Gestion des papiers [R] [*]	1 ✓	1 ✓	✓	✓	11 ✓	19/04/2007 15:07
Gestion cantine [R] [*]						
Approvisionnement [R] [*]	1 ✓	1 ✓	✓	✓	12 ✓	19/04/2007 15:54
Préparation et vente de repas [R] [*]	6 ⚠	1 ✓	✓	✓	12 ✓	19/04/2007 16:00
Vente de boissons [R] [*]	6 ⚠	2 ✓	✓	✓	10 ✓	19/04/2007 16:01
Gestion compétition [R] [*]						
Elaboration d'un parcours VTT [R] [*]	2 ✓	1 ✓	✓	✓	12 ✓	02/06/2007 09:41
Déplacement des participants [R] [*]	7 ⚠	1 ✓	✓	✓	10 ✓	19/04/2007 16:12
Ravitaillement participants [R] [*]	2 ✓	2 ✓	✓	✓	12 ✓	02/06/2007 09:37
Gestion animations [R] [*]						
Déplacement public [R] [*]	7 ⚠	2 ✓	✓	✓	12 ✓	19/04/2007 16:19

Fig. 2. Environmental analysis for Solid'air (mountain bike race in favour of the fight against the cystic fibrosis).

To date, only one sport event finished the certification process (Solid'air) whereas three horse shows organized by the same professional structure will soon obtain the certification Valais excellence. However, three sport events (an alpine marathon, a long distance mountain bike race and a multi-sport race) began the certification process but gave up. Mainly two reasons explain this abandonment: strategy changes within the organizing committees and a too heavy workload for organizers who are in general volunteers. The success met by the solution "Event" near the organizers of sport events is thus rather mitigated up to now.

4 A NEW TOOL : THE "EVENT PROFILE"

The relative "heaviness" of the management system Valais excellence for sport event organizers who have not a professional structure was one of the reasons which convinces the director of Valais excellence to take part in a research project whose objective is to develop a more "simple" tool. Financed mainly by the Swiss Commission on technology and innovation (CTI) and carried out jointly by the Institute of Business information systems of the University of Applied Sciences of Western Switzerland and the Swiss Graduate School of Public Administration, this project entitled "Knowledge management tools for sport events" started in spring 2007 and finish currently. It in particular led to the creation of an electronic file called "Event Profile". This file can be used by organizers to make an assessment of their sport event according to six fields (self-evaluation): economy, environment, society, safety, quality and management. Graphically the results are presented in the form of "radars" for each field. Fig. 3 presents as example the radar obtained by Solid'air for the field "environment" (energy, waste, noise, CO_2, land and landscape, water). One can notice that this event must in particular improve its waste management and minimize the impacts related to the displacement of participants and spectators (CO_2 emissions).

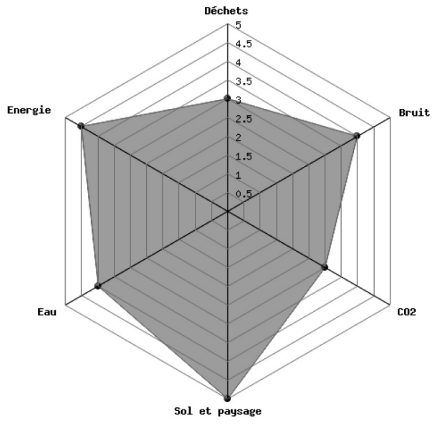


Fig. 3. Environmental radar of the Event Profile for Solid'air.

In Switzerland, the Sportevent-scorecard project (www.sportevent-scorecard.ch) had already led to a list of economic, ecological and social indicators for sport events [5], but the measurement of these indicators implies the engagement of important financial resources which limits the use of these indicators to the biggest sport events. The Event Profile can on the contrary be used by small events working with an exclusively voluntary structure.

Simpler to put into practice than the Event solution of Valais excellence, the Event Profile tool does not have however the same finality: the aim is not to improve the operational management of sport events by the means of internationally recognized quality management systems (ISO, OHSAS), but simply to make an assessment of the strengths and weaknesses of the event. Moreover, the Event Profile tool was set up with the idea to answer not only the needs of event organizers but also the ones of local communities which support sport events financially. It must indeed help them to select the events whose radars correspond the most to their waitings. We will see in the coming years if this tool will or will not be used by the event organizers and the local communities.

5 CONCLUSION

The management system Valais excellence applied to sport events integrates all dimensions of sustainable development and it is what makes its strength. Too often, still today, it is before all the socio-economic impacts which interest the event organizers or the communities which support them. By using the Event solution of Valais excellence, an organizer has an integrated management system allowing him to improve the operational functioning of its event. The process is however relatively heavy and requires a strong engagement on behalf of the organizer. For the organizer which cannot begin such a process but nevertheless want to make an assessment

from the point of view of sustainable development, the Event Profile tool is more adapted. This tool should also be useful for the local communities which must select the events they want to support.

The Event solution of Valais excellence and the Event Profile tool have a particular advantage from the point of view of sustainable development: they oblige the organizers to review all the impacts of the event. At the environmental level for instance, it is in Switzerland increasingly frequent that the organizers take into account the impact of their event regarding waste production or energy consumption. On the other hand, they often don't take into account how participants and spectators go on the competition sites whereas these flows of people often constitute the principal environmental impact.

The Event solution of Valais excellence and the Event Profile tool require to carry out an impact analysis on the various dimensions of sustainable development (in the first case with a control by a certifier, in the second case only by self-evaluation). It is the strength but also the limit of these instruments: they highlight which are the strong and weak points of a sport event, but don't specify which kind of measures have to be taken to consolidate the strong points and to improve the weak points. The Event solution of Valais excellence requires nevertheless that the organizers take measures according to the results of the impact analysis, even if it doesn't specify which kind of measures must be taken. The philosophy of the Event solution of Valais excellence as well as the one of the Event Profile tool is to sensitize the organizers with the impacts of their event, in other words to modify the company culture rather than to impose ready-made solutions.

References

[1] J.-L. Chappelet, O. Brighenti, C. Clivaz, N. Délétroz and N. Favre, *From the initial idea to success: a guide to bidding for sports events for politicians and administrators*, Chavannes-Lausanne: IDHEAP, Interreg IIIB Project Sports Event Network for Tourism and Economic Development of the Alpine Space (SENTEDALPS) 2005.

[2] C. Clivaz, "Durabilité de l'événementiel sportif : quelles implications pour les collectivités territoriales ?", *Les politiques publiques d'accueil d'événements sportifs*, J.-L. Chappelet, ed., projet Interreg IIIB SENTEDALPS, Paris : L'Harmattan, pp. 199-221, 2006.

[3] Association Marque Valais, *Règlement d'attribution Label Valais excellence*, Sierre, 2007.

[4] N. Favre, "La labellisation ou l'adaptation d'un système qualité pour les événements sportifs", *Les politiques publiques d'accueil d'événements sportifs*, J.-L. Chappelet, ed., projet Interreg IIIB SENTEDALPS, Paris : L'Harmattan, pp. 155-173, 2006.

[5] H. Rütter, J. Stettler et al., *Volkswirtschaftliche Bedeutung von Sportgrossanlässen in der Schweiz. Schlussbericht*, KTI Projekt "Volkwirtschaftliche Bedeutung von Sportgrossanlässen in der Schweiz", Luzern, 2002.

Christophe Clivaz, PhD in Public Administration (University of Lausanne, Switzerland), Assistant Professor at the University Institute Kurt Bösch (Sion, Switzerland).

Nancy Favre, Master in Sociology of Sport (University of Strasbourg, France), Scientific collaborator at the Swiss Graduate School of Public Administration (Lausanne, Switzerland).

Visitor risk management in core zones of protected areas: First results from a survey of European park administrations

Zahra Ghelichipour, Andreas Muhar

Abstract - Effective visitor risk management practices play an important role in the management of outdoor recreation. Many forms of outdoor recreation have inherent risks associated with them, indeed for many recreational activities risk and challenge are integral components. In many European countries, the administrations of protected areas are legally liable for some kinds of visitors' injuries, e.g. caused by falling trees or damaged handrails. Sometimes this liability may cause legal problems for the managers, as management measures (e.g. removal of trees) might be in conflict with conservation regulations. These problems are particularly serious in core zones of protected areas, because of their stronger conservation status.
In this study, visitor safety management and likely conflicts with conservation regulations in different European protected areas has been surveyed.
The findings imply that today visitor risk management is not considered as an important aspect of the management process in core zones of protected areas. This might change in the future: In many core zones of European parks regular forest management for timber production has only recently been discontinued, which will lead to an increased visitor risk when natural processes of ecosystem development take over.

Index Terms - Conservation regulations, European Protected Areas, Questionnaire, Visitor Risk Management

1 Introduction

The link between protected areas and tourism is as old as the history of protected areas. Protected areas normally achieve recognition and enhanced protection when sufficient numbers of people visit them, appreciate them, and take political action to assure their survival. Park tourism is a critical component of protected area establishment and management.[4]

Zahra Ghelichipour and Andreas Muhar are with the Institute of Landscape Development, Recreation and Conservation Planning ;BOKU - University of Natural Resources and Applied Life Sciences
Peter Jordan-Str.82 A-1190 Vienna/Austria
Email: zahra.ghelichipour@boku.ac.at
andreas.muhar@boku.ac.at

All outdoor recreation involves some level of risk. Dealing with such risk is an important component of park tourism management. Visitor risk management is the systematic identification, analysis and control of the broad range of visitor risks, which threaten an agency or its ability to achieve its objectives.

Visitors should return home safely and satisfied with their experiences. There is a moral obligation to consider their safety, and protect them from unnecessary or unreasonable risk. [3]

Sometimes developing tourism in protected areas causes conflicts between the managers' legal liability and conservation laws. For example, according to Bell et al. (2007), in the Central European Continental Region (i.e. Poland, the Baltic states, the Czech Republic, Slovakia and others) the main conflict

area is between recreation and nature conservation. Most of the protected areas in this region have been established during the last 20 or 30 years, many of them in traditional recreational locations, for example in Latvia and along the Baltic coast line and in mountainous areas. The mountainous areas of the Czech Republic, Slovakia and southern Poland are facing increasing problems, especially with ski touring, cross country skiing, snow shoeing and snow mobiles as well as rock climbing and mountain biking.[1]

In the Benelux countries and in the U.K. the combination of intensive recreation and nature conservation also poses a special challenge. [2], [5]

Managing visitor risk may also cause legal problems for the managers, as management measures (e.g. removal of trees) might be in conflict with conservation regulations. These problems are particularly serious in core zones of protected areas, because of their higher conservation status.

2 Study method

A digital questionnaire concerning visitor risk management in European protected areas, was developed. Questions were designed to gather information about the following aspects:

- General character of the protected areas and their core zones
- General visitor management strategies in core zone(s) of the protected areas
- Potential hazards and reported accidents in the core zones
- Visitor risk management legislation and measures

The questionnaires were sent out via email to about 300 National Parks and Biosphere reserve in Europe, in particular national parks and biosphere reserves.

All information collected from the received questionnaires was entered into a database. As the questionnaire included some open ended answers and comments, this information was categorized and coded, and finally all data were exported into an SPSS data sheet. The analysis used frequencies, cross-tabulations, and multiple response tables to explore the patterns and relationships among the data.

3 Results

58 area administrations (= 19.3% return rate) completed and returned the questionnaires.

3.1 Type and IUCN Management Category of Respondents

The majority (66%) of the returned questionnaires was received from national parks. Biosphere reserves represent a 12% share in the sample. In 64% of the responding protected areas core zones are belonging to the IUCN management category II (National Parks). Category Ia (Strict Nature Reserve) refers to 16% of the core zones.

3.2 Visitor Access to Core Zones

The results show that in 88% of the responding protected areas visitors are allowed to enter the core zones in some way, so only in 12% of them visitor access to core zones is totally banned.

Hiking is the most frequent (78%) activity that is allowed for visitors in the core zones, followed by mountain biking (43%) and horseback riding (40%).

3.3 Potential Hazards and Actual Visitor Accidents in Core Zones

50 protected area administrations specified the existent potential hazards in their core zones. Table 1 presents the most frequently mentioned categories.

TABLE 1.

POTENTIAL HAZARDS IN CORE ZONES OF RESPONDENT PROTECTED AREAS (N=50)

Hazard	Count
Falling trees	27
Bad trail condition	22
Windstorm	21
Rock fall	18
Dangerous terrain (e.g. swamps)	16
Avalanches	13
Lightning	13
Floods	12
Bad infrastructure condition	10
Landslides	7
Wildfire	6
Toxic or aggressive animals	5

Only 22% of the respondents keep official records of incidents related to visitor safety in their core zones. The most frequently reported cases are typical mountaineering accidents (fractures, sprains after falling from rock or slipping from trails), heart attacks or just getting lost. Accidents from falling trees or branches have so far only rarely been an issue, despite the high score in Table 1.

3.4 Legal Liability for Visitor Safety in Core Zones

Interestingly, only 41% of the respondent protected areas answered the question about the legal liability for visitor safety in their core zones (see Table 2).

TABLE 2.

LEGAL LIABILITY FOR VISITOR SAFETY IN CORE ZONES OF RESPONDENTS PROTECTED AREAS (N=36)

Legal Liable for Visitor Safety	Count
Protected area administration	20
Land owner	13
Visitors	9
Others	8

3.5 Visitor Risk Management Strategies

17 respondents (29%) declared that they have an explicit visitor risk management strategy, but only about one half of them have a structured process for identification and mitigation of visitor risks. There is also little systematic training of staff with regard to visitor safety management.26 respondent protected areas (45%) specified management measures that are carried out in their core zones in this connection. The most frequently mentioned measures are shown in Table 3.

TABLE 3.

MANAGEMENT MEASURES TO IDENTIFY EXPOSURES TO PROBABLE RISKS IN CORE ZONES (N=26)

Management Measures to Identify Exposures	Count
Regular Monitoring of Trail Conditions and Infrastructure	23
Assessing Natural Risks in Terms of Impact on Visitors	14
Regular Monitoring of Tree Conditions	13
Determining Necessary Control Measures	12
Review the Degree of Success of the Control Measures Implemented	10

3.6 Managing tree related risks

46 protected area administrations answered the question regarding the management of tree/branch fall risks in core zones. The relevant management measures are presented in Table 4.

TABLE 4.

MANAGING TREE/BRANCH FALL RISKS IN CORE ZONES OF RESPONDENT PROTECTED AREAS (N=46)

Managing Treefall/Branchfall Risks	Count
Tree Felling/Branch Cutting Without Removing of Material	24
Warning to Visitors	20
No Action	18
Tree Felling/Branch Cutting With Removing of Material	5
Trail closure	1

Only 12% of the respondents reported that there are conflicts between conservation laws and visitor safety in the core zones of their protected areas, mostly related to tree felling and removal. However, 16% of the respondents reported some resistance of visitors against management actions for decreasing natural risks.

4 Discussion and conclusions

The findings imply that in the majority of the protected areas in Europe visitor risk management, both generally and in particular in core zones, is not considered as an important part of the management process. The low return rate of our survey can also be seen as an indicator for this.

However, some problems may be left unknown as a result of the lack of systematic visitor risk management procedures. In most protected areas visitors are allowed to enter the core zones, so their safety must also be considered, in particular with regard to the special conservation status of a core zone. Although it is accepted that visitors have a responsibility to look after their own wellbeing and safety, our survey results show that protected area administrations are usually also legally liable for visitor safety. Court cases where protected area administrations were held to account for neglecting visitor safety are still rare in Europe, however, the current trend to cease forest management for timber production in protected areas, even close to urban settlements, might change this situation in mid future, as a natural dynamic vegetation development (which includes collapse and decay) will most probably lead to a higher degree of risks related to tree fall.

An efficient visitor risk management requires the development of a systematic visitor risk management program. The design of such a program in a protected area varies based on the respective natural, conservational, legal and cultural conditions, but there are some common bases for every visitor risk management program. According to the West Australian Department of Conservation and Land Management [1] a visitor risk program should involve the following stages:

- Identify the risks.
- Assess the risks.
- Determine what control measures to take.
- Review, apply and monitor control measures.

Risks encountered by visitors cannot be managed unless they are identified and understood. In each area potential visitor risks depend on a broad range of different natural, managerial and infrastructure factors. Determining current visitor activities in the area and risks associated with them is essential for the identification process. To investigate and record the visitor incidents can provide a broader understanding of the potential risks in different locations and at different times.

Once a risk has been identified, an assessment should be carried out in order to determine its extent. Determining the likelihood of incidents associated with each risk and their probable consequences for visitors construct the bases of any risk assessment process.

Using the results of the risk assessment, the appropriate control measures can be determined, or the necessary action taken in order to eliminate or reduce the risks.

Effective and regular risk inspection is necessary to detect and manage hazards before visitors are injured, thereby minimizing the frequency of incidents.

It is clear that installing a Visitor Risk Management Program in a protected area means an additional administrative task for the management. Therefore pragmatic approaches will be needed in order to minimize the expenses and the bureaucratic effort.

References

[1] Australian Department of Conservation and Land Management, August (1998),Visitor Risk Management & Public Liability, ANZECC Working Group on National Parks and Protected Area Management, Australia

[2] Bell, S. Tyrväinen , L. Sievänen , T., Pröbstl ,U. and

Simpson M.,2007, Outdoor Recreation and Nature Tourism: A European Perspective,Available at: http://www.livingreviews.org/lrlr-2007-2

[3] Bruls, E., Busser, M., Tuunter, E. (2004), 'Jewels in the crown': Good practices Natura 2000 and leisure, Den Haag (Stichting Recreatie). Related online version Available at: http://ec.europa.eu/environment/nature/info/pubs/docs/others/jewels_in_the_crown.pdf (Cited in1)

[4] Coillte (2005) Recreation Policy - Healthy Forest, Healthy Nation, Coillte. Available at http://www.coillte.ie/fileadmin/user_upload/pdfs/Coillte_Eng_6.pdf

[5] Eagles P. F.J., McCool S. F. and Haynes C. D.,2002,Sustainable Tourism in Protected Areas: Guidelines for Planning and Management ,in *Best Practice Protected Areas Guidelines Series No.8,* Phillips A. (ed), World Commission on Protected Areas (WCPA)

Zahra Ghelichipour studied Environmental Science at Gorgan University of Agricultural Sciences and Natural Resources Gorgan, Iran (B.SC) and Tehran University Karaj, Iran (M.Sc), is scientific staff of the Sabzevar Tarbiat Moallem University, Iran.Currently she studies as PhD student at BOKU University of Natural Resources and Applied Life Sciences Vienna, Austria. Research focus on visitor risk management in protected areas and ecotourism.

Andreas Muhar studied Landscape Ecology and Landscape Design at BOKU University of Natural Resources and Applied Life Sciences Vienna, Austria, worked at University of Technology Vienna, Griffith University, Brisbane, Australia, and BOKU Vienna, where he is currently head of the Institute of Landscape Development, Recreation and Conservation Planning. Research focus on landscape based recreation and tourism and sustainable development of cultural landscapes.

Quality assessment of public use in National Parks. Application to the Spanish National Park System

Maria Muñoz-Santos, Javier Benayas

Abstract — In recent years, we have observed how, worldwide, the goal of nature preservation has to be developed in a scenario of continuous increment in the number of visitors who are interested in experiencing PA resources, landscapes and stories. Spain is a good example of this process. It's estimated that the whole Spanish PA receive over 50 million visitors a year, ten of them to the National Park System. The progressive influx of visitors in a short period of time has made administrations and managers to offer and develop a broad network of facilities and programs in order to provide these visitors with information, knowledge and recreation. But, are we doing it in the best way?
In this context, this investigation defines an evaluation tool to asses the quality of public use programs developed in National Parks which has been applied to the Spanish National Park System, and could be applied to other parks and systems. It examines different trends and provides with some future recommendations.

Index Terms — Visitor information and visitor management, Visitor monitoring methods, Public use quality

1 Introduction

Protected Areas (PA) have been used for recreation for a long time. Current levels of demand, however, indicate an unprecedented situation, initiated in the 60s. More than ever, the desire of nature preservation has to deal with a growing increase of visitors who look for recreation in these areas. In this context, public use has become one of the most powerful tools for connecting protected areas with society and one of the most valuable ones for sustainability.

Spain is a good example of this process. The traditional "sun and beach" tourist offer is being complemented by nature tourism, converting PA into important tourist destinations. It's estimated that the whole Spanish PA receive over 50 million visitors a year, ten of them to the Spanish National Park System (SNPS) [1]. As an example of this situation, the most visited one, is receiving more visitors a year (3.3 million) than territories like Costa Rica [2] . The progressive influx of visitors in a short period of time (from 2.2 million in 1984 to 10 in 2007) [3] has brought Spanish administrations and managers to offer and develop a broad network of facilities and programs in order to provide these visitors with information, knowledge and recreation. After years of investment, now is the time for evaluation.

There is a growing concern amongst PA professionals that many PA are not achieving the objectives for which they were established. As a response to this concern over the last decade, a number of assessment tools have been developed to assess management practices (as the existence of a wide range of situations and needs require different methods of assessment).

M. Muñoz-Santos is with the Department of Ecology. Universidad Autonoma of Madrid. E-mail: maria.munnoz@uam.es
Javier Benayas is with the Department of Ecology. Universidad Autonoma of Madrid. E-mail: javier.benayas@uam.es

In this way, this investigation (funded by the Spanish National Park Service) defines an evaluation tool to asses the quality of public use programs developed in National Parks (NP) which has been applied to the Spanish National Park System (Fig.1), and could be applied to other parks and systems. It examines different trends and provides with some future recommendations.

2 METHODS

2.1 The evaluation tool

In order to asses the quality of public use programs in the SNPS an evaluation tool was designed by a panel of experts as an external evaluation based on HOCKINGS et al. (2000) and CAYOT & CRUZ (1998) [4][5]

The final version has 9 general categories which have been identified as essential for public use in PA. These categories are divided in 17 sub-categories, which comprise 78 semi-quantitative indicators (adjusted inside each sub-category).

Each of the 78 indicators is divided into four benchmarks which reflect a similar level of progress across all the indicators, ranging between 1 (bad) to 4 (excellent).

A series of four alternative answers are provided against each question to help assessors to make judgements as to the level of score given.

The categories and indicators are included in Fig.2.

2.2 Data gathering

The indicators are to be applied by a panel of external assessors (at least three) with experience in public use in PA in cooperation with PA managers.

Each indicator specifies its information source: interviews to NP managers, observation, questionnaires, documentation, etc. Triangulation is preffered whenever possible.

The final result for each indicator is the avarage between the results of the assessors given that there is not more than a point of difference between them. In that case they should achieve a reasoned agreement.

3 RESULTS: AN ASSESMENT OF THE SPANISH NATIONAL PARK SYSTEM

The methodology has been applied to the SNPS. The information was gathered during years 2005 and 2006.

Fig. 1

Fig. 2

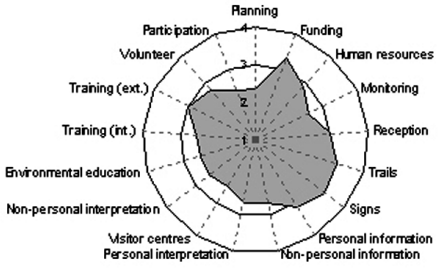


Fig. 3

Fig. 3 shows the main results of the application of the evaluation model to the SNPS. The columns show the different NP and the rows the different sub-categories analysed. In order to emphasize the main differences they are organized decreasingly from left to right and for top to bottom.

The results show a medium-high level of quality of public use for the SNPS (69.55% of optimum). No NP shows excellent or poor levels. Although the studied Parks belong to the same network, in general, there is a great heterogeneity between the different units and the analyzed areas.

All sub-areas are valued over the accepted value (2.0 points). The areas most valued are the economic resources, signs, trails and personal information. The lower value is for planning, followed by participation and the quality of visitor centres.

The lack of planning has been reported in different documents as one of the main problems of the PA in Spain [6], [7], and, as the results show, of the public use in National Parks. Planning should be the base of management but, in Spain, the high increase of visitors in the last decades has allowed little time for planning [8]. If we have good funding but not planning, how can we be sure that we are investing in the more sensible way? We aren't. Although the good values in the other areas show that things go reasonably well, there's space for improvement.

The low value for the visitor centres contrast with the high inversions that have been made in these facilities over the last decade.

4 Conclusions

The evaluation tool has proved itself as a useful tool contributing to detect deficiencies and best practices, enabling the managers to correct the first and use as models the last.

The public use model of the SNPS shows a medium-high quality. Although it is a network, there are important differences between its units.

No program shows a low quality value, but greater efforts should be placed on the communication programs. Visitor centres design should be reconsidered. Special attention is required by the planning process and the participation program.

Acknowledgements

Authors are grateful to the workers of the National Parks and to the experts García & Díaz who participated in this research. This study was supported by the Spanish Ministry of Environment (OAPN 102/2002).

References

[1] EUROPARC-ESPAÑA. *Anuario EUROPARC-España del estado de los espacios naturales protegidos 2005*. Ed. Fundación Fernando González Bernáldez. 2006.

[2] Mundial Tourism Organization (Wto). Essential Data. 2006. http://www.unwto.org/facts/menu.html.

[3] Spanish National Park Service. *Annual performance review*. 2007.

[4] M. Hockings; S. Stolton, N. Dudley & A.Phillips (Eds.) *Evaluating effectiveness- a framework for assessing the management of protected areas*. Gland IUCN. 2000.

[5] L. Cayot & F. Cruz. *Manual para la Evaluación de la Eficiencia de Manejo del Parque Nacional Galápagos*. Servicio Parque Nacional Galápagos. Instituto Ecuatoriano Forestal y de Áreas Naturales y Vida Silvestre. Puerto Ayora, Islas Galápagos. 1998.

[6] EUROPARC-España. *Anuario EUROPARC-España del estado de los espacios naturales protegidos 2005*. Ed. Fundación Fernando González Bernáldez.

[7] EUROPARC-España. *Manual 7. Planificar para gestionar los espacios naturales protegidos*. Ed. Fundación Fernando González Bernáldez.

[8] M. Muñoz. *Evaluation and Funding of Protected Areas. The case of the Spanish National Park System.* PhD dissertation, Dept. of Ecology., Autonoma University Madrid.,2008.

María Muñoz Santos is PhD at the Ecology Department of the Universidad Autonoma of Madrid. As part

of the Environmental Education team of the UAM Ecology Department, she has participated in and coordinated different researches related to public use and communication in protected areas, environmental education evaluation, public use funding and accessibility to protected areas. Currently she is working in the Area of Formation and Communication, of the Fernando González Bernáldez Foundation for Protected Areas.

Javier Benayas del Alamo is professor of Ecology, and currently he is vice-chancellor of the Universidad Autonoma of Madrid. He has about 20 years of research experience in the fields of environmental education evaluation, public use management in protected areas, sustainable development planning for urban areas and human-landscape relationship. Over the last years, he has published many papers and works on the subjects above.

How to involve retailers into sensitization of end-users for ecologically responsible behavior – results of a snow-shoe-seller survey

Marcel Hunziker and Dominik Schletti

Abstract — The outdoor activity snow-shoe walking is experiencing an increase in popularity and is more and more frequently practiced. This tendency represents a desirable development of soft tourism, contributes to the regional economical development of remote areas and enables people to experience pure nature. However, snow-shoe walking is rather problematic from the perspective of nature conservation. Therefore, the willingness of snow-shoe walkers to change their behavior has been investigated in several studies. One opportunity to influencing the behavior of snow-shoe walkers is when they buy or rent the snow shoes. However, the question remained whether shop owners and their staff are willing to adopt this role. The aim of our study was to answer this question and to identify the drivers of their willingness to contribute to persuading snow-shoe walkers to behave in an ecologically responsible way. A questionnaire was sent to 754 sports shops in Switzerland to measure the willingness to apply measures of persuasion and to measure the drivers of this willingness. The questionnaire data show that the willingness to contribute to persuasion campaigns is rather small. In particular, the potential for participation in the persuasion work is quite low for contributions that require high efforts or costs,. The variables "subjectively perceived social norms", "attitude to the behavior" and "attitude to information about the protection of nature and landscape" represent the strongest predictors of the willingness to contribute to the campaign. On the basis of the results, suggestions for measures to persuade snow-shoe sellers to support persuasion of snow-shoe walkers were developed.

Index Terms — ecological conflicts, outdoor recreation, persuasion, questionnaire, theory of planned behavior

1 Introduction

Snow-shoe walking is experiencing an increase in popularity and is more and more frequently practiced. An explanation is that it is easy to learn, requires little equipment, and can be practiced in almost all areas where snow is found, without dependence on transport facilities.

The rise of snow-shoe walking represents a desirable development of soft tourism, contributes to the regional economical development of remote areas, and enables people to experience pure nature. However, snow-shoe walking is rather problematic from the perspective of nature conservation. Snow-shoe walkers often visit areas that are otherwise untouched by winter sports such as skiing, snow-boarding or ski-touring since they do not satisfy the requirements of slope quality and steepness. Therefore, snow-shoe walkers often cross habitats of wildlife such as the capercaillie and grouse, which are sensitive to the presence of humans [1]. Since such habitats are often considered as nature conservation zones, conflicts with nature conser-

M. Hunziker is with the Swiss Fed. Res. Inst. WSL, 8903 Birmensdorf, Switzerland.
E-mail: hunziker@wsl.ch
D. Schletti is with the Dept. of Psych., Univ. Zurich, 8050 Zurich, Switzerland.
E-mail: dominik.schletti@access.uzh.ch

vation organizations and authorities occur. However, as is known from former studies, e.g. [2], many snow-shoe walkers have limited knowledge of Alpine winter nature and are not conscious about the negative consequences of their activity on wildlife.

In the cited study and others, e.g. [3], it has been investigated how the behavior of snow-shoe walkers and participants in other winter-sports can be directly influenced by on site measures, such as information panels and suggested codes of conduct. However, these studies also concluded that early information and persuasion of snow-shoe walkers, before they start their trip or even before they start planning their trip, would enhance the success of campaigns. One opportunity to influence snow-shoe walkers is when they buy or rent the snow shoes. However, the question remained whether the shop owners, and their personnel, are willing to take this opportunity.

The aim of our study was to answer this question and to identify the drivers of their willingness to contribute to the persuasion of the snow-shoe walkers to behave in an ecologically responsible way.

2 State of research and theoretical approach

According to [2], much research has dealt with the description and analysis of social and ecological conflicts involving outdoor activities, e.g. [4], [5]. Even though snowshoe walking is a rather new activity, we were able to base our work on previously conducted research. From a survey of Swiss snow-shoe walkers, we know that they are willing to avoid protected areas if they are informed [6]. On the other hand, a survey of more than 350 foresters showed that forest visitors often ignore behavior directives and that snowshoe walking still causes severe ecological problems, especially in sub-Alpine areas [7].

In social psychology there is an extensive body of research dealing with the explanation of attitude, behavior, behavioral change, and their interrelations, e.g. [8], [9], as it is stated by [2]. An important starting point of such research has often been the theory of planned behavior [10]. It has been applied in various fields of environmental psychology, and there have also been first attempts to apply it in the context of recreation activities, e.g. [3], [11]. Therefore it served as a theoretical basis of our study, which aimed to predict the willingness of snow-shoe sellers to support measures of sensitization of snow-shoe walkers to nature and nature-responsible behavior.

3 Research questions and hypotheses

Our specific research questions were as follows: (1) Are snow-shoe sellers willing to sensitize snow-shoe walkers to nature and nature-responsible behavior? (2) Which measures would be the most and least supported by the sellers? (3) Are there any differences in willingness between different types of snow-shoe sellers? (4) Which factors predict willingness?

No theory-based hypotheses could be established with regard to research questions 1, 2 and 3, so these questions were addressed by an inductive research method.

Research question 4 allowed the formulation of a first hypothesis, based on the theory of planned behavior [10], which was tested by empirical investigation. We assumed that the willingness to sensitize is dependent on the “Ajzen-factors” (a) the sellers attitudes towards sensitization (do they find sensitization good/necessary), (b) their subjective norms (their perception of the related attitudes of their relevant social group), and (c) their perceived behavior control (do they perceive possibilities to actually behave in the desired way).

Former research [3] further suggested that the attitude towards intervention measures also predicts willingness to sensitize (hypothesis 2).

In a third hypothesis we propose that willingness also depends on the sellers’ knowledge of ecological issues [12] and from their general environmental consciousness [13].

In accordance with the literature, we further hypothesize (hypothesis 4) that these two factors also influence some of the predictors of willingness, namely attitudes towards sensitization behavior and attitudes towards intervention measures.

4 Methods

For the measurement of the willingness to apply measures of persuasion and for the measurement of the predictors of this willingness, a highly standardized questionnaire was sent to mountaineering and sports shops (with mountain equipment) and to the main distributors of snow-shoes in the German- and French-speaking parts of Switzerland. Shop owners, relevant department heads, marketing communication and sales managers, and the sales staff represented the sampling universe. Questionnaires were sent to a random sample of 754 people and 108 questionnaires were returned (response rate: 14.5%). The questionnaire included questions regarding willingness to sensitize as well as items to operationalize its predictors.

5 Results

Research questions 1 and 2 are answered by the descriptive results of the survey. They show that the willingness to support sensitization campaigns highly depends from the measure that would be applied. Simply handing out or providing information leaflets is well accepted. Willingness to try to persuade clients by using oral hints is also reasonably high. All other measures, even just pinning up posters are less preferred. In particular, snow-shoe sellers rather reject investing time resources, such as would be needed to attend education programs or meetings with interest groups. They also reject explicit installations in their shops such as video presentations or an information booth. Least preferred are monetary interventions such as asking the buyers of snow shoes to pay an additional amount in order to support information campaigns or conservation measures.

On a scale from 0 (no willingness at all) to 4 (high willingness), the willingness value varied from 3.5 (handing out information leaflets) to 0.2 (asking for co-financing campaigns). The average willingness for all the different measures was 2.19 (SD=0.72). Thus, general willingness to support sensitization campaigns was not very high among the snow-shoe sellers. In addition, the large standard deviation shows that there are considerable differences between the individual sellers.

The latter leads to research question 3. The statistical analyses revealed highly significant differences between sellers who are members of environmental conservation organizations such as WWF. They are considerably more willing to support sensitization than the non-members. The same applies for mountain guides, tour leaders and the personnel of shops offering snow-shoe tours.

Research question 4 was answered by regressing all possible predictors of the willingness to sensitize with the dependent variable “willingness”. The following potential predictors were included in different regression models (multivariate and univariate, stepwise and full, etc.): attitude towards behavior, subjective norm, perceived behavior control, general environmental consciousness, attitude towards information campaigns, attitude towards restrictions, and knowledge of the ecological effects of snow-shoe walking. All these predictors represented factors summarizing several single items of the questionnaire. No multi-collinearity problems could be observed.

The stepwise model revealed that willingness to support sensitization can be very well narrowed down to three predictors, which explain more than 60% of the variance of the willingness (adj. R^2=61.9%). The most important predictor is the subjective norm, i.e., the attitudes of the relevant other people of the seller, in particular, the chief and the colleagues in the shop (β=0.47; p=0.000). As second, the attitude towards information

campaigns proved to highly influence the willingness (β=0.26; p=0.000), and third, the attitude towards the behavior was also important, i.e., the fact whether the seller perceives sensitization activities as something good or not (β=0.21; p=0.045).

Univariate regressions, between those predictors that were not significant in the multivariate models and the depend variable, revealed that perceived behavior control, general environmental consciousness and the attitude towards restrictions also significantly affect the willingness. However, the beta-values and the partial R^2s remained small. Even in the univariate models, knowledge of ecological issues did not significantly influence the willingness to sensitize.

We then analyzed whether general environmental consciousness and knowledge about ecological issues influence the attitude towards sensitization behavior and the attitude towards intervention measures. This was the case for general environmental consciousness, but not for knowledge about ecological issues.

6 Discussion and Conclusions

The descriptive findings regarding the research questions 1-3 show that the willingness of snow-shoe sellers to support sensitization is not very large, depends on sensitization measures and varies considerably between different seller types. These findings reveal that the sellers' willingness to sensitize does differ from the generally quite high willingness of the public to actually behave in an ecologically responsible way during snow-shoe trips [2], [6]. This might be explained by the fact that Snow-shoe walkers are usually already highly sensitive with regard to nature, while this is not automatically the case for the snow-shoe sellers, who partly do not actually participate snow shoeing. The latter corresponds well with the result that those sellers who are actively involved in snow-shoe activities (mountain guides etc.) accept sensitization efforts more than others. For practical implementation of these results we can conclude the following. Information provided by the sellers would be very effective since snow-shoe walkers are already highly willing to behave in an ecologically responsible way, but often have insufficient knowledge of how to do so. However, as the sellers are unwilling to actively sensitize and inform the buyers, sensitization campaigns that are directed to the sellers might be more effective in influencing the behavior of the snow-shoe walkers.

Based on the statistical analyses, hypothesis 1 and 2 (prediction of willingness by the "Ajzen-factors" and by attitudes towards intervention measures) can partly be accepted. This corresponds well with the theory of Aizen and Madden and many other former research results, which, however, focused on actual outdoor-recreation behavior and not on the "selling and sensitization behavior". This corroborates the general validity of the theory of planned behavior and helps to find adequate solutions, based on findings of intervention research in other contexts. Hypothesis 3 (prediction of willingness to sensitize by knowledge and general environmental consciousness), however, must be rejected and hypothesis 4 can only be accepted for general environmental consciousness. This corroborates the assumption of [13] that environmental consciousness represents a deeper-rooted predictor of many other environment-related attitudes. The non-effect of the knowledge also corresponds well with many former findings [3], [14], [15]. knowledge is often over weighted and does not help to persuade people in all cases.

The following hypothetical model is proposed as a summary of the results of the hypotheses testing: The willingness of snow-shoe sellers to support sensitization campaigns depends on their own attitude toward sensitization behavior, the attitudes of the relevant social group, which is in this case their supervisor and workmates (subjective norms), and the attitudes towards information

campaigns. The first and last of these are in turn influenced by the general environmental consciousness of the sellers. Knowledge of the ecological effects of snow-shoe walking, however, does not play an important role.

With regard to implementation activities, it can be concluded that if the snow-shoe sellers are to be persuaded to support, and undertake, information/sensitization campaigns –see conclusion above – then sensitization campaigns directed at the sellers are necessary. Therefore, providing ecological knowledge should not be a favored strategy but instead people who are relevant for the sellers (chiefs, colleagues, market competitors etc.) and already act in the desired direction should be introduced.

Acknowledgments

We are grateful to Petra Vögeli, SAC, for initiating and co-supervising this study, to Prof. Heinz Gutscher, Psych. Dept. Univ. Zurich, for accepting this study as a master thesis of Dominik Schletti, and finally to Robert Home, WSL, for language corrections.

References

[1] Ingold, P., 2004: Freizeitaktivitäten im Lebensraum der Alpentiere: Konfliktbereiche zwischen Mensch und Tier - mit einem Ratgeber für die Praxis. Bern: Haupt.

[2] Freuler, B. & Hunziker M., 2007: Recreation activities in protected areas: bridging the gap between the attitudes and behaviour of snowshoe walkers. Forest Snow and Landscape Research 81(1/2): 191–206.

[3] Zeidenitz, C., Mosler, H.J. & Hunziker, M., 2007: Outdoor recreation: from analysing motivations to furthering ecologically responsible behaviour. Forest Snow and Landscape Research 81(1/2): 175–190.

[4] Manning, R. E., 1999: Studies in Outdoor Recreation. Corvallis, Oregon State University Press.

[5] Ammer, U. & Pröbstl, U., 1991: Freizeit und Natur – Probleme und Lösungsmöglichkeiten einer ökologisch verträglichen Freizeitnutzung. Hamburg, Parey.

[6] Radü, G., 2004: Schneeschuhlaufen – eine Trendsportart. Geogr. Institut. Zürich, Univ. Zürich.

[7] Freuler, B. & Hunziker, M., 2005: Lenkungsmassnahmen zur Bewältigung von ökologischen und sozialen Nutzungskonflikten im Schweizer Wald. Ergebnisse und Folgerungen aus einer Försterbefragung. Eidg. Forschungsanstalt WSL, Birmensdorf.

[8] Kaiser, F. G. & Gutscher, H., 2003: The Proposition of a General Verision of the Theory of Planned Behavior: Predicting Ecological Behavior. Journal of Applied Social Psychology 33(3): 586-603.

[9] Staats, H., 2003: Understanding Proenvironmental Attitudes and Behavior: An Analysis and Review of Research Based on the Theory of Planned Behavior. Psychological Theories for Environmental Issues. M. Bonnes, T. Lee and M. Bonaiuto. Hants, Ashgate: 171-201.

[10] Ajzen, I. & Madden, T. J., 1986: Prediction of Goal-Directed Behaviour: Attitudes, Intentions, and Perceived behaviour control. Journal of Experimental Social Psychology, 22: 453-474.

[11] Ajzen, I. & Driver, B. L., 1992: Application of the Theory of Planned Behavior to Leisure Choice. Journal of Leisure Research 24(3): 207-224.

[12] Meinhold, J. L. & Malkus, A. J., 2005: Adolescent environmental behaviors: Can knowledge, attitudes, and self-efficacy make a difference? Environment and Behavior, 37(4), 511-532.

[13] Stern, P. C, Dietz, T. & Guagnano, G. A., 1995: The new ecological paradigm in social-psychological context. Environment and Behavior, 27(6), 723-743.

[14] Maloney, M. P. & Ward, M. P., 1973: Ecology: Let's hear from the people: An objective scale for the measurement of ecological attitudes and knowledge. American Psychologist, 28, 583-586.

[15] Petty, R. E. & Cacioppo, J. T., 1986: Communication and persuasion. Central and peripheral routes to attitude change. New York, Springer.

M. Hunziker holds a Masters degree in Geography, Sociology and Tourism Research from University of Berne (1991), and a PhD in Geography from the University of Zurich (2000), where he is giving lectures. He is head of the research group "Social Sciences in Landscape Research" at the Swiss Federal Institute for Forest, Snow and Landscape Research (WSL).

D. Schletti holds a Masters degree in Psychology, Psychopathology and Ethnomusicology from University of Zurich (2008).

Analysis of visitor nodes as a tool for visitor management by the example of Berchtesgaden National Park

Johanna Pfeifer, Sabine Hennig, Chr. Opp

Abstract — Infrastructural elements in protected areas play an important role for visitors. They provide equipment to visitor activities and their demands. However data on infrastructure is frequently disregarded. Concepts and models to collect and deal with infrastructure data have to be developed. In Berchtesgaden National Park the concept of visitor nodes is used in order to support visitor management. Identification of 81 visitor nodes in this protected area took place. They have been classified into five categories: “place for excursions”, “destination for hiking”, “information”, “resting” and “orientation”. Each category is characterized through a defined standard supply. By using categories, evaluation of each visitor node was done. Deficits as well as satisfying situations became observably.

Index Terms — visitor nodes, recreational use, visitor management, infrastructure and statistical analysis

1 Background

Today changing visitor demands as well as rising numbers of visitors pose challenges for visitor management in protected areas. Park management is confronted with the complex task of combining recreational and ecological objectives in a sustainable way. Here infrastructure plays an important role: infrastructure enables public access, facilitates visitor use, performs environmental issues and meets visitor expectations. In addition – based on this meaning infrastructure is useful to support visitor management (see Benthien 1997, Job 1991, Zollner et al. 2006).

In consequence knowledge on infrastructure, its equipment and its design is necessary. A detailed survey of the infrastructural situation in recreational and protected areas is preferable (Worboys et al. 2005). It is imperative to “measure what you manage” (Sukhdev 2008: 53). Therefore infrastructural data should be available and managed like other data (e.g. on flora, fauna or soil). However, data on infrastructure is frequently incomplete or is not uncommonly absent in these areas. Reasons therefore are the existence of numerous infrastructural elements for recreation and the large size of protected areas. To apply infrastructure to visitor management in a successful way, it is essential to elaborate methods to deal with infrastructure and its data. Therefore different approaches and models exist. One is the concept of visitor nodes. This concept is especially helpful to get an overview of the infrastructural situation, to evaluate it and to deduce measures. The concept of visitor nodes has been used in Berchtesgaden National Park.

J. Pfeiffer is with the Department of Geography, Philipps University of Marburg, 35037, Germany. E-mail: pfeifer.johanna@googlemail.com.
S. Hennig Author is with the Department of Geography, Friedrich- Alexander University of Erlangen- Nuremberg, visiting researcher at Austrian Academy of Sciences / giscience Salzburg.
E-mail: Sabine.Hennig@assoc.oewaw.ac.at.
Chr.Opp is with the Department of Geography, Philipps University of Marburg, 35037, Germany. E-mail: opp@staff.uni-marburg.de.

2 Concepts of Visitor Nodes

2.1 Definition of visitor nodes

Visitor nodes are areas of spectacular beauty, educational signage, areas of general interest or unique settings. They provide an adequate infrastructural supply (benches, picnic tables, signs, information shelters, elements of environmental education etc.). The equipment can vary from primitive to high developed depending on e.g. visitor numbers, visitor activities, management objectives and the location within the zoning of a protected area (Macleod 2006, Lockwood et al. 2006, Tucker 2006, Worboys et al. 2005).

On the one hand visitor nodes respond to visitor demands by their infrastructural supply; on the other hand they affect visitor demands by this supply.

Originally the approach of visitor nodes comes from the Australian recreational planning processes. However, in Central Europe numerous terms for such sites also exist. Examples are hot spots, interesting points, points of interest, points of information, attractive or central sites (Hoisl et al. 2000, Schemel 2003).

2.2 Classification of visitor nodes

To be useful in the recreational planning processes visitor nodes should be classified. Therefore it is helpful to focus on recreational activities that take place at visitor nodes. Activities that have to be considered are for example resting, relaxing, playing, eating and drinking, studying, getting information or orientation (Hoisl et al. 2000).

To provide an adequate infrastructural supply at visitor nodes further functions in relation to these activities are significant. These are accessibility, information brokering, visitor management or facilities and services.

According to functions and activities the five following categories can be established:

- “place of excursions”,
- “destination for hiking”,
- “information”,
- “resting” and
- “orientation”.

The five categories are built up as a hierarchical system. This means that the visitor node category “orientation” is the least important category, while the category “place of excursions” is the most important one (Table1).

TABLE 1

Categories of visitor nodes and a selection of possible standard supply

visitor node category	standard supply
place of excursions	**elements of accessibility:** parking places, bus station, cable car station, landing stage for boats, etc. (not including elements for biking or hiking)
destination for hiking	**facility to stay for the night:** alpine hut, guesthouse, etc. **facility to drink or eat something:** restaurant, mountain pasture, cafe, etc.
information	**information elements:** visitor centre, information board, map, shelters, etc.
resting	elements for resting: bench, table, etc. elements for playing: playground, swing, etc. **access:** to water (spring, brook, lake, etc.)
orientation	elements for orientation: signs, markers, etc.

The category “orientation” just provides infrastructural elements for orientation like signs and markers. Visitor nodes within the category “place of excursions” should provide infrastructural supply of all five categories: orientation, resting and information elements, aspects of a typical destination and specific accessibility (Hoisl et al. 2000, Schemel 2003).

2.3 Standards of visitor nodes

Each category should offer a specific array

of infrastructural elements. Thereby standard equipment for each category is defined (Table 1). For example, a visitor node of the category “information” should include the following standard supply: information of the National Park, resting infrastructure and orientation elements.

General standards are needed to make evaluation possible. In consequence, the actual equipment at each visitor node can be evaluated with the defined standard supply. Deficits as well as satisfying situations can be observed.

3 STUDY AREA

Berchtesgaden National Park lies within the Alps in the south-eastern part of Germany at the border to Austria. The park area extends about 21000 hectares with an elevation ranging from 600 m (Lake Königssee) to 2700 m (summit of the Watzmann Massif) above main see level (BayStMLU 2001).

The region of Berchtesgaden is one of the oldest holiday destinations in the Alps. Today more than 1.3 million people visit the Park every year. Main recreational activities are promenading, hiking, mountain climbing and biking. High season is during the summer months. Besides different facilities and services, 236 kilometres of trails, nine alpine huts and six information centres are available for visitors. Landscape attractions are viewing points, alpine meadows, waterfalls, wild life viewings and lakes (BayStMLU 2001).

4 METHODS

In Berchtesgaden National Park the concept of visitor nodes was used to evaluate the infrastructural situation. It exposes deficits as well as satisfying conditions.

Here the following steps have been applied. An inventory of visitor nodes has been done. Based on data collection and management, evaluation of visitor nodes took place using the defined categories.

4.1 Data collection and management

Visitor nodes and their infrastructural equipment were measured on site using a specific survey and GPS mapping. Supplemental data has been added from the GIS of Berchtesgaden National Park, different maps and literature. Table 2 gives an overview of the collected data.

All data is managed in a data model in RDBMS Oracle 10g XE using also Oracle Spatial. The data model also manages photographs and outlines transferred into “html-pages”.

TABLE 2

OVERVIEW OF THE COLLECTED DATA IN BERCHTESGADEN NATIONAL PARK

data	description
natural environment	water bodies (lake, brook, etc.), vegetation, viewing points, punctual attractions of nature, wild life viewings, etc
recreational infrastructure	**information elements**: signs, maps, boards, etc. **resting elements**: benches and tables, places for picnics, playing elements, refuges, etc. **orientation elements**: Signs, markers, etc.
mobility and accessibility	parking places, cable car stations, bus stations, landing stages for boats, etc.
facilities and services	restaurants, cafes, mountain pastures, alpine huts, toilets, etc.

4.2 Data evaluation

By having the description of each visitor node and the standard supply of the five defined categories a systematically evaluation was done. The actual infrastructural situation of the visitor node was compared with the defined standard supply of its belonging category.

A numeral code has been developed. The code structure represents the hierarchical system of visitor nodes. That means that the code for the visitor node category

"orientation" consists of one numeral, for the category "resting" of four, for "information" of five, for "destination for hiking" of six and for the category "place of excursion" of seven numerals. Each numeral refers to a specific type of element. Table 3 displays an example.

The value of the numerals represents the number of elements according to the respective infrastructural type at a specific visitor node. The value can vary from 0 to 3:
- 3: high equipped (high developed),
- 2: semi equipped,
- 1: primitive equipped and
- 0: for no elements existing.

By using this code the management overviews the equipment on each visitor node. Deficits and benefits of visitor nodes become observably. In consequence possible recommendations can be made for sites (to equip the visitor node with adequate infrastructure) or the whole park area (to equip the area with presentable visitor nodes).

TABLE 3

AN EXAMPLE FOR THE NUMERAL CODE

visitor node category	position of the numeral	description (numerals 0,1,2 or 3)
place of excursions	1	elements for orientation
	2	access to water
	3	elements for playing
	4	elements for resting
	5	information elements
	6	facilities to stay for the night or to drink and eat something
	7	specific accessibility

5 Results and Discussion

In Berchtesgaden National Park 81 visitor nodes were identified. Their distribution by categories is as follows:
- 6 as "place of excursions",
- 26 as "destination for hiking",
- 17 as "information" and
- 32 as "resting".

5.1 Example of area specific evaluation

Some regions in Berchtesgaden National Park have a special importance. They are used intensively for recreation and are characterized by high visitor numbers. Examples are the Wimbach-Valley and the Jenner-Area.

In the Wimbach-Valley ten visitor nodes are located. This valley indicates a satisfying situation. All categories of visitor nodes are represented and the infrastructural situation at these nodes is very well equipped.

By contrast, the Jenner-Area shows some deficits. Here 15 visitor nodes are located. Nine of them are classified into the categories "place of excursions" and "destination for hiking". Although there is a considerable amount of visitor nodes within these categories, there is no corresponding amount of information elements concerning the protected area (Figure 1). But categories like "place of excursions" and "destination for hiking" should provide such information. This corresponds to the management task environmental education of National Parks.

5.2 Example of site specific evaluation

Site specific evaluation focuses upon the infrastructural situation at individual visitor nodes. As already explained, the numeric code for each visitor node indicates missing infrastructure. To illustrate this, one example on the visitor node category "information" is given.

For the category "information" seventeen visitor nodes have been identified. The code shows that within this category only two sites have an optimum standard supply. This means that all aspects (information elements, elements for resting and orienta-

tion) exist at these visitor nodes. Another two points are classified as high equipped. The remaining 14 visitor nodes range from primitive to semi equipped. Half the visitor nodes classified as semi equipped have no resting elements. They just provide information elements. Furthermore, the orientation elements are absent. Finally just seven visitor nodes within the category "information" provide orientation elements. Need for action is obvious.

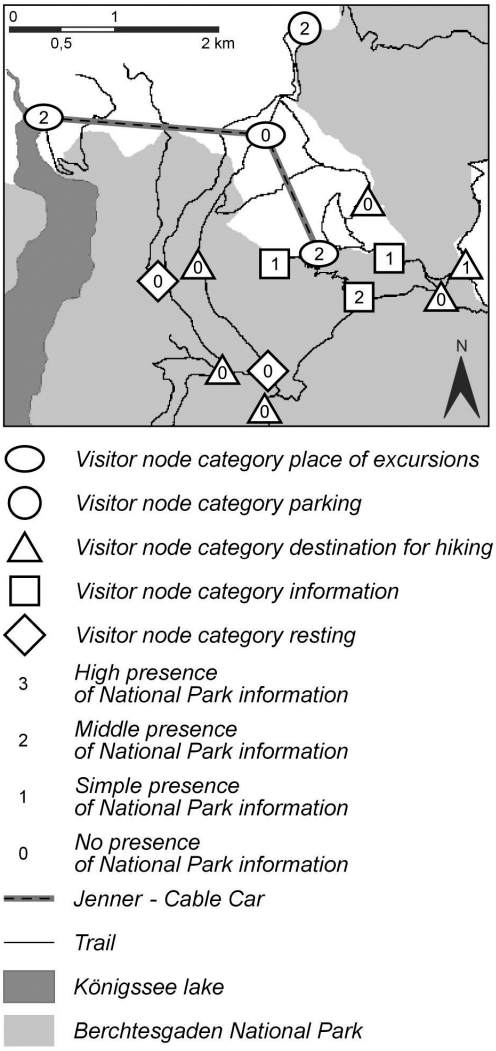


Figure 1: The map displays the Jenner-Area in Berchtesgaden National Park.

6 Conclusion and outlook

The concept of visitor nodes has proved to be sufficient in Berchtesgaden National Park. It is useful to evaluate the infrastructural situation. Due to the visitor nodes categorisation information on infrastructural elements is well organized. Deficits can be found within short time and measures can be set up.

Further studies should work on the characterization of visitor behaviour at visitor nodes. The information gained can be relevant to improve the equipment.

At the moment the concept of visitor nodes as it is presented in this paper is only applied in Berchtesgaden National Park. The evaluation and application in other protected areas would be an interesting aspect.

References

[1] Bayrisches Staatsministerium für Landesentwicklung und Umweltfragen (BayStMLU), „Nationalpark Berchtesgaden. Nationalparkplan," München, 2001.

[2] B. Benthien, "Geographie der Erholung und Tourismus." Gotha, 1997.

[3] R. Hoisl, W. Nohl and P. Engelhardt, „Naturbezogene Erholung und Landschaftsbild. Handbuch," Darmstadt, 2000.

[4] H. Job, „Tourismus versus Naturschutz: sanfte Besucherlenkung in (Nah-) Erholungsgebieten," *Naturschutz und Landschaftsplanung,* vol. 23, no. 1,pp. 28-34,1991.

[5] M. Lockwood, G. Worboys, and A. Kothari, "Managing Protected Area: a global guide." Trowbridge, 2006.

[6] A. MacLeod, Parks Victoria, Melbourne, Victoria, personal communication, 2006.

[7] H.J. Schemel, "Erholungsplanung," http://www.umweltbuero-schemel.de/Manuskript_Lehre-TU2.pdf, 2003.

[8] P. Sukhdev, "The economics of ecosystems and biodiversity – an interim report," http://ec.europa.eu/environment/nature/biodiversity/economics/pdf/teeb_report.pdf. 2008.

[9] W. Tucker, Parks Canada, Gatineau, Quebec, personal communication, 2006.

[10] G. Worboys, M. Lockwood and T. de Lacy, “Protected Area Management. Principles and practice.” Oxford, 2005.
[11] D. Zollner, Jungmeier, M. and G. Jaritz, “Naturparkentwicklung Weißbach bei Lofer: Erhaltungs-und Gestaltungsplan-Rahmenkonzept“, http://weissbach.at/naturpark/aktuelles/Erhaltungs-%20und%20Gestaltungsplan.pdf, 2006.

J. Pfeifer, Dipl. Geogr., first year of PhD, current research interests: recreation in protected areas, visitor management.

S. Hennig, Dipl. Geogr., Dr. rer. nat. .

Chr. Opp, Prof., Dr. rer. nat., Soil and Hydrology.

MMV4 PROCEEDINGS
MONITORING

Managing and monitoring allowance for new second homes in the Rondane Region, Norway

Hans Olav Bråtå, Marta Moranduzzo

Abstract — The Rondane mountain region, in South-East Norway, is very popular for recreational purposes. The region is also the habitat for 4500 wild reindeer (Rangifer tarandus tarandus). The reindeer are hunted in controlled forms as part of the area management and harvesting of nature. This rural region suffers from decreasing population figures, reduced agricultural activity and declining economic activity in general. Boosting economic activity by increasing tourism, especially in second homes, is thought to be one way of mitigating this decline. Increased recreational activity may however negatively influence a sustainable development of the wild reindeer herd. In order to manage this possibly conflicting interest, local and regional authorities in 1991 set up a regional development plan, covering relevant parts of 14 municipalities in the Hedmark and Oppland counties. Research indicates that taken actions to some extent have managed to balance increase in tourism and protect vital space for wild reindeer. Still, the exact localization of existing and new second homes, and hence the development of new interventions, was until some years ago, not possible to analyse at an aggregated level. Such monitoring is important. A Norwegian real estate register, mapping the exact geographic position of buildings and their year of construction, has however become an important means for such monitoring. By the end of 2005 there were about 18,000 second homes mapped in the region. Increased GIS knowledge has now made it possible to develop detailed analysis of localization of second homes, i.e. distance from the wild reindeer core area, and analyse the development by statistic tools. This is a breakthrough and is anticipated to influence the management of the region and strengthen the potential for balancing economic activity and maintenance of biological diversity.

Index Terms — Common pool resource, regional planning, Rondane, second homes, wild reindeer.

1 The Rondane region and the reason for regional planning

The Rondane region is one of 23 wild reindeer management areas in Norway. The region is 150 km north – south, and the total area is 12600 km². The Rondane region is a mountain plateau between 600 metres in the southern part and 2000 metres on the sea level in the northern part. In that part Rondane National Park, Norway's first national park, was established in 1962. Rondane is one of the most popular areas for outdoor recreation in Norway, which has caused a number of privately owned second homes at the fringe of the region and a number of hotels. At the interior part several cabins and a system of marked trails exist. Roads penetrate the region from east and west, but are generally not cleared for snow in the winter.

This region has for decades suffered form decreasing population, reduced agricultural activity and declining economy. Boosting economic activity by increasing the number of second homes is a municipal strategy to mitigate that development. None of the municipalities has their whole territory in the

H.O. Bråtå is with the Eastern Norway Research Institute, Lillehammer, Norway. E-mail: hob@ostforsk.no. M. Moranduzzo did an internship at the Eastern Norway Research Institute in the context of the Leonardo da Vinci EU program. E-mail: marta.moranduzzo@yahoo.it.

Rondane region. In total, around 150,000 people live in these municipalities. In the southernmost part of the area the population density is 23 inhabitants per km². In the rest of the area the density is 3.4 inhabitants per km².

By the end of 2005 17816 second homes existed in the region, most of them in the southern and western parts, see fig. 1. But Rondane is also the habitat for 4500 wild reindeer. These are some of the remnants of the original European mountain wild reindeer. The management is under local and regional control and a controlled hunting is done every autumn.

Wild reindeer are afraid of man, and may temporarily or permanently abandon areas where they frequently are disturbed by man. Increased human activity has therefore reduced the land available to the wild reindeer and increased the general stress when they are disturbed. Less available land means a smaller herd.

The wild reindeer is nomadic, which means they migrate and use large areas summer and winter. When moving in and between these areas the wild reindeer often use specific routes. Some areas are more suitable for winter or summer forage than others, but all together they are all important to the wild reindeer. The wild reindeer habitat is a common pool resource; human intervention in one part of the region influences the possibility to maintain the whole herd. This caused a conflict because some municipalities have planned for both a large number of second homes and have harvested the herd, whereas other municipalities have planned for fewer second homes and harvesting.

This turns the first kind of municipalities to free-riders. When trying to mitigate this challenge, and the incremental step-by-step reduction of wild reindeer habitat, people face the problem that the region is divided between two counties, Hedmark and Oppland, and 14 municipalities. The question then arises; how can a coordinated plan that preserves habitat and gives option for some further development be established? [1], [2].

2 The partial county development plan

Amongst the ones who raised this question at the mid 1980's was the mayor of the Ringebu municipality, whom also was very familiar with wild reindeer management. One option was to enlarge the Rondane National Park, but this was anticipated too controversial[1]. The alternative was to agree on a joint partial county development plan for the whole region, because the municipalities then to a larger extent could influence the rules and regulations set up in the plan – the rules they later would have to face. By regular revisions they would also be able to influence on the rules as they got more experience. Another advantage, emphasized by county agencies, is that although county plans in principle are only guiding for each municipality, they can be used as background for objections to plans.

The Partial County Development plan was approved by all municipalities and both county municipalities in 1991 and adopted by the Ministry of Environment in 1992. The basic structure of the plan is a defined core area, where new impacts are not supposed to be allowed if conflicting with wild reindeer, and a zone of influence, where new impacts are allowed, if they do not cause increased disturbance in the core area. The core area is 3200 km². The zone of influence is 9400 km². Detailed regulations are laid down for the core area and the zone of influence. In general the basic extensions of the zones are kept since the first plan, but some changes are decided on. A planning board, with an equal number of representatives from county agencies and municipalities in Hedmark and Op-

[1] Later, in the 1990s, a process leading up to enlargement of Rondane National Park, establishment of Dovre National Park, and several protected landscapes began. These areas, under the rule of the Nature Conservation Act (NCA), are within the outer limits of the County Development Plan. Protection of wild reindeer habitat was essential for enlarging the areas under rule of the NCA.

pland is set up in order to guide the implementation of the plan. One reason is to “calibrate” the decisions in both counties in order to get people feel that plans are assessed on an equal basis. This is important for the acceptance, implementation and long term management of the common pool resource [1], [2], [3].

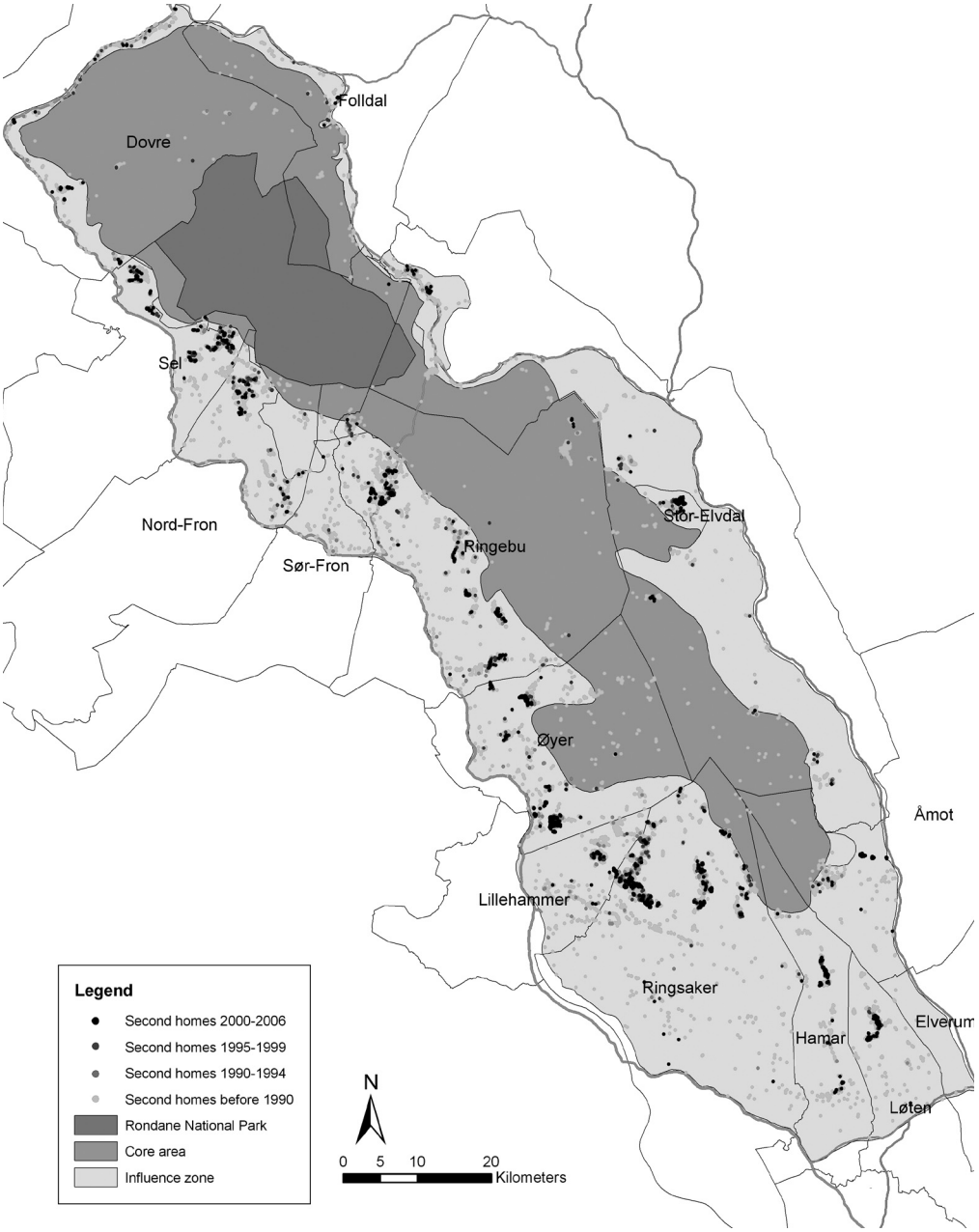


Figure 1. Second homes built in the Rondane Region. Source: [5], original in colour. The national parks and protected landscapes have been enlarged since the basic map was prepared.

3 Objective and method

This paper aims to focus on the spatial and temporal evolution of the building of second homes in the Rondane region, especially in the influence zone. Furthermore how GIS and the Norwegian Real Estate Register may be used for a detailed mapping of the building of second homes. A joint and accepted knowledge, often detailed, is important for long term and successful management of common pool resources [2], [3], [6].

In the registers, there is not reliable data before 1980 about the year the second home has been built, which has affected the time period selection. Uncertainty also exists concerning when the partial county plan actually became effective, but it is reason to believe that its influence increased as time passed throughout the 1990`s. Setting up a new second home (which is the fact recorded) is influenced by the time needed to allow for a plot according to the plan, to sell it and to construct the buildings. On the contrary, it is known that i.e. the county governor used the coming partial county development plan as an argument against planning proposals already at the initial stages of that plan, causing some early effects of it [1], [2].

4 Spatial and temporal evolution in building second homes

The real estate register shows that by the end of 2005 17816 second homes existed in the Rondane region, most of them built in the western and southern parts. The register shows an increasing number of second homes, from 13593 in 1980, to 14334 in 1989 and 16455 in 1999, and 17816 in 2005.

Consequently, in the time which the partial county plan is supposed to have had en influence the number of second homes is still increasing. Notwithstanding, analysis at a regional level shows that in the south and middle parts the annual number of new second homes was ca 160-170 per year in the period 1990 - 2005, but decreasing. In the north part annual numbers of new second homes in 1990 – 2005 was about 27-28. [4].

The reason for this uneven development may be that the south and middle parts are closer to the larger cities and the Oslo-area, and because those parts host popular ski resorts. Another reason may be that there is more land not directly conflicting with wild reindeer habitat than in the north part. A slower increase in the North part may also be caused by the closeness to the national parks and protected landscapes [4].

The number of new second homes are influenced by the number and location allowed for in the plans. If the partial county plan had an effect that could be on the number of new second homes allowed for, where they are located and measures taken to direct human activity to less harmful areas.

An analysis of the number of new second homes in the core area contrary to the zone of influence shows that until 1990 a total of 770 second homes were built in the core area. Most of them were built prior to 1980, probably many years before. In the period 1990 – 2005 59 second homes were built in the core area. Compared to the 1980's that is considerably more. As the growth in the core area has not slowed down since 1990, that indicate a weaknesses in the implementation of the plan [5].

When it comes to the development in the zone of influence a visual evaluation of the location of new second homes, indicate that in general new second homes are located more distant away from the core area. Still, a more detailed analysis is needed, and by merging different parts of the real estate register it is possible to record the number of new second homes per year at different distances around the core area.

Constructing rings around the core area, and electronic counting of the number of second homes built in each ring at a certain period, is one way of aggregating the data, both for visual presentation and statistical

purposes. This procedure shows that in general the number of new second homes in the first kilometre is reduced, but that is also the long term tendency before the partial county development plan existed. A slight increase is recorded in the 1-2 km ring, but especially in the 3-4 and 6-7 km rings. This mixed picture may be caused by the fact that the available land for new second homes varies due to the topography. In some areas there it is not possible to set up second homes further away than1-2 km, whereas in others there is amble land. Although the number of second homes increases close to the core area, the annual growth in % is larger in more distant rings [5].

In order to acquire a more detailed picture, we analysed the development in the rings in each municipality. In general these data shows that in municipalities with ample land more distant from the core area the new second homes are actually located more distant from the core area [5].

5 Conclusion

An analysis based on the real estate register, especially the recent merging of different parts of it, gives valuable and detailed data. It does enable us to analyse the development from a statistical point of view, detecting the more hidden patterns of development. The data indicates that the partial county plan functions according to its goals; it is supposed to both allow for new second homes and preserve the wild reindeer habitat. Still, some questions can be raised concerning the development in parts of the core area and the closer rings. This knowledge has been passed over to the county agencies, where it hopefully will be considered at the ongoing revision of the plan. In any case we now have a tool that easily can monitor the ongoing implementation of the plan. That kind of knowledge may be an advantage for the future management of the common pool resource.

References

[1] H.O. Bråtå, “Evaluation of the County Development Plan for the Rondane Region”. [Evaluering av fylkesdelplan for Rondane]. Norwegian Institute for Urban and Regional Research, Report No 18. Oslo. pp 143. 1997. (Report)

[2] H.O. Bråtå, “The Management of Wild Reindeer and its Resource System in the Rondane Region. The Management is Analysed by Arena, Knowledge and Power as Theoretical Perspectives”. [Forvaltningen av villreinen og dens ressurssystem i Rondane. Belyst I et arenaperspektiv med makt og kunnskap som teoretiske innfallsvinkler]. The Faculty of Mathematics and Natural Sciences University of Oslo, Ph.D. thesis. Oslo. pp 559. 2001. (Thesis)

[3] H.O. Bråtå, “County Development Plans as Means for Preserving Wild Reindeer Habitats in Norway”. *Rangifer,* vol. 28, no.1, pp 89-102, 2008. (Journal)

[4] H.O. Bråtå and K. Overvåg, “Number of Second Homes in the Rondane Region”. [Antall fritidsboliger over tid i Rondaneregionen]. Lillehammer: Eastern Norway Research Institute. ØF-report no. 11. pp. 17 2006. (Report)

[5] M. Moranduzzo, “Analysis of the Evolution of Second Homes Built Around the Rondane’s Wild Reindeer Core Area”. Eastern Norway Research Institute, Lillehammer. pp 27. (Report submitted for publication).

[6] E.Ostrom, “Governing the Commons. The Evolution of Institutions for Collective *Action”*. Cambridge University Press. Cambridge. pp 280. 1990. (Book)

Dr. Hans O. Bråtå. Dr.scient (PH.D) 2001 in Geography, MA 1986 in Geography, Biology & Chemistry. 2002 and ongoing researcher at the Eastern Norway Research Institute (Lillehammer). 1988-2002 researcher at the Norwegian Institute for Urban and Regional Research (Oslo). Project leader at a number of projects grated by the Research Council of Norway. 41 reports or working papers published. 15 articles in Norwegian or international books /journals. 18 papers at Norwegian or international conferences. Current interests; innovations in commercial and sustainable use of natural and cultural resources. Studies of common pool resource management.

Marta Moranduzzo MA in economics and management of environment and tourism at the University of Trento, Italy. Internship at the Eastern Norway Research Institute in the context of the Leonardo da Vinci EU program.

Visitor measuring and monitoring challenges on remote national forests: The case of Alaska, USA

Robert Burns, Alan Graefe, Don English

Abstract — The purpose of this project was to identify and evaluate the set of issues associated with recreation use studies measuring and monitoring in Region 10 of the USDA Forest Service (Alaska), and more specifically within the Chugach and Tongass National Forests. The unique environment and conditions of Alaska have long posed significant challenges to recreation monitoring efforts, and several previous efforts have been undertaken to address this topic, both internally (Reed, 2003) and externally (Stynes, 2006). The US Forest Service uses the National Visitor Use Monitoring (NVUM) protocol to measure and monitor visitor use on all of its national forests. In 2000, an initial attempt to measure visitor use on the Tongass National Forest was conducted. Only 138 of 165 planned sampling days were completed, resulting in a completion rate of 84 percent (USDA 2001). This was the lowest achievement rate among all regions, which averaged 95 percent overall. An in depth review suggested that weather was not a factor and that the low accomplishment rate was attributable to personnel and strategic problems experienced by the sample districts. Approximately 12 interviews were conducted, along with a review of literature focusing on this issue. A series of approximately 20—25 recommendations were made to managers as a result of the review and interviews. It is intended that the results of this review will ultimately aid in customizing the survey protocol and instruments for the National Visitor Use Monitoring (NVUM) and related recreation use monitoring studies in this region.

Index Terms — Alaska, recreation use, national forests, visitor monitoring.

Trap shyness in onsite visitor surveys; evidence from the U.S.

Donald B.K. English, Stanley J. Zarnoch, and J.M. Bowker

Abstract — In onsite surveys of visitors, whether the purpose is estimating visitation volume or characteristics of the visit population, those who visit the area multiple times per year are candidates to be surveyed more than one time. In such surveys, each visit represents a unique sampling unit. However, individuals may be unwilling to be surveyed after the first contact. The phenomenon is similar to 'trap shyness' in wildlife studies wherein an animal learns to avoid traps after the initial experience. If trap shyness exists, it has the potential to bias the results for either or both visitation estimation or describing the average visit characteristics.
There is some anecdotal evidence that trap shyness does exist, and could be problematic for long-term surveys such as the National Visitor Use Monitoring program used by the US Forest Service. This paper describes the conceptual framework for how trap shyness can affect both visitation estimates and visit characteristics, identify empirical hypotheses to be tested that provide evidence of trap shyness, present results for the hypotheses, and describe possible improvements to sampling processes that could determine it existence and extent.
Data for the paper come from onsite surveying collected during the period October 2004 – September 2007 for about three dozen National Forests.

Index Terms — Estimation bias, onsite surveys, recreation visitation, trap shyness.

1 Introduction

Studies whose purpose is estimating the amount of visitation to a park, protected area, or recreation area generally follow a conceptually consistent estimation process. The area is divided into sampling units defined spatially and temporally. Mechanical counts of traffic are taken from a sample of the units via photographs, infrared or pneumatic counters, observation, or some similar method. Coefficients to calibrate the counts to visitation estimates are obtained through surveys, interpretation by trained staff, or onsite observation. In the U.S., a very common protocol is the combination of mechanical counts of auto traffic calibrated with onsite surveys.

Similarly, studies that seek to describe visitor characteristics usually have temporally and spatially defined sampling strata. Onsite interviews are conducted over a number of days. Characteristics of the population of visits are derived from the sample of individuals obtained.

For both types of studies, a unique element in the population of individual contacts occurs each time a person or vehicle passes the traffic counter or interview site. That is, each such passage is an opportunity to capture and record the person's behaviour with the survey instrument. However, anecdotal evidence indicates that individuals who have been 'captured' once are less likely to be willing to submit to subsequent interviews.

D.B.K. English is the national program manager for the National Visitor Use Monitoring program, with the Recreation, Heritage, and Volunteer Resources Staff of the US Forest Service, Washington, DC 20250. E-mail: denglish@fs.fed.us.
S.J. Zarnoch is a mathematical statistician with the Southern Research Station, US Forest Service, Asheville, NC 28804. E-mail: szarnoch@fs.fed.us.
J.M. Bowker is a research social scientist with the Southern Research Station, US Forest Service, Athens, GA 30602. E-mail: mbowker@fs.fed.us.

Research that estimates the size of wildlife populations through capture-recapture studies has identified learned behaviour in animals that makes those once captured more likely to be recaptured or to avoid recapture. Animals that seek recapture are referred to as 'trap-happy', and those who avoid it are 'trap-shy'. These learned behaviours yield biased estimates of population sizes if not corrected in the analysis [1], [2].

This paper posits that a trap-shyness phenomenon exists in onsite surveys of visitors to recreation areas. Trap shyness can be considered as a form of self-selection bias in respondents, in that once a person has been 'captured' during the interview season, their willingness to participate on subsequent visits is less. The paper explains the effects of trap shyness on estimating visitation volume, and on characteristics of the visit population. Several measures that could indicate the presence of trap shyness are presented, and results from data collected in year-long interview windows form several National Forests are presented.

2 Trap shyness effects

2.1 Visitation Estimation

Let T = the estimate of traffic obtained by the traffic counter, and p = the proportion of the surveyed individuals who are completing a recreation visit. The visitation estimate, V, is:

$$V = T * p \quad (1)$$

In general, if trap shyness exists among recreation visitors, then p will be biased downward, and the visitation estimate will be too low. Surveys conducted later in the data collection time window will not include all of the recreation visits. Moreover, the bias may be greater if the proportion of visits made by people making repeat visits is higher.

2.2 Visit characteristics

A primary effect of trap shyness will be to underestimate the concentration of visits made by frequent visitors. Further, if visit frequency is correlated with a given characteristic, then the existence of trap shyness can lead to an underestimate of the proportion of visits made by people with that characteristic. For example, in the U.S., men are more likely than women to be frequent users of wildland recreation areas, and locals visit more frequently than non-locals.

2.3 Endogenous stratification

A curious side note is that trap shyness would appear to counter some of the effects of endogenous stratification for studies that were designed to sample or describe the population of visiting individuals. For example, in studies of consumer surplus for recreation, endogenous stratification can be a problem, because those persons who visit more frequently are more likely to be surveyed once (or more) than are those who visit less frequently [3]. However, trap shyness would eliminate the chance that a particular person will show up in the onsite sample multiple times.

3 Evidence of trap shyness

What would we expect to see if trap shyness exists in the population of potential survey respondents? First, we would expect to see a lower incidence of frequent visitors in the population of sampled recreation visitors as we progress through the time window of sampling. To the extent that frequent visitors return to the same location on the forest to recreate, we could expect to see a lower percentage of frequent visitors on sample occasions when we revisit a survey location.

We also expect that a greater proportion of the onsite contacts would decline to be interviewed over time, since they had already been 'captured' in the survey process.

Data for the study came from year-long

onsite surveys conducted on three National Forests through the National Visitor Use Monitoring program. We selected the three forests sampled between 2004 and 2007 that had the highest estimated proportion of visits made by visitors who reported visitoing at least 50 times per year. We assumed that the effects of trap shyness would be most evident on those forests. The forests selected were the Lolo (in Idaho), Sawtooth (Idaho), and Tahoe (California). For the Lolo, we estimate that about one-third of all recreation visits are made by individuals who visit at least 50 times per year; for the other two forests, the figure is about 23 percent of visits.

4 RESULTS

For two of the three forests, the percentage of survey respondents who were frequent (>50 visits/year) visitors generally declined over the sampling year (Table 1). For the Lolo NF, the percent of contacts who were frequent visitors declined steadily each successive quarter of the sampling year. On the Sawtooth NF, the percentage of frequent visitors was much less in the second half of the sampling year. For the Lolo, about 28 percent of respondents were frequent visitors on the first day of sampling at a site. On later sampling efforts at the same locations only 21 percent of contacts were frequent visitors.

TABLE 1.

PERCENT OF RECREATION SURVEY RESPONSES REPORTING 50 OR MORE VISITS PER YEAR, FOR THREE NATIONAL FORESTS

Quarter of Sampling year	Lolo N.F.	Sawtooth N.F.	Tahoe N.F.
1 (Oct – Dec)	30	22	17
2 (Jan – Mar)	28	19	12
3 (Apr – Jun)	26	6	19
4 (Jul – Sep)	12	10	12
First day at sample location	28	12	16
Later days at same sample location	21	13	15

On the Lolo, the recreation contacts who reported visiting the forest at least 200 times per year made up about five percent of the contacts on the first day of sampling at sites, but only about 1 percent for subsequent days at those same locations.

There was no consistent pattern over the quarters of the sampling year regarding the percentage of survey contacts who agreed to be interviewed (Table 2). For the Tahoe NF, the percentage who agreed to be interviewed was slightly higher in the last three quarters of the year than in the first. On the Sawtooth, the percentage who agreed to be interviewed was lower in the second half of the sample year.

However, on second and later sample days at sample sites, the percentage of onsite contacts who agreed to be interviewed were 10 percent lower on the Lolo than on the first sample day at those sites. For the Sawtooth, the percentage who agreed to be interviewed declined from 88 percent on the first day at sampled sites to 84 percent on succeeding days

TABLE 2.

PERCENT OF ONSITE CONTACTS WHO AGREED TO BE INTERVIEWED, FOR THREE NATIONAL FORESTS

Quarter of Sampling year	Lolo N.F.	Sawtooth N.F.	Tahoe N.F.
1 (Oct – Dec)	88	91	91
2 (Jan – Mar)	71	98	96
3 (Apr – Jun)	80	83	97
4 (Jul – Sep)	87	83	97
First day at sample location	87	88	96
Later days at same sample location	77	84	96

5 DISCUSSION

These preliminary results show some evidence that trap shyness may exist in the sample population for the Lolo NF, but only very limited evidence that it is evident for the sam-

ple populations on the other two forests. In particular for the Lolo, we see that the proportion of frequent visitors is less in later quarters of the sample year. As well, on the second or later sample days at a site, both the percentage of contacts who agree to be interviewed, and the percentage of recreation visitors who are frequent visitors are lower than on the first day that sampling occurs there.

For the Lolo, visit frequency is correlated significantly and negatively with both visit duration and distance travelled to the forest, but not with gender, age, or racial characteristics. So trap shyness would lead to underestimating the proportion of local residents who recreate on the forest, and overestimating the average visit duration.

It is worth noting that for sampling on the Lolo, there were 16 locations that were each sampled 5 or more times during the sample year. For the Sawtooth, there were 12 such locations, and for the Tahoe, there were only eight. It may be that trap shyness is more evident in an onsite sample that contains a higher proportion of repeat locations in the set of sampled days.

The examinations performed here cannot provide definitive evidence that trap shyness exists in the population of visiting individuals. Rather, they can only provide indications that it may exist. It is very possible that those who have been sampled once in the process may choose to not even be contacted in the rest of their visits. That is, they may just pass by the interview location without stopping to allow the interviewer to ask if they would be willing to participate in the interview.

Definitive evidence for the existence and degree of trap shyness would best be determined by incorporating a mandatory traffic stop as part of the survey protocol. Currently, the Forest Service's Visitor Use Monitoring program has only a voluntary traffic stop. That is, individuals or vehicles passing by the interview location are not required to stop for an interview. In addition, for those who decline an interview it would be helpful to ascertain if the reason for refusal is that the individual had been surveyed before during the process. Those interviewed for the first time could be asked if they felt they would be any less likely to stop for an interview on succeeding visits to the forest.

6 Conclusion

Trap shyness in onsite recreation surveys is a form of self-selection bias. It would seem to be most likely at recreation areas that have high levels of repeat visitors. Popular day use sites, dispersed trailheads, or similar places where the same individual may visit several dozen times a year would have the greatest potential. Its effects could be limited in onsite surveys that have shorter sampling windows, or that do not revisit the same sampling location multiple times.

Research on trap shyness in onsite recreation samples is difficult to find. This paper was motivated by discussions with field interviewers at the end of the sampling year, who noticed that frequent visitors chose not to be interviewed more than one time. Additional research is needed to develop a definitive set of tests and identify the necessary data to evaluate and correct for trap shyness.

References

[1] S.J. Zarnoch, "Simulation of Effects of Learned Trap Response on Three Estimators of Population Size," *Journal of Wildlife Management,* vol. 43, no. 2, pp. 474-483, Apr. 1979.

[2] J.D. Nichols, J.E. Hines, and K.H. Pollock, "Effects of Permanent Trap Response in Capture Probability on Jolly-Seber Capture-Recapture Model Estimates," *Journal of Wildlife Management,* vol. 48, no. 1, pp. 289- 294, Jan. 1984.

[3] D. Shaw, "On-site Sample's Regression: Problems of Non-Negative Integers, Truncation, and Endogenous Selection," *J. Econometrics,* vol. 37, pp. 211-223, 1988.

The role of recreation demand and supply information in monitoring outdoor recreation sustainability

Joel Erkkonen and Liisa Kajala

Abstract — Metsähallitus bears major responsibility for the development of tourism in Finland's state-owned protected and recreational areas. In order to further develop the existing potential for high-quality recreation and nature tourism in these areas, Metsähallitus is implementing a set of key measures for the development of sustainable nature tourism. The measures are applied through sustainable nature tourism management plans, which are implemented in all areas in which recreation and/or nature tourism exists to a significant degree. An essential aspect of the drafting process of the sustainable nature tourism management plans is the setting of standards, i.e. limits, of acceptable change for selected sustainable recreation and nature tourism criteria by means of participatory planning.

Metsähallitus started out with an extensive range of applicable criteria. On the basis of experiences gained from pilot projects and a targeted evaluation and selection process, the number of criteria was subsequently significantly narrowed down to a set of around 20 key criteria. This was found to be a manageable and effective number once the most essential variables had been selected and their measurement standardised. For information management, Metsähallitus uses database applications for the demand and supply data, which can be used to produce reports on current figures and trends, ranging in scale from individual areas to regions and to the national level.

This paper describes the development process of the approach and methods applied by Metsähallitus in monitoring the sustainability of outdoor recreation and nature tourism in Finland. In addition, a case study example from Pyhä-Luosto National Park is used to illustrate the system at the park level.

Index terms — Database applications, nature tourism, outdoor recreation, sustainability, visitor monitoring.

1 Introduction

Many of Finland's recreational and protected areas are highly attractive destinations for both recreation and tourism. Metsähallitus' responsibility for the administration of all state-owned recreational and protected areas covers a total of 35 national parks, 17 strict nature reserves, 12 wilderness areas and nearly 500 nature reserves. These areas of high conservational or recreational value cover a total area of some 4 million hectares. Annual visits to these areas number over 1.5 million to national parks, 350,000 to national hiking areas and 798,400 to visitor centres and other Metsähallitus customer service points. Consequently, Metsähallitus has a major responsibility as regards tourism development in these areas.

In order to contribute to sustainable, high-quality outdoor recreation and nature tourism in these protected and recreational areas, Metsähallitus has developed a set of principles and measures for the evaluation of the sustainability of nature tourism [1, 2]. The measures are applied through sustainable nature tourism management plans. These plans are implemented in all areas in which recreation and/or nature tourism exists at a

J. Erkkonen of Metsähallitus Natural Heritage Services, Lapland, P.O. Box 8016, 96101 Rovaniemi, Finland. E-mail: joel.erkkonen@metsa.fi.
L. Kajala of Metsähallitus Natural Heritage Services, Southern Finland, Akselinkatu 8, 57130 Savonlinna, Finland. E-mail: liisa.kajala@metsa.fi.

significant level. The planning framework is based on the Limits of Acceptable Change (LAC) concept [3]. Database applications have proven to be an essential aid in implementing the monitoring process at the national level.

This paper describes the development and current status of the methods applied by Metsähallitus in monitoring the sustainability of outdoor recreation and nature tourism. An example from Pyhä-Luosto National Park is used to illustrate the methodology.

2 Development process for measuring sustainability

Metsähallitus started the process with an extensive number (appr. 70) of applicable criteria [2] which, on the basis of experiences from pilot projects in six protected areas and a targeted evaluation process, was significantly narrowed down to a set of selected key criteria.

The practical criteria for selecting the best indicators were developed based on literature [4]. The following criteria for good indicators were used:

- Indicators must be specific to the measurement target, i.e. environmental impacts of outdoor recreation and nature tourism (minimal variation due to other factors)
- Indicators must be objective and their variables clearly measurable.
- Indicators must be reliable and their measurement repeatable to the extent required.
- Indicators must be sensitive and reactive to sustainability related changes.
- Measurements must be reasonably easy to implement (minimal additional work).
- Measurements must be cost-effective, making use of existing information whenever possible.

For Metsähallitus' purposes, a set of around 20 criteria has been found to be a manageable and efficient number, once the most essential variables have been selected and their measurement has been standardised.

3 Data management for recreational demand and supply information

Information on recreational demand and supply is essential when estimating the sustainability of outdoor recreation. For example, the number of visits is an essential variable in the calculation of many indicators.

For various purposes, Metsähallitus has developed database applications for managing demand and supply information. One important use for the applications is in monitoring, including monitoring of sustainability, at national, regional and local levels.

In order to improve the reliability, accessibility and applicability of visitor information, a database system, ASTA, was developed during 2005–2006 for the management of this information. ASTA includes visitor survey data, numeric feedback data, and information on numbers of visits to protected and recreational areas, nature centres and other customer service points managed by Metsähallitus.

At the same time as the ASTA development process, Metsähallitus guidelines and manuals for visitor monitoring were updated and personnel training in the use of the updated methods and new applications was implemented. Parallel to this development process, a Nordic and Baltic joint project on Developing Visitor Monitoring Methodology was also implemented [5]. This is a first step towards obtaining uniform visitor monitoring information from the Nordic and Baltic countries, and thus creating a common basis for statistics and databases.

The supply data for recreation services within Metsähallitus is managed by a GIS Database system, Reiska GIS, which has been in use since 2004. Reiska GIS includes data on all buildings and other man-made structures and routes managed by Metsähallitus.

From the ASTA and Reiska database applications, reports can be produced at area, regional or national level. The information

obtained from the database applications is essential in monitoring the sustainability of outdoor recreation and nature tourism.

4 CASE PYHÄ-LUOSTO NATIONAL PARK

4.1 Sustainability at the National Park Level

Pyhä-Luosto National Park is located in central Lapland. The main purpose of the national park is to protect arctic tundra, boreal forests and aapa mires. The land area of the Pyhä-Luosto National Park, which forms part of the EU's Natura 2000 network, covers 14,300 hectares. The backbone of the national park is a 35-km-long range of 12 hills and fells. Marked routes and ski trails running along the fell range connect the Pyhä and Luosto holiday resorts. There are several maintained campfire and rest sites, lean-tos, day huts and wilderness huts for overnight stays located along the routes. The estimated number of visits to the national park was around 109,000 in 2007, the majority of which were domestic visitors. Cross-country skiing and hiking are the most popular activities in the park. The General Management Plan for Pyhä-Luosto National Park was approved in 2007. A separate management plan for sustainable nature tourism was also drafted in connection with the general management plan.

A sustainable nature tourism management plan is a strategic plan aimed at promoting sustainable nature tourism both within a national park and in its surrounding area. The plan includes guidelines and recommendations for achieving Metsähallitus' strategic goals regarding nature tourism and outdoor recreation. More practically, it also presents the ways in which key indicators are used and incorporated into the overall planning process.

The sustainable nature tourism management planning process is based on the participatory planning principle. As such, the process creates common understanding between national park management and nature tourism businesses, as well as other important stakeholders. Sustainable nature tourism management plans are typically implemented in areas where there is a common understanding of the need for and strong commitment to the promotion of sustainable nature tourism.

During the initial identification phase of sustainable nature tourism indicators, some 30 relevant indicators were identified for Pyhä-Luosto National Park [6]. From a practical point of view, this number was too high and difficult to manage. Careful re-evaluation of these indicators in 2008 on the basis of good indicator criteria reduced the number to 22 (Table 1).

4.2 Sustainability at the tourism destination level

The environmentally focused quality programme, Green DMN™, was launched at the Pyhä-Luosto tourism destination in August 2008. Developing this kind of operation mode in tourism destination will take three years and will include open training for all interested stakeholders as well as more specific training for companies more closely involved in the quality programme.

The environmentally focused quality programmes for tourism destinations, Green DQN™ and Green DMN™, have been developed jointly by Metsähallitus' Natural Heritage Services (Metsähallitus NHS), the Finnish Tourist Board and the Haaga-Perho Institute [7]. The aim at Pyhä-Luosto is to gain crucial competitive advantage within the tourism sector by focusing on quality, environmental know-how and caring for natural and cultural values. The quality programmes, Green DQN™ and Green DMN™, play a remarkable role in combining the aims of the tourism sector and of Pyhä-Luosto National Park. The Metsähallitus NHS principles of sustainable nature tourism are embedded in both the Green DQN™ and Green DMN™ quality programmes. Cooperation with the tourism sector is thus a way of achieving the goals of the national parks at the tourism destination level.

Table 1.

Sustainable nature tourism indicators and data sources. example: Pyhä-Luosto National Park

General principle	a. Indicator	b. Data source	a. Indicator	b. Data source
1. Nature values are preserved and tourism activities promote nature protection	1.1a Number of occupied endangered bird of prey nesting territories	1.1b Annual nest surveys	1.2.a Hiking trail network area of impact / park area (ha)	1.2b Reiska GIS
2. Minimum loading of the environment is assured	2.1a Hiking trail depth	2.1b Wear monitoring, 5-year	2.2a Extent of littering	2.2b ASTA
	2.3a Hiking trail width	2.3b Wear monitoring, 5-year	2.4a Total firewood consumption / duration of stay	2.4b Reiska GIS and ASTA
	2.5a Terrain wear	2.5b ASTA		
3. Local culture and heritage are respected	3.1a Number of valid cooperation agreements	3.1b VUOKRA Database		
4. Customers' appreciation and knowledge of nature and culture are promoted	4.1a Importance to visitors of experiencing nature	4.1b ASTA	4.2a Number of visits to Pyhätunturi Visitor Centre	4.2b ASTA
	4.3a Importance to visitors of learning about Finnish cultural heritage	4.3b ASTA	4.4a Extent of littering	4.4b Littering monitoring, 5-year
5. Customers' opportunities for nature recreation are enhanced	5.1a Comparable visitor satisfaction index	5.1b ASTA	5.2a Customer evaluation of the quality of the recreational environment (index)	5.2b ASTA
	5.3a Customer evaluation of negative impacts (index)	5.3b ASTA	5.4a Customer evaluation of the quality of services (index)	5.4b ASTA
6. Customers' mental and physical wellbeing are reinforced	6.1a Importance to visitors of personal wellbeing	6.1b ASTA	6.2a Condition of nature infrastructure	6.2b Reiska GIS
	6.3a Importance to visitors of relaxation	6.3b ASTA		
7. Positive impacts are made on the local economy and employment	7.1a Customer monetary contribution to the local economy	7.1b ASTA and local economy impact evaluation model (under development)		
8. Communication and marketing are of a high standard and carried out with a sense of responsibility	8.1a How well do the natural environment, recreational opportunities and services correspond to visitors' expectations (index)	8.1b ASTA		
9. Activities are jointly planned and implemented	9.1a Evaluation of Metsähallitus' operations by stakeholder businesses	9.1b ASTA		

5 CONCLUSIONS

Despite progress in monitoring sustainability, Metsähallitus' Natural Heritage Services recognises that there is still lot of work to be done in years to come. Challenges remain both at the grassroots and national level in making more efficient use of gathered information. To further enhance the use of visitor supply and demand data, as well as other information related to nature conservation, the "Monitoring the Status of Protected Areas" project has been launched. Its aim is to develop an application to assist further in monitoring the status of protected areas, including the sustainability of outdoor recreation. The project application will use data from different Databases, including ASTA and Reiska, and will enable definition of the objects and limits of acceptable change. The project will thereby allow for more intensive status monitoring, e.g. by comparing objectives with current status data by means of state-of-the-art reporting.

REFERENCES

[1] J. Högmander and A. Leivo, "General Principles for Sustainable Nature Tourism in Protected Areas." *In: Sievänen et al., eds. Policies, Methods and Tools for Visitor Mangement. – Proceedings of the Second International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas*, June 16–20, 2004, Rovaniemi, Finland. Rovaniemi. pp. 345–347, 2004.

[2] L. Kajala, J. Erkkonen, J., and M. Perttula, "Measures for Developing Sustainability of Nature Tourism in Protected Areas." *In: Sievänen et al. (eds.) Policies, Methods and Tools for Visitor Management. – Proceedings of the Second International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas,* June 16–20, 2004, Rovaniemi, Finland. Rovaniemi. pp. 241–246, 2004.

[3] G.H. Stankey, D.N. Cole, R.C. Lucas, M.E. Petersen, and S.S. Frissell "The Limits of Acceptable Change (LAC) System for Wilderness Planning" *USDA Forest Service General Technical Report, INT-176*. Ogden, Utah: Intermountain Forest and Experiment Station. 37 p. 1985.

[4] The Visitor Experience and Resource Protection (VERP) Framework. A Handbook for Planners and Managers. US Department of the Interior, National Park Service, Denver Service Center. pp. 62–64, 1997

[5] L. Kajala, A. Almik, R. Dahl, L. Dikšaitė, J. Erkkonen, P. Fredman, F.S. Jensen, K. Karoles, T. Sievänen, H. Skov-Petersen, O.I. Vistad, and P. Wallsten, "Visitor monitoring in nature areas – a manual based on experiences from the Nordic and Baltic countries" *TemaNord 2007:534*. ISBN 91-620-1258-4, 2007.

[6] J. Erkkonen, J. and P. Itkonen, "Monitoring Sustainable Nature Tourism in Practice – Experiences from Pyhä-Luosto National Park, Finland." *In: Siegrist, D. Clivaz, C., Hunziker, M & Iten, S., eds. Exploring the Nature of Management. Proceedings of the Third International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas.* University of Applied Sciences Rapperswil, Switzerland. 13–17 September 2006. Rapperswil. pp. 56–57, 2006.

[7] http://www.haagaperho.fi/kehitys/laatutuotteet/greenDQN/index.htm

Joel Erkkonen, M.Sc. (For.) 1996, University of Helsinki, Department of Forest Economics. Erkkonen has worked as an assistant in 1996–1997 and as a researcher at the University of Helsinki from 1996–2000 in the National Outdoor Recreation Demand and Supply Assessment Study (LVVI). Since 2000 he has served as a Senior Advisor for Metsähallitus, Natural Heritage Services.

Liisa Kajala, M.Sc. (For.) 1991, University of Joensuu, Faculty of Forestry, M.Sc. (For.) 1994, Oregon State University, Lic. For. 1994, University of Joensuu, Faculty of Forestry. Kajala has worked as a researcher in 1994 at the University of Joensuu and in 1995–1996 at the Finnish Forest Research Institute. She has served as a Senior Advisor for Metsähallitus, Natural Heritage Services since 1996.

Designing a visitor monitoring concept for Harz National Park in Germany

Eick von Ruschkowski, Susanne Valdeig, Rebekka Jakob and Sandra Homann

Abstract — Germany's protected areas encounter many specific challenges in regards to visitor management. Due to a high population density, they are frequented by high visitor numbers who also enter unaccounted for from diffuse ingress points as access is free of charge. Additionally, Germany's parks are historically young. Thus, scientific monitoring is often limited to conservation issues whereas socioeconomic dimensions are not always considered a core management issue. Harz National Park with an area of 246 km^2, situated in the German states of Lower Saxony and Saxony-Anhalt, is a typical example. Although visitor counts have been conducted in several recreational "hot spots" within in the park, no quantitative and qualitative visitor use statistics for the park as a whole exist. As a consequence, the park administration lacks information that is necessary to analyse and evaluate potential conflicts between visitor use and conservation objectives. In 2007, the Institute of Environmental Planning and the Harz National Park administration joined efforts to develop a long-term strategy to implement visitor use monitoring with the national park. Based on extensive interviews, mainly with park staff, and an evaluation of current available technologies, a first framework was developed which will address the methodological challenges outlined above. Key pillars of the framework are a concept for quantitative visitor counts by means of pyroelectric counters and a modular-structured questionnaire to collect qualitative data such as visitor preferences, and value added to the region. The framework will now further undergo scientific evaluation to be implemented from 2009 onwards.

Index Terms — Harz National Park, visitor monitoring concept, Germany.

1 Introduction

Visitor-induced impacts on a protected area's resources are a common and legitimate concern for park managers worldwide [1], [2]. Because most European large protected areas such as national parks or biosphere reserves have only been established in the last 25 to 30 years, integrated approaches to resource management and visitor monitoring are not fully developed yet or even non-existent. While most parks manage their natural resources, management approaches to recreational use continue to be lacking. However, increasing use, changing user groups and the desire for intact resources underline the need for further implementation of tools that enable park managers to balance recreational use and resource protection [3]. Specifically, Germany's national parks have a strong history in natural resource management while even current attempts to establish quality guidelines and standards for park management [4] do not include socio-economic issues on the research and monitoring agenda. Due to high visitation numbers, but also because of increasing pressure from politics to prove their benefit to regional economic development, a number

Eick von Ruschkowski is with the Institute of Environmental Planning, Leibniz Universität Hannover, Herrenhäuser Straße 2, 30419 Hannover, Germany. E-mail: ruschkowski@umwelt.uni-hannover.de
Susanne Valdeig, Rebekka Jakob and Sandra Homann are graduate students at the Institute of Environmental Planning at Leibniz Universität Hannover.

of protected areas have started individual approaches to address this topic.

2 HARZ NATIONAL PARK

2.1 Background

Harz National Park encompasses about 246 km² of colline and montane habitat zones and is located in the German states of of Lower Saxony and Saxony-Anhalt. From the North Sea inward, the Harz mountains are the first mountain range beyond the northern German lowlands, raising to an elevation of up to 1,142 meters above sea level. The national park only comprises a minor area of the mountain range and features forests and bogs. The forests have mainly been altered by logging and mining for at least the

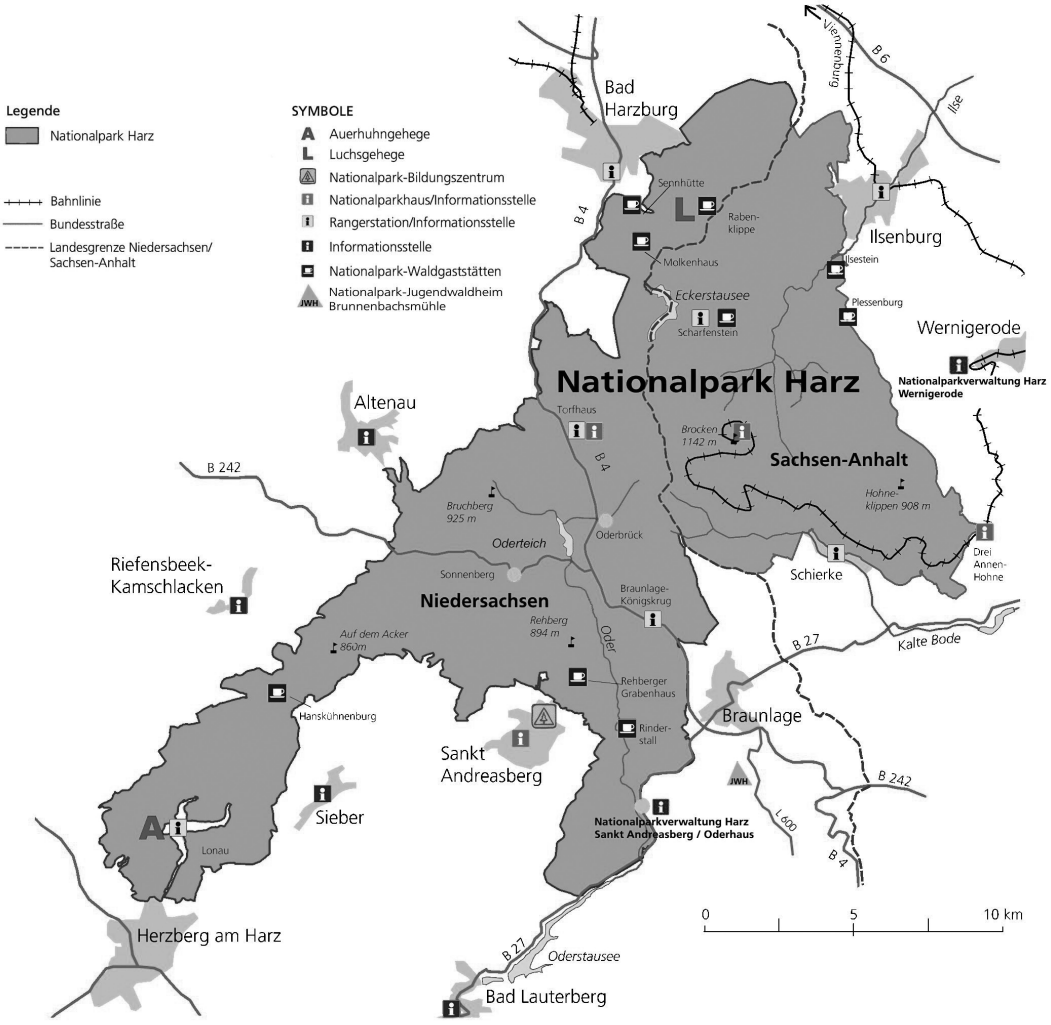


Fig. 1. Harz National Park with its surrounding communities and infrastructure. Source: Nationalpark Harz.

past 1,000 years, thus the vegetation is still far from a natural state in the elevations between 500 and 850 meters above sea level. The national park was originally founded as two separate parks along the state lines (and the former borderline between East and West Germany) of Saxony-Anhalt (1990) and Lower Saxony (1994). National park legislation is a matter to the federal states in Germany, hence two different parks. Both parks were merged into the current Harz National Park in 2006, creating Germany's first (and only) interstate national park.

The Harz region has been a strong tourism destination for more than 100 years. The number of visitors is estimated between 10 and 40 million visitors per year (including multiple visits and day visits) without sound validation of this data available. Still, the number of overnight stays indicates strong visitor use. For the year 2003, 4.2 million overnight stays were recorded by the local tourism administration Harzer Verkehrsverband [5].

2.2 Current visitor monitoring activities

Prior to the merger in 2006, the Lower Saxony portion of Harz National Park was not conducting any visitor monitoring at all. The eastern portion was running a socio-economic monitoring program (SÖM) which included visitor counts with different counter types between 2003 and 2005 [6].Currently, these counters are not being operated and are substituted by manual counts (e.g. cars on forest roads in selected locations). A comprehensive approach to monitor visitor activities is not in place. Due to staff shortages, socio-economic research in Harz National Park mostly relies on external efforts by partner universities and research institutions.

3 Planned visitor monitoring concept

3.1 Objectives

Based on the current status of visitor monitoring activities in Harz National Park and to address the needs of the park's administration, a framework for visitor monitoring was developed in a two-semester term project at the Institute of Environmental Planning in 2006/2007 [7]. The need for a visitor monitoring concept is underlined by the park managers' mandate to draft a new general management plan and a trail management plan within the next three years which call for valid empirical data in regards to visitation and visitor use.

The data needed requires a multi-stage approach, using different, mainly quantitative methods to generate data that gives information about

- total visitation throughout the park,
- preferred types of visitor use,
- visitor distribution throughout the park, and
- potential conflicts between visitor use and conservation objectives.

3.2 Methods

The concept relies on automated counts ("visitor count") and surveys with standardized questionnaires ("visitor survey"). Both elements were subdivided in modules to allow maximum flexibility with the monitoring concept.

Technically, the visitor count will be based on a combination of pyro-electric counters on trails and traffic counters on the roads. This combination might also allow for establishing correlations between traffic and actual visitation as the park is crossed by several thoroughfares which are a contributor to the inaccuracy of current visitation numbers. The locations for all counters were selected on the basis of an ad hoc workshop with the park district rangers who have the field knowledge about highly and less frequented areas. The basic layout for continuous visitor counts includes 25 locations in the national park of which 21 are permanent and an additional four seasonal during the summer. All 25 locations will record hikers. Mountain bikers will be accounted for in 17 locations, skiers in 11. Add-on modules for visitor counts include additional counters for vehicle traffic, winter

seasonal use, and circular trails, with partial location overlaps. The maximum number of data collecting locations would be 35.

Visitor surveys will be used to achieve the park administration's other objectives. The survey is based on a standardizes and highly structured questionnaire in order to achieve maximum comparability of data. The survey is also divided into several modules under which data could be collected separately and tailored to need. The basic modules include demographic data, visitor interests, and knowledge about the park. Additional modules include visitor satisfaction with trails, interpretive exhibits and information, and socio-economic data. All modules combined add up to 26 questions plus an additional demographic information section.

4 Implementation and expected results

The concept was presented to park managers and park staff in December of 2007. Their comments were integrated into a joint proposal which is currently pending for funding. Depending on funding, the implementation of the concept is planned for the beginning of 2009.

If the program will be implemented as planned, it will be the first comprehensive approach to visitor use monitoring in a large protected area in Germany. Besides the objectives laid out by the park administration, a second step will be the blending of the results with conservation objectives in order to improve protected area management tools that allow the integration of natural resource and visitor use monitoring in protected areas. Additionally, the project aims at a close cooperation with international partners to allow testing whether existing management frameworks such as Visitor Impact Management (VIM), Visitor Experience and Resource Protection (VERP) or Limits of Acceptable Chance (LAC) may be adapted to the specific needs of Harz National Park.

References

[1] G. Worboys, M. Lockwood, T. DeLacy (2005): Protected Area Management: Principles and Practice, 2nd edition. New York: Oxford University Press.

[2] Y.-F. Leung, C. Monz (2006): Visitor Impact Monitoring: Old Issues, New Challenges. *George Wright Forum* 23 (2), pp. 7-10.

[3] A. Arnberger (2007): Internationale Entwicklungen im Besuchermonitoring – Ein Überblick. *Besuchermonitoring und ökonomische Effekte in Nationalen Naturlandschaften, Biosphärenreservat Vessertal-Thüringer Wald, pp. 8-17* (Conference Proceedings)

[4] L. Maly-Wischhof, W. Kemkes (2008): Qualitätsmanagement in Nationalparks (Management effectiveness in German national parks). *Natur und Landschaft* 83 (3), pp. 101-104.

[5] T. Wilken, J. Neuhaus (2005): Europäische Charta für nachhaltigen Tourismus in Schutzgebieten.. Projektplanung für die Nationalparkregion Harz. Technical report, Hamburg.

[6] F. Steingass, R. Wendt (2007): Bausteine des sozioökonomischen Monitorings im Nationalpark Harz. *Besuchermonitoring und ökonomische Effekte in Nationalen Naturlandschaften, Biosphärenreservat Vessertal-Thüringer Wald, pp. 60-65* (Conference Proceedings)

[7] S. Valdeig, R. Jakob, S. Homann (2007): Besuchermonotoring – ein Konzept für den Nationalpark Harz. Technical report, Institute of Environmental Planning, Leibniz Universität Hannover.

Eick von Ruschkowski: Diplom-Umweltwissenschaftler, Universität Lüneburg (2000), currently completing PhD in environmental planning, Leibniz Universität Hannover (2008).
Editor, Science's Next Wave Germany, 2001 – 2003
Scholar, Deutsche Bundesstiftung Umwelt PhD Scholarship Programme 2003 – 2006
Policy Analyst, German Federal Advisory Council on the Environment 2006 – 2008
Research Assistant, Institute of Environmental Planning since 2006
Member of IASNR
Research interests: park management, human dimensions of natural resource management.

Susanne Valdeig, Rebekka Jakob and Sandra Homann are graduate students at the Institute of Environmental Planning in the Leibniz Universität's programme in landscape architecture and environmental planning.

Long term benefits of visitor monitoring – An Australian experience

Dino Zanon, John Hall, Robin Shaw

Abstract — Parks Victoria manages Victoria's (Australia) national, state and urban parks. These parks make up approximately 17% of the state's area and annually receive 45.3 million visits. Parks Victoria has been dedicated to the development of scientifically sound methods for monitoring visitors and the community since 1994. The three main ongoing monitoring streams are: visit quantities, community perceptions of management and visitor experience (Visitor Satisfaction Monitor). Accumulated research data from the Visitor Satisfaction Monitor (VSM) has been used to profile and refine the organisation's understanding of its various park visitors. After 10 years that data has matured to produce a comprehensive visitor-product market segmentation. Over 11,000 interviews at 34 major parks (including 68 visitor sites) between 2000 and 2004 were used to group park visitors into seven segments. The segments are Nature Admirers, Urban Socials Trail Users, Passives and Other Users, Activity Centrics, Access Made Easy and Country Vacationers. Each park visitor segment, or group, had substantial differences from the other groups, while the individuals within each segment had much more in common; Nature Admirers visit in small groups for a short spectacular scenic experience whereas Urban Socials visit in large groups for half-day social interactions such as birthday parties and picnics. Further analyses have been conducted to identify individual sub-segments within each of the major segments. These sub-segments provide detailed information that can be used for the future development of parks and associated services. Subsequent analysis using Structural Equation Modelling provides evidence that the relationships between services and satisfaction are better understood when considering segments. Parks Victoria has been using segments in park management applications such as wild fire recovery plans, tourism strategy formulation, park management planning and visitor risk management. It has proved to be an efficient and effective systematic way of meeting visitor needs.

Index Terms — Visitor Satisfaction, Visitor Segments, Park Visitors, Structural Equation Model, Park Management Planning.

1 Introduction

Park organisations worldwide manage a high proportion of their country's natural resources, in trust for their population and under the direction of government. Most park managers do not, however, have a clear understanding of how their organisation and products are perceived by the public, what the public expects of them and how they are performing in relation to the multiple market segments that the government wants them to serve. The primary goal of managing parks and recreation areas is to provide satisfying experiences to visitors1, while protecting natural values. In order to achieve this goal objective information regarding park visitor satisfaction and activity preferences is needed to form the basis of sound policy, personnel, budgeting and programming decisions.

Practitioners and researchers agree that the basic purpose of managing outdoor recreation is to provide satisfying experiences to visitors. Many leisure and tourism organisations, including publically funded agencies, struggle to maintain adequate services and facilities within a limited budget. One of the primary objectives of recreation manage-

Dino Zanon is the Team Leader Visitor Research for Parks Victoria Level 10, 535 Bourke St Melbourne Victoria 3000 Australia E-mail: dzanon@ parks.vic.gov.au

ment has become the maximisation of user satisfaction within given financial and operational constraints. This situation has resulted in park and recreation agencies looking for techniques to promote efficiency in service management within tightening budget constraints.

Marketing theory can be applied to enhance management efficiency by improving the match between park services and visitor preferences. Park management has embraced some elements of marketing theory, but it has generally been viewed with scepticism as it is often thought to be synonymous with commercialisation or narrowly focused on capacity management. Marketing theory can be used, however, to identify and characterise different park-user groups. Fundamental to modern marketing is the notion that consumers are heterogeneous, which makes market segmentation virtually always relevant. Heterogeneity exists regarding who visits parks and with what frequency, what is visited, with whom, what is engaged in, and what is valued, amongst many other aspects[2]. This theory has been successfully applied within a number of contexts, including tourism[3]; leisure[4]; and wine marketing[5]. Park management is yet to apply this marketing theory in a strategic manner. This study seeks to address this limitation through the development of market segments within the context of park management.

2 Method

2.1 Participants

The participants in this study were 11,387 visitors to Parks Victoria (Australia) managed parks. Just over half the sample was male (54%) and all participants were aged 18 years and over, with a median age in the 35-39 year category. The majority of the sample was born in Australia (65.4%), followed by the United Kingdom (9.5%) and New Zealand (2.8%). In terms of the highest level of education achieved 7.5% had completed primary and some secondary school, 29.6% had completed secondary school and 63% had completed a tertiary degree.

2.2 Instrument

The instrument used in this study is from the Visitor Satisfaction Monitor (VSM Parks Victoria, 2000-2004). The VSM has a 69 item questionnaire. Seven items measured visitor demographics, such as age, gender and lifecycle category and three items assessed the weather during the visit. Two questions assessed visit history and eight items assessed characteristics of their visit, such as party size, length of stay, and reasons for visiting. Open ended questions were used to assess how they found out about the park, the main and other reasons for visiting, activities the park does not provide for, how their visit satisfaction could be improved and the most and least positive aspects of the visit. Satisfaction relating to the overall visit and satisfaction with park management was assessed using a 6-point Likert scale ranging from 1 (completely dissatisfied) to 6 (fully satisfied). The likelihood of recommending the park to others was measured using a Likert scale ranging from 1 (would strongly recommend) to 4 (would strongly not recommend). Service Attributes in the park were assessed using five subscales, labelled Park Accessibility (4 items), Ranger Service (3 items), General Management Service (4 items), Recreation Facilities (3 items) and Information, Interpretation & Education (4 items). Each item was rated twice, in terms of what was expected of these services and how well they performed, using a 6-point Likert scale ranging from 1 (agree) to 6 (very strongly agree).

2.3 Procedure

Face to face interviews were conducted at 68 visitor sites in 34 major parks by an independent market research company. The surveys were conducted during summer, spring and winter over four years ranging from 2000-2004.

3 Results

3.1 Segmentation

Prior to conducting the segmentation analysis, a two-stage factor analysis was conducted using the continuous, dichotomous and ordinal variables, to reduce the number of Service Attribute included in the cluster analysis. It should be noted that the main reason for visiting was recoded into five dichotomous variables, so that it could be included in this analysis.

Simple hierarchical clustering, followed by quick K-clustering was conducted using the 12 factors identified in the above analysis. Cluster membership dispersion was examined for 2 to 12 K-cluster solutions and relatively good reduction occurred on the 2, 5 and 7 cluster solutions. The remaining solutions either failed to converge or had inferior membership dispersion. The 7 cluster solution had the lowest dispersion and most differentiation between clusters so was selected as the best solution. Each of the 7 segments was shown to be well differentiated from the other segments and to have strong consistency within the segment.

The segment centres on each factor were examined to determine the distinctive differences between the segments. The factor-items contained in the distinguishing factors were then examined to evaluate which variables contributed most to the differentiation between the segments. These items were checked by cross tabulating the segments with the variables in question.

Finally, all variables were analysed for differences across the seven segments. These differences were found using cross-tabulations between segments and each variable. Continuous variables were compared using t-tests; chi-square tests were used to compare the remaining variables.

A summary of the distinctive characteristics of each segment is presented below:

Nature Admirers (26.1% of the sample). This segment visits for a novel but short visual experience of nature; especially seeking scenery, plants, animals or cultural attractions.

Urban Socials (25.9% of the sample). They visit typically for a large social gathering with the park serving as a suitably large and recreationally serviced venue for such occasions. Nature is simply serving as the backdrop for the social occasion.

Trail Users (14.4% of the sample). They visit for a variety of trail activities, mostly walking but also cycling or jogging, with the park providing a suitable track or trail.

Passive and Other Users (9.4% of the sample). They visit to relax and unwind in a natural setting or visit for some other activity, which is typically low energy such as sun baking or reading.

Activity Centrics (8.5% of the sample). They visit to undertake specific activities where the park provides a suitable venue to undertake such activity, typically water based and/or high energy such as surfing or rock climbing.

Access Made Easy (8.1% of the sample). Unlike other segments this segment does not visit for any one specific activity; also they differ in that they have lower satisfaction because they encounter more problems related to park accessibility.

Country Vacationers (7.5% of the sample). They like to spend a weekend away or a substantial period of their vacation, staying or camping in National Parks and undertake a wide range of secondary activities.

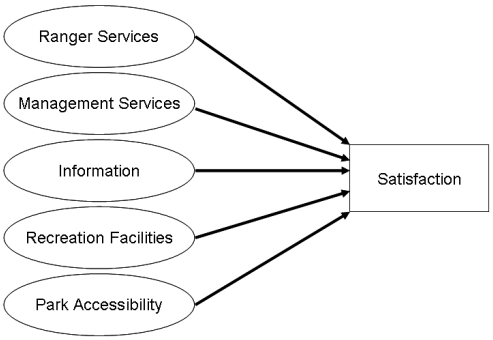


Fig. 1. Model of visitor satisfaction.

3.2 Structural equation modelling

Confirmatory factor analysis (CFA)[6] was used to extract the items that provided a reliable measure of the constructs under investigation in this study. Structural Equation Modelling (SEM) was used subsequently to analyse the relationships between the constructs of park visitation and visitor satisfaction (see Figure 1).

The model developed and estimated in this study investigates the influence of the various constructs developed from the factor analysis and confirmed in the literature, (i.e. ranger services, information, recreation facilities, park accessibility and management services) relating to overall visitor satisfaction. One-factor congeneric models were developed for each construct. Unsuitable items (i.e. those that had low standardised factor loadings or a low level of explained variance) were removed when the one-factor models were fitted to the full measurement model. The path model's fit indices indicated a good fit of the eight models to the data, (i.e. CMIN/DF<3, significant P value, GFI>.90, AGFI>.90, TLI > .90, CFI > .90, RMSEA<.08). Reliability, convergent and discriminant validity were also identified in the constructs of the models through examination of the correlations of items and constructs and were found to be acceptable.

TABLE 1

SEM OF PARK SEGMENTS

	Variance Total Satisfaction	Ranger Services	Information	Recreation Facilities	Park Accessibility	Management Services
Passive	.30	.10	.08	**.24+**	**.47****	.16
Trail Users	.21	.00	**.16***	.07	**.25****	.07
Activity Centrics	.32	.03	.03	**.13+**	**.52****	.04
Urban Social	.36	**.11***	.03	**.53****	**.25****	**.12+**
Access Made Easy	.27	.05	.05	.06	**.40****	.12
Country Vacationers	.27	.09	-.03	**.22+**	**.29****	.03
Nature Admirers	.15	.01	**.11***	.08	**.30****	-.03
Total Sample	.17	**.07****	-.01	**.18****	**.37****	**.06***

**Significant .001, *Significant .05, +Significant .01.

It is important to note from the results (see Table 1) of the structural equation modelling that the combination of significant constructs and the relative importance of each vary across the segments e.g.: Passive users (park accessibility .47 and recreation facilities .24), Urban Socials (recreation facilities .53, park accessibility .25, management services .12 and ranger services .11). Furthermore by considering each segment separately, a very different insight is gained of park visitors than which would be achieved by considering the sample as a whole. The value of the segmented approach is also highlighted by the fact that each of the segments except Nature Admirers accounts for more variance than that achieved in the general model.

4 CONCLUSION AND IMPLICATIONS

Park management is a multifaceted problem. Visitor and environmental priorities need to be balanced within increasingly tight budgetary constraints. This has created a need for efficient and effective decision support tools that can assist park managers to administer resources, assess planning decisions, cater for an increased range of users, avoid user conflicts, manage visitor safety risks and minimise negative impacts on the environment.

The segmentation of park visitors shows that different types of parks attract different types of users, who undertake site specific activities, have specific service needs and specific predictors of visit satisfaction. The two biggest user groups highlight this point. Nature Admirers are willing to travel long distances to National Parks where they admire natural or spectacular scenery. They have high expectations relating to General Management and Ranger Services and have high visit satisfaction. In contrast, Urban Socials use urban parks as a venue for a large social gathering. They don't travel far and have high expectations for Recreational Facilities, which are strong predictors for their overall visit satisfaction.

Park managers can use this information to tailor services within their parks to meet their specific market's needs. It has multiple uses including the development of service and infrastructure plans, targeted communication strategies, visitor risk mitigation strategies, and park management plans. Applying this research 'on the ground' is likely to lead to improved visitor experiences and reduced costs for the park management organisation.

An example of one such application is shown in Table 2. It shows part of a procedure developed to manage visitor risk in parks. The table demonstrates how segment groupings can be effectively used to organise visitor risks. The procedure goes on to identify appropriate control actions, e.g. monitor, harden or reduce, for different risks at varying site service levels.

TABLE 2

ASSESSING RISK CONTROLS IN PARKS

Type of Visitor (Market Segment)	Recreation Category	Example of potential risk	Level of Risk Tolerance
Nature Admirer	• Walking / Sight Seeing	• Insect Bite • Tree limb fall • Trip hazard	Low
Urban Social	• Children's Play • Picnicking / Socialising	• Tree limb fall • Trip hazard	Low to Medium
Country Vacationer	• Camping / Accommodation • Four Wheel Driving	• Bushfire • Exposure • Tree limb fall • Trip hazard • Vehicle rolling	Medium to High

Parks Victoria is in the early stages of using the segmentation but it has already been used in a number of park management applications. Similar visitor segmentation is being extended for other venues such as piers and bays. Finally, it is also being extended to evaluate the various sub-segments within each park segment. For example Trail Users includes 5 sub segments: High Speed Melbournians, Regular Melbourne Walkers, Occasional Pleasant Walkers, Cross Country Skiers and Long Distance Bushwalkers.

REFERENCES

[1] Glover, T.D. (1999). Municipal Park and Recreation Agencies unite! A single case analysis of an inter-municipal partnership. Journal of Park and Recreation Administration, 17(1), pp. 73-90.

[2] Crompton, J. (2000). Repositioning leisure services. Managing Leisure, 5, pp. 65 - 75.

[3] Hede, A., Jago, L. and Deery, M. (2004) Segmentation of Special Event Attendees Using Personal Values: Relationships with Satisfaction and Behavioural Intentions, Journal of Quality Assurance in Hospitality & Tourism, Volume 5, Nos 2/3/4, pp. 33-55, Haworth Hospitality Press, United States

[4] Kim, S. S. and Petrick, J. F. (2004). Segmenting horse racing gamblers using the concept of involvement. Tourism Analysis, 9, pp. 1/2.

[5] Hall, J. and Winchester, M. 2000. An Empirical Confirmation of Segments in the Australian Wine Market. International Journal of Wine Marketing, 13(1): pp. 19 - 35.

[6] Tabachnick, B. G. and L. S. Fidell (2001), Using Multivariate Statistics (Fourth ed.). Northridge: HarperCollins Publishers.

Dino Zanon Assoc. Dip. of Aero Eng, BSc, is Team Leader of Visitor Research and Development at Parks Victoria, Australia.

John Hall and **Robin Shaw** are professors at Deakin University Business School, Burwood Victoria, Australia.

MMV4 PROCEEDINGS
MODELLING AND SIMULATION

Level of sustainable activity: bottom up vessel traffic management

Robert M. Itami

Abstract — This paper presents a decision-making framework called "Level of Sustainable Activity"(LSA) which is a user-based approach to vessel traffic planning and management of high volume multiple use urban waterways. The method is adapted from the US Federal Highway Administrations "Level of Service" for traffic capacity. However the LSA framework links user estimates of traffic density to quality of service objects and a risk management framework to identify social and environmental risk factors. The results of the method are then used to interpret simulations of existing and projected use for making management decisions. The LSA framework was developed to define traffic capacity to urban waterways, however a spinoff of the method has been improved stakeholder buy-in into the process and a much stronger basis for management decision making. This is a direct result of the "bottom up" approach taken to both developing behavioural simulation models and the methods of obtaining information from users for populating and validating the simulation model. This paper advocates the LSA approach for a wider range of management applications by taking a user-based approach for describing existing conditions, projecting future growth, identifying key issues, and developing management actions. A case study of a vessel traffic management plan for Hobson's Bay in Melbourne, Australia is used to demonstrate the concepts described in this paper.

Index Terms — Vessel Traffic Management, Level of Sustainable Activity, RBSim, Recreation Behaviour Simulation, Bottom Up Decision Making

1 Introduction

Computer modelling and simulation is a useful technology for describing and understanding complex behaviour in recreational environments. The development of RBSim specifically for the purposes of simulating outdoor recreation behaviour over the last 18 years has yielded a wealth of experience in the technical aspects of applying simulation to outdoor recreation environments including software architecture [1], field methods for collecting reliable input data, and statistical techniques for analysing outputs of the simulation. More recently however, the development has moved from the technical implementation of simulation to the integration of simulation methodologies into planning and management frameworks. This has brought us almost full circle to the starting point of our efforts which is how to improve visitor management through the use of new concepts and technologies. This paper presents a decision making framework for developing a vessel traffic management plan for high use traffic in an urban bay in Australia. The framework is based on complementary processes that engage stakeholders and conduct objective analysis of traffic patterns to develop a holistic understanding of the users of urban waterways, the criteria for quality of service, pattern of use, the nature and intensity of traffic conflicts and means of balancing competing interests. The decision making approach has been called "Level of Sustainable Activity" or LSA.

Robert M. Itami is Director of GeoDimensions Pty Ltd. 16 Tullyvallin Crescent, Sorrento Victoria 3943 Australia. E-mail: bob.itami@geodimensions.com.au

2 Williamstown vessel traffic management plan

2.1 Study area and Problem

The study area (See fig 1) is the western side of Hobson's Bay which is the north end of Port Phillip Bay in Melbourne, Victoria Australia. The study is a busy urban waterfront bounded on the east by the Williamstown Shipping Channel used by commercial traffic and container ships moving to the container ports and wharves up the Yarra River to the north. Parallel the to the west side of the Yarra River and merging with the mouth of the river is a Newport power station cooling water channel that also serves as the channel servicing a major boat ramp and parking area known as Warmies Boat Ramp operated by the City of Hobsons Bay. Williamstown is a suburb of the City of Melbourne and is a historic port. It hosts six sailing and yacht clubs, businesses including marinas, marine services, boat building, passenger ferries, tourist charters, and commercial fishing vessels.

Parks Victoria is the local port manager for the Port of Port Phillip. It is responsible for the management of boating activities in the local port, with a view to ensuring that those operations are carried out safely, efficiently and effectively. Parks Victoria is also the Committee of Management under the Crown Land (Reserves) Act for a large area of the Williamstown foreshore and water extending from Ann St Pier to the top end of Greenwich Bay. Parks Victoria commissioned GeoDimensions Pty Ltd in 2007 to develop a vessel traffic management plan for the study area. The study brief focussed on the following questions:

- Has the Williamstown berthing area reached capacity?
- Is vessel operator safety at risk currently or will it be in the future?
- Is vessel operator and visitor amenity being affected by the growth in vessel traffic?
- To define the fairway capacity in terms of safety and vessel operator expectations and amenity.
- To assess the management implications of proposed developments on fairway capacity.

2.2 Study method

The Level of Sustainable Activity method has five stages:

1. Interview stakeholders to determine the nature of organisation, pattern of use, and issues relating to traffic management and quality of service.
2. Traffic observations during peak use periods
3. Forecasting traffic to 2013 and 2018.
4. Using a Level of Sustainable Activity framework to:
   - confirm pattern of use,
   - define traffic capacity levels
   - determine current traffic capacity level during peak periods of use
   - impacts of proposed marina expansions by Hobsons Bay Yacht Club and Royal Yacht Club of Victoria.
5. Develop the Traffic Management Plan from the above information

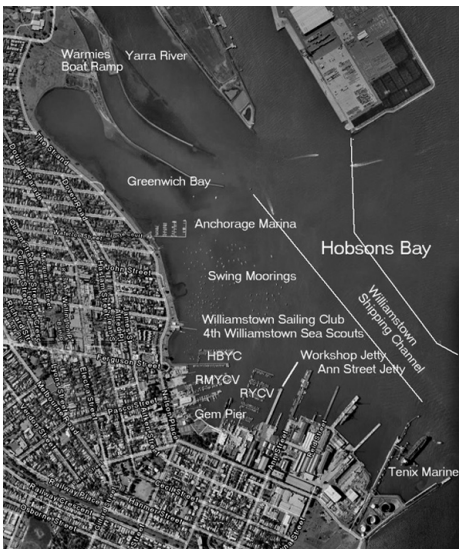


Figure 1 Williamstown Vessel Traffic Management Plan Study area (background image: Google Earth 2008)

Each step of the study method generates new information with the explicit idea of cross checking information in other steps. This idea of cross validation of information between steps of the process is important because, like many consulting studies, there is neither the time nor the budget to collect enough data to generate statistically valid conclusions about recreational behaviour in the study area. In fact, the study method is fundamentally dependent on information from stakeholders. This is the basis of "bottom up" planning and management where information gathered from users drives the process as compared to a top down approach where managers set the agenda with formal planning analysis studies used to characterise the situation with stakeholders used primarily to give feedback to planners on the process.

2 Phase 1: stakeholder interviews

Face to face or phone interviews were conducted with stakeholders identified by Parks Victoria. The list included sailing clubs, commercial ferry operators, commercial charters, commercial marinas, marine services, boat and ship building businesses, Victorian Water Police, Hobsons Bay City Council and Port of Melbourne Corporation. There was generally high interest in the project and all but two stakeholders participated in the interview process out of a total of 33. The interview was structured to gather the following information:

- The purpose of the organization
- For clubs, the membership of the club
- Size of current fleet
- Plans for expansion
- Season of operation
- Scheduled boating activities
- Peak period of use
- Traffic conflicts
- Safety Issues
- Traffic management advice

Interviews lasted on average 1 hour and stakeholders were generally cooperative and eager to volunteer information they thought would be helpful to the process. The process resulted in a detailed list of traffic issues for seven distinct areas in the bay. In addition stakeholders provided detailed information on pattern of use, traffic conflicts, safety issues as well as many suggestions for improving traffic conditions. An unexpected result of the interview process was the high level of dissatisfaction with current management and high levels of animosity between user groups. Key issues include:

- Lack of enforcement of rules
- Conflicts between small boat sailing and large yacht races
- Conflicts between passenger ferries and sail boats
- Poor facilities at Gem Pier for ferries and charters
- Expansion of private marinas into public water
- Insufficient number of public berths
- Increasing traffic
- Lax licensing requirements for recreational boaters
- Aggressive behaviour between commercial operators
- Speeding in the bay
- Recreational boats anchoring in fairways.
- Poor management of swing moorings

On the basis of this information a field observation study was designed to collect objective information about traffic.

3 Phase 2: traffic observations during peak periods

From Phase I it was determined that the peak periods for traffic was during summer weekends, Wednesday evening races, Monday and Tuesday evenings. On site observations were made from three locations in the bay to record all vessel movements. Movements were categorised with a record made of the date, time and type of vessel. The results of the observations confirmed the use patterns reported by stakeholders and provided objective data on intensity of use. In addition to the on-ground observations, aerial surveys

of traffic during the peak periods were also made to photograph traffic during peak periods and to capture the nature of traffic conflicts in a way that ground observations were unable to.

3 Phase 3: traffic projections

From the information obtained in interviews and site observations traffic during peak weekend days was constructed to show hourly traffic for each hour of the day. Based on information on expansion plans by clubs and businesses low and high estimates of traffic growth for 5 and 10 year time horizons were estimated. The results showed natural limits to growth for most clubs and businesses due to the lack of room to expand facilities such as boat storage and marinas, and continued increase in independent motorised boating.

4 Phase 4: level of sustainable activity focus groups

The above information gives a comprehensive picture of current traffic issues and traffic schedules; however it was apparent from field observations that the pattern of use of the different groups was a key to resolving the major traffic conflicts. In addition it is still necessary to determine the current and maximum traffic capacity of the bay. The stakeholders were organised into four focus groups:

- Small Sailing Clubs
- Large Yacht Clubs
- Commercial Marina operators and marine services
- Commercial tourist operators from Gem Pier

In each case users were first briefed on the issues from phase 1. This ensured that all users had the same information available to them. Next, users were asked to draw on aerial photos, their pattern of use (fig. 2). Third users were asked to indicate Level of Sustainable activity in the bay when they have exclusive use of the bay and during peak periods using the scale shown in Table 1. Table 2 shows the results of this evaluation. It shows that LSA ratings are sensitive to local conditions with Users in the Gem Pier areas (such as the Australian Naval Cadets, Melbourne Seaplanes, Able Fish Charters and Red Engine Group all finding conditions at off-peak periods either level C or level D. Most users find that at peak periods (summer weekends) traffic is already at capacity (Levels D or E). This suggests that future growth in traffic will create greater conflicts, increase risks to safety and lower quality of experience for users. It also suggests that actions need to be taken to reduce traffic conflicts during summer weekends.

TABLE 1

Level of Sustainable Activity definitions

Level	Description
A	Plenty of open water, no conflicts between users
B	Moderate amount of open water, need to look out for other users, but plenty of room to manoeuvre
C	Satisfactory sailing conditions need to watch out for other traffic but safe for sailors with good skills
D	Crowded conditions, need to constantly watch out for traffic in order to avoid collisions requires skill and experience to safely navigate
E	Jammed – frequently have to stop or wait for other boats to pass, many near misses, unsafe for inexperienced sailors.

TABLE 2

RESULTS OF LSA RATINGS

Organisation	Off Peak	Peak
Williamstown Sailing Club	A-B	E
4th Williamstown Sea Scouts	B	D
Australian Naval Cadets	C	E
Hobsons Bay Yacht Club	C	C+
Royal Victorian Motor Yacht Club	B	C-D
Royal Yacht Club of Victoria	B	C-D
Anchorage Marina	B	C-D
Aussie Boat Sales	B	B
Savages Wharf	B	D
C. Blunt Boat Builders	B	D
Williamstown Bay and River Cruises	A	D
Melbourne River Cruises	B	E
Williamstown Charters	B	D
Enterprize	A	D-E
Melbourne Seaplanes	C	D
Able Fishing Charters	D	D
Red Engine Group	D	D

5 PHASE 5: TRAFFIC MANAGEMENT PLAN

The information from the previous 4 phases provides a comprehensive understanding of traffic issues in Hobsons Bay. Insights into the problem and the information needed to make decisions relating to traffic management are largely provided by stakeholders in a "bottom-up" approach to management decision making. Traffic management concepts were developed that represent the mix of views on the future of the Williamstown foreshore with strong stakeholder support for the process. This requires a number of strategies to be successful: 1) Trust in the users and the process. It is important that at the outset management and users "buy into" the process. 2) Cross checking information – this is important to keep people honest and bring confidence to the the conclusions. 3) Transparency – everyone should have access to all information both managers and stakeholders. It should be clear what the criteria for decision making is and who will be making the final decisions.

The LSA framework should be adaptable to a range of mixed use environments and adds considerable value to the management process.

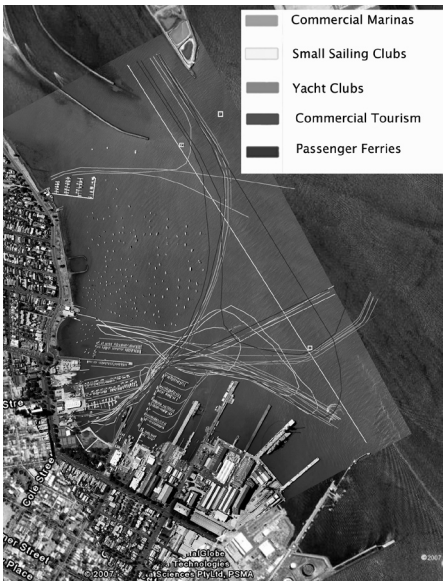


Figure 2 Self reported pattern of use

REFERENCES

[1] Itami, R. et al (2003). RBSim 2: Simulating the complex interactions between human movement and the outdoor recreation environment. *Journal of Nature Conservation* , 278-286.

Robert M. Itami BLA, 1974 University of Idaho, MLArch, 1980, Melbourne, Director, GeoDimensions Pty Ltd. has over 18 years of international experience applying computer simulation technology to visitor management for outdoor recreation, and management of traffic in river and coastal environments.

Building the model right and building the right model: Verification and validation of the recreation simulation model MASOOR

Rene Jochem

Abstract — MASOOR (Multi Agent Simulation Of Outdoor Recreation) is a multi-agent recreational behaviour simulation model. MASOOR is developed to evaluate both existing management policies and effects of various management actions. In addition, it can serve as a communication tool in participatory processes. By visualizing recreational behaviour on maps the model helps different stakeholders (recreationists, managers, scientists) to interpret the complex patterns of visitor use and support the discussion among those stakeholders. However, it is important that the model is verified and validated. Verification can be defined as the process of testing whether or not the logic of the model is acceptable. It involves checking that the model behaves as expected and it is sometimes referred to as testing the ëinner validityí of the model. Verification deals with building the model *right*. Validation relates to the extent that the model adequately represent the actual situation that is modeled. Validation deals with building the *right* model. Validity can be ascertained by comparing the output of the model with comparable data collected from a real-world system using a various statistics. In this paper we verify MASOOR by an assessment of recreational path use at different numbers of replications. We validate MASOOR by comparing the modeled output with real world data. Finally, we focus the validation on specific behavioural rules such as preference for path type and chunking direction

Index Terms — Behaviour simulation, MASOOR, recreation model, behavioural rules and preferences.

Rene Jochem is with the Wageningen University and Research. Email: rene.jochem@wur.nl

How to elaborate precise visitor numbers?

Reto Rupf, Michael Wernli, Ruedi Haller

Abstract — Visitor numbers and visitor distribution are required information for various management tasks of recreational areas. Automatic data collection is a low-price opportunity to obtain data. The main problem of automatic methods is data precision. In the Swiss National Park, automatic visitor counting with acoustic slab sensors started in 2005. As precision did not appear to be satisfactory, the counting problems were investigated. Sensor installation strictly followed the instruction manuals given and fine tuning during the calibration period led to a deviance of 5%. Precise counting data resulted in the sum of persons counted whereas direction separated data was not as precise. Recommendations for counting site selection, installation and calibration counting are given.

Index Terms — Acoustic slab sensor, calibration, visitor census, visitor monitoring, Swiss National Park

1 Introduction

Visitor management in nature parks requires a good data of visitor numbers. Effects on regional economy, carrying capacity, necessary infrastructure, disturbance of wildlife etc. can only be estimated from reliable data e.g. [1] (based on survey and estimated visitor numbers form 1993 [2], Küpfer [3] estimated the economic effect of the National Park on the region of about 17.4 Million Swiss Francs). The quality of visitor experience influences a visitor's attitude towards nature and the environment. Positive experiences promote understanding of the need for nature conservation [4]. In the Swiss National Park, the first visitor counting and survey took place in the nineties [2], [5]. In 2006 and 2007 surveys of visitor structure and requirements were carried out [6], and the Swiss population's perception of the National Park was ascertained [7]. In 2005 automatic visitor counting started in the Swiss National Park. Acoustic slab sensors recording hikers were chosen because they are imperceptible and use little energy [8]. However, the precision of the visitor counting was not satisfactory. On-site precision did not correspond to counting under lab conditions [9]. Reasons for this lack of accuracy are discussed in Ross [10]. Therefore, the aim of visitor counting during the hiking season 2007 was to enhance the counting precision.

2 Method

During the 2007 season, an improvement in counting certainty was sought to reduce the difference between automatic and manual counting to less than 10%. Three calibration loops were made. Each loop lasted one month and contained 2-8 hours of manual counting per sensor. Loop results were analyzed and followed by system adjustments if required. Exact manuals for the installation (based on the manual of the producer Eco-Counter [11]) and calibration counting were written.

Eight acoustic slab sensors from the eco

R. Rupf, Zurich University of Applied Sciences, Institute of Natural Resource Sciences, P. O. Box, 8820 Waedenswil, Switzerland. E-mail: reto.rupf@zhaw.ch
M. Wernli, Zurich University of Applied Sciences, Institute of Natural Resource Sciences, P. O. Box, 8820 Waedenswil, Switzerland. E-mail: michael.wernli@zhaw.ch
R. Haller, Swiss National Park, Chasa Planta Wildenberg, 7503 Zernez, Switzerland. E-mail: rhaller@nationalpark.ch

counter company were installed. The sites were selected based on the path network and further sensor requirements [11]. The systems were combined and tested before on-site installation. This process was documented. Sensor functionality was checked after installation. The data collected included total numbers of visitors per hour as well as the direction in which they passed the sensor. Manual calibration counting lasted at least 2 hours per sensor and loop. Calibration counting was always operated by the same well-trained counting team. Detailed protocols supported the counting. Due to the sensors being imperceptible, visitors' behaviour was not influenced. Absolute deflection of calibration and automatic counting was tested using a Wilcoxon test [12].

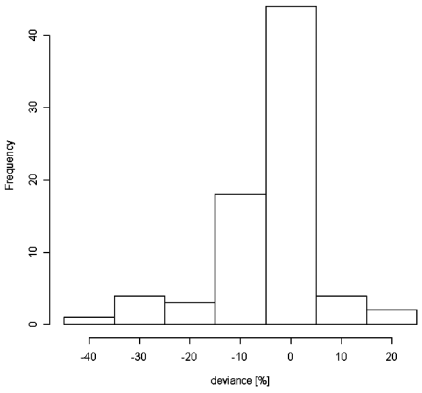


Fig. 1: Histogram of relative deviance of automatically and manually counted visitors; N=76.

TABLE 1

RESULTS OF CALIBRATION COUNTING

loop	n	mean abrolute deviance	p-value wilcoxon test
1	31	8.0%	0:007
2	18	6.2%	**0.005**
3	27	4.7%	**< 0.001**
1 - 3	76	6.4%	**< 0.001**

3 RESULTS

The calculated deviance detected by manual calibration counting is shown in Fig. 1. Most counting hours showed a deviance less than 5%. Negative deviance (the sensors counted fewer people than actually passed the site) occurs more often than positive deviance. In Table 1 the average deviations and the test results for expected deviance of less than 10% are given. Counting precision was ameliorated during the project. However, the data indicates the importance of sensor calibration and fine tuning of the counting site. Despite very careful preparation and installation at the beginning, automatically counts differed about 8% from manually counted visitors. The precision of automatic counting was enhanced during the project by adjustment of counting site settings. The deviation fell significantly, to below the target of 10%. The indicated deviance of 5% given by the company Eco-Counter was reached only in the 3rd loop.

Besides counting passing visitors, the sensor used detects the directions in which they are walking. The deviance was greater for direction separated data. Especially groups walking very closely can cause big relative deviance. Mean deviance is about 25%. Directional data can provide information about the amount of use of a path in a particular direction, but cannot be used to estimate visitor numbers.

On-site sensor results differed from lab conditions [9]. With adjustments concerning path width, cover material, path stabilization etc. precision was enhanced but deviance was still about 5%. Optimal system settings are very important to determine precise visitor numbers. Repeated calibration counting is necessary to obtain optimal sensor and path settings, to correct and interpret counter data, and to estimate visitor numbers.

6 Recommendations

To obtain precise visitor counting data using acoustic wave - sensitive sensors, the requirements are as follows:

Site selection:
- Path width must be very narrow, less than 80 cm using one slab of 50 cm width. This restriction prevents visitors from following each other too closely and impedes crossing directly over the slab sensors.
- The view from the sensor site should not be particularly interesting so visitors are not tempted to stop.
- Proximity to obstacles should be avoided in order not to provoke jams on the slab sensors.
- Placing the slab sensors near path crossings and rest areas should be avoided as there is a risk of multiple counting of visitors crossing repeatedly the counting systems.
- As stairs regulate the hikers' steps, they are recommended for visitor counting with automatic sensors [13]. Fixing installations of stairs proved not to transfer information satisfactorily to the slabs provoking counting mistakes.
- Path erosion should be considered as sites with narrow paths are often situated at exposed locations.
- Steep sites are not recommended for installations of sensors as erosion may expose the sensors. On flat sites drainage should be considered.

Sensor installation:
- The sensors should be tested before and after installation [10].
- The cover material has to transfer pressure and should not be too smooth [9]. Furthermore, it should be the same material as the path not to attract attention and change visitors' behaviour.
- The exact sensor site should be recorded to watch the visitors' behaviour just over the system in calibration counting and to relocate the sensors [14].

Calibration counting:
- It is recommended that well-trained staff is used for calibration counting. Written field instructions are very useful.
- Before calibration counting, time levelling with the sensor should be performed [9].
- The staff involved in counting should be out of sight so as not to disturb the natural behaviour of visitors.
- The visitors' behaviour passing the sensor has to be watched due to following data check.
- Counting should be recorded in detail to avoid unnecessary mistakes.

References

[1] D.B. English, S.J. Zarnoch and S.M. Kocis, "Designing a Sampling System for Concurrently Measuring Outdoor Recreation Visitation and Describing Visitor Characteristics," Proc. Monitoring and Management of Visitor Flows in Recreational and Protected Areas 2, pp. 28-33, 2004.

[2] H. Lozza, "Tourismusbefragung 1993 im Schweizerischen Nationalpark," Semesterarbeit, Dept. of Geography, University of Zurich, Arbeitsberichte zur Nationalparkforschung, 1996.

[3] I. Küpfer, «Die regionalwirschaftliche Bedeutung des Nationalparktourismus untersucht am Beispiel des Schweizerischen Nationalparks,» PhD dissertation, Dept. of Geography, University of Zurich, Nationalpark-Forschung in der Schweiz, nr. 90, 2000.

[4] R.E. Manning, "How Much is Too Much? Carrying Capacity of National Parks and Protected Areas," Proc. Monitoring and Management of Visitor Flows in Recreational and Protected Areas 1, pp.306-313, 2002

[5] M. Ott, «Besuch und BesucherInnen des Schweizerischen Nationalparks: Struktur, Verhalten und räumliche Verteilung,» Diplomarbeit, Dept. of Geography, University of Zurich, 1995.

[6] F. Filli, "Besucherbefragung im Nationalpark," Cratschla nr. 1, 2007.

[7] D. Haller, "Aussensicht des Schweizerischen Nationalparks", BSc Thesis, Institute of Natural Resource Sciences, Zurich University of Applied Sciences, 2008.

[8] G. Cessford A. Muhar, "Monitoring options for visitor numbers in national parks and natural areas," Journal for Nature Conservation, nr. 11, pp. 240-250, 2003.

[9] R. Rupf-Haller, M. Wernli and F. Filli, "Visitor Counting with Acoustic Slab Sensors in the Swiss National Park," Proc. Monitoring and Man-

agement of Visitor Flows in Recreational and Protected Areas 3, pp. 72-77, 2006.
[10] J. Ross, “Visitor Counters in Parks: Management Practices for Counter Calibration,” Dept. of Conservation, New Zealand, 2005.
[11] Eco-Counter, “Installation guide, Acoustic slab sensor,” Technical Report Ref MEAC-P-2, 2006, unpublished.
[12] M. Hollander and D. A. Wolfe, “Nonparametric Statistical Methods,” 1973, in help of Statistical Data Analysis Software R Version 2.6.1.
[13] G. Cessford, S. Cockburn and M. Douglas, “Developing New Visitor Counters and their Applications for Management,” Proc. Monitoring and Management of Visitor Flows in Recreational and Protected Areas, pp. 14-20, 2002.
[14] K.E. Hornback and P.F. Eagles, “Guidelines for Public Use Measurement and Reporting at Parks and Protected Areas,” Technical Report IUCN, 1999.

Reto Rupf MSc. Geography. Head Unit Environmental Planning, Institute of Natural Resource Sciences, Zurich University of Applied Sciences. Current research interests: Visitor monitoring, carrying capacity, nature conservation and recreation, environmental sports management, environmental impact assessment, Discrete Choice Models, Agent Based Modelling.

Michael Wernli MSc Geography, Assistant, Institute of Natural Resource Sciences, Zurich University of Applied Sciences.

Ruedi Haller MSc Geography, Manager Information Systems, Swiss National Park.

The progress project: the dynamics of involving the public in managing Peri-Urban Forests

Sarah Colas, Martin Fitton and Peter Thaxter

Abstract — The EU Forest Action Plan gives special emphasis to the benefits of Urban and Peri-urban forests for public recreation and as an aid to public understanding of conservation issues. At the same time forest and green recreation is being promoted in national agendas because of perceived therapeutic benefits. This strong promotion of forest recreation has re-kindled the concerns that recreation use would damage the resource and have major detrimental impact on biodiversity. The PROGRESS project, which focussed on two peri-urban forests in England and France, offered the opportunity to review these issues.

Index Terms — Keywords should closely reflect the topic and should optimally characterize the paper. Use about four key words or phrases in alphabetical order, separated by commas.

1 Introduction

The EU funded project was based on the New Forest (Forestry Commission FC) and Fontainebleau (Office National des Forêts ONF). This work required re-assessment of a number of recreation theories and the development of new data collection and modelling tools. In addition the way data can be presented to the visiting public has also had to be considered.

The project ran from 2003 to 2008, and in addition to the main partners also involved Alterra (who provided the computer based ecological and recreational models to aid decision making), Natural England and Comite Depart de Tourisme.

Both forests have seen a significant increase in visitor numbers over recent decades which have had visible effects on both areas, their wildlife and ecology.

The project aimed to reconcile the needs of conservation and recreation in both forests through detailed environmental and recreation research, on-site management actions based on these findings and the use of innovative modelling and communication tools, to involve and commit the public to management changes.

2 PROGRESS project methodology

The PROGRESS team needed to gain a more up to date and complete understanding of recreation and conservation needs and Identify areas where needs of conservation clashed with current recreational pressure. To achieve this the following research tools were used:

- Household and Site Surveys
- Detailed Site Behaviour data through use of GPS
- Collection of environmental data on spe-

Sarah Colas is with the Office National des Forêts, Service Accueil Biodiversité Cynégétique, Parc de la Faisanderie 77 300 Fontainebleau, France, Email: sarah.colas@onf.fr
Martin Fitton and Peter Thaxter are with Forestry Commission, New Forest, The Queen's House, Lyndhurst SO43 7NH, England, Email: martin.fitton@forestry.gsi.gov.uk, peter.thaxter@forestry.gsi.gov.uk

cies and habitat
- Development of new modelling tools to aid understanding of habitat change and changes in visitor behaviour
- Detailed assessment of effective ways to present this data to stakeholders and the public to achieve understanding and agreement to management changes and to provide guidance on "limits of acceptable change"

Surveys

Extensive visitor surveys were carried out in the two forests. In the New Forest, over 3500 interviews were conducted at 70 sites, together with a further 2100 telephone interviews. In Fontainebleau, 1700 visitors were interviewed over eight days, between March and September.

GPS

1700 of those surveyed were issued with GPS equipment, this comprehensive data was used to calibrate the MASOOR model described below, which allowed prediction of use when other parameters were changed. The information generated was also very visual as it allowed many tracks to be overlaid on mapped recreation sites and to show the very different behaviours of different site users. Such behaviour could have been predicted but the ability to show it visually had great impact.

Environmental Data

Ecological data regarding landscape, habitat, vegetation and wildlife populations was collected and codified as the basis for identifying areas where recreation appeared to be having detrimental effect.

Modelling

This recreation and environmental data provided a starting point for understanding the negative impacts of recreation within the two forests. The ability to understand the interaction between the two and the impact of recreation was strengthened through the use of two computer-based models developed by Alterra (LARCH and MASOOR).

The LARCH model (Landscape ecological Analysis and Rules for the Configuration of Habitat) has been developed to assess the biodiversity potential of fragmented landscapes by analysing the landscape from the perspective of a selection of indicator species.

MASOOR (Multi-Agent Simulation of Outdoor Recreation) focuses on the simulation of recreational movement in natural areas. The tracks taken by visitors can be attributed for their surface type, attraction and other characteristics. The choices made by various visitor types, which is calibrated by the use of GPS data, is what gives the model strength. With this data, changes in the level of use and/or the type of visitor can be used to effectively predict future distribution of visitors across sites and thus their likely impact on biodiversity (Jochem R et al 2005)

Following the input of baseline ecological and recreational data, these enabled the impacts of recreation on different habitats and how different user groups interacted to be assessed. More importantly the models allowed proposed actions to be simulated, to view the possible impacts resulting from the prospective changes, thus providing the FC and ONF with a powerful decision making tool.

Running MASOOR and LARCH together showed the impact that recreation was having on different habitats and also how different groups interacted. Subsequently, the land manager was able to see what effect a pilot action may have on ecology and wildlife, by running the model again under the new scenario and analysing the differences between the two.

3 Formulating pilot action proposals

Having collected information on the recreational issues affecting each forest,

through surveying, modelling results, ONF/FC expertise, and meetings with local user groups, forest managers then proposed a number of actions to limit the effects of recreation.

In the New Forest these proposed pilot actions were then presented to the public (through site-surgeries, surveys etc.) The FC PROGRESS team also used the Alterra models and its own methods of impact assessment to look at the possible implications and feasibility of the proposed actions. This information was presented to stakeholders and used to make revisions of initial proposals.

The revised pilot actions were presented to the public and discussed by the stakeholder groups in order to produce finalised pilot action proposals.

4 Problems encountered

To achieve the objectives of PROGRESS the project teams had to overcome some difficult challenges. The immediate response of both stakeholders and the general public was to be suspicious of management changes which were seen as a constraint on existing access rights.
As a result, in both the New Forest and Fontainebleau it took several months to negotiate the actions to be implemented (e.g. in Fontainebleau, it took over a year of negotiating for a local stakeholder group to agree to a road closure). In the New Forest, negotiations and plans were complicated by the presence of strict planning laws and regulations.

5 The role of communications within the PROGRESS Project

Communicating and engaging with the public played a central role in ensuring sustainable recreation. A sizeable element of the communications strategy involved promoting and encouraging the use of the most robust recreational sites. The message which the FC and ONF wanted to promote through PROGRESS was one of respect rather than restriction. The land managers still wanted to encourage the recreational use of the two forests.

In the New Forest this allowed a cogent presentation of the likely impact of reductions in visitor use in a sequence of different recreation patterns as the closure of car parks was simulated. This successfully demonstrated a number of key sites where conservation needs were being put under pressure from recreational use and to illustrate, to local stakeholders, the options available and the likely outcomes of a chosen action. The Forestry Commission were therefore able to use these models as both a research and decision making tool.

This presentation, at a crucial stakeholders meeting, arguably almost totally obviated opposition to management changes because of the very visual way in which recreation pressure could be illustrated as different management options were simulated.

Though this result was not initially predicted it re-emphasised the benefits of a “Limits to Acceptable Change” process which has been extensively used in natural site management in the United States (McCool S et al: 1997)

6 Results and achievements

Unlike the impact of ‘on-site’ pilot actions on biodiversity, it is more difficult to assess the impact or success of communication actions: they involve changing user perceptions, which are hard to quantify. The change in attitude to proposed car park closures by both the stakeholders and public provided one measure. In addition, the effectiveness of the communications programme is probably best assessed through event feedback from the public, the number of reprints, and the breadth of distribution of leaflets and the publicity message.

7 Conclusion

As a result of the project, a large number of pilot measures have been implemented, in both the New Forest and Fontainebleau. These measures have the main objective to improve the recreation facilities in order to channel the visitors and answer public demand. More robust sites have been opened up, and visits to them encouraged through guide maps and easier access. Communication has been enhanced through community workshops, site surgeries, and public opinion surveys. In addition, codes of conduct and information packs have been produced.

8 Lessons Learnt

One of the main lessons learnt is to work closely with local groups, tourism providers, and the general public. Keeping them informed, and allowing them to participate in the decision making process, is a key part of sustainable recreation management. The time required for stakeholder consultation is often underestimated and can require a degree of compromise.

A call for a broad spatial understanding of outdoor recreation use

Michael Yuan and Peter Fredman

Abstract — To better understand the scope of outdoor recreation in a pan Europe context, many agencies and organizations have attempted to collect data at various spatial levels and for a multitude of uses. The aim of this paper is to suggest a need for better and broader understanding of outdoor recreation use at various spatial levels. Case examples from Swedish data collection efforts are provided and suggestions are made to have a better understanding of horizontal harmonization and vertical data integration.

Index Terms — outdoor recreation, monitoring, vertical data integration.

1 Introduction

Understanding outdoor recreation use has long been acknowledged as fundamental to decision making for a range of recreation providers. As European life in the post Soviet era changed due to rising incomes, increase free time, technology developments, and EU expansion and centralization, the ethos of the outdoors has also changed [2]. Participation in the outdoors is now not only linked to enjoyable experiences but also to a country's health, economy, environment, and overall quality of life.

Outdoor recreation is often considered to be a public good and highly valued by citizens. This valuation continues to rise as users receive a higher consumer surplus due to the perception that the benefits of outdoor recreation greatly outweigh the exchange costs. One limiting factor that has prevented outdoor recreation, and conversely tourism, from being a major economic force in many regions is the lack of primary research-based data on recreation demand [16]. Without demand data, recreation planning decisions would be based on speculation and anecdotal accounts.

Many of the decisions surrounding recreation are directly related to planning and marketing, and they are dependent upon understanding their users. The volume, flow, scale, and impact from recreation are understood through these data [1], [6]. Those regions with weak or incomplete information risk being undervalued when policy, planning and management decision are made. The more comprehensive and precise the data, the better the understanding of recreation needs and where the industry is heading.

The goal of this paper is to suggest a need for better and broader understanding of outdoor recreation use at various spatial levels. Case examples using experiences from Swedish data collection efforts are provided, and suggestions are made to have a better understanding of horizontal harmonization and vertical data integration.

2 Outdoor recreation use at various spatial levels

To better understand the scope of outdoor recreation in a pan Europe context, many agencies and organizations have attempted to collect data at various spatial levels and for a multitude of uses [9], [14]. While many

M. Yuan is with the Lakehead University, Canada.
P. Fredman is with the Etour and the Mid-Sweden University

countries and management units have spent considerable effort in collecting visitor data, most studies are limited to a small geographic area, are not compatible with studies in other areas and do not lend themselves to trend analysis. This is not to imply that past efforts at understanding outdoor recreation have not been valuable, but only to suggest that many countries still have a long way to go to fully understand outdoor recreation at all levels.

Data requirements at three primary spatial levels have been conceptualized based on geo-political constructs and information usage (Table 1). While these are broad interpretations of a complex system of data usage, it presents the observation that recreation planning operates at different levels and their data requirements are unique. The first level is at the continent (e.g. E.U. or U.S. level [2], [3]. This level would also address defined regions such as the Nordic and Baltic countries. At the second level would be country specific understanding of outdoor recreation. In addition, this level would also include sub-regions of a country such as the mountain region in Sweden. At the third level would be the municipalities in the sub-regions, also including site-specific information for designated areas of national significance (e.g. National Parks) or urban proximate areas near municipalities.

As Table 1 also shows, the principal use of demand data varies depending on the spatial level. At the continent and country levels, this information is primarily used for policy development. At their corresponding sublevel, a main use is for funding allocations. At the site level, the main uses are for product development and marketing by small businesses. The frequency of use of recreation data also differs based on the spatial level. As the level increases to a broader geographic area, the frequency of use declines. Individual sites need accurate data quite frequently, often many times each year, while at the higher levels, policy development use often only occurs once every several years [11].

TABLE 1

DATA REQUIREMENTS AT MULTIPLE SPATIAL LEVELS

Spatial Level	Demand Function	Frequency of Use
Level 1: Continent	Policy development	Long term: 5-10 years
1A: Regions	EU funding allocation	Med Long term: 3-5 years
Level 2: Country	Policy development	Med Long term: 3-5 years
2A: Sub-regions	Country funding allocation	Medium term: 3 years
Level 3: Municipality	Sub-region funding allocation and marketing	Medium Short term: 1-3
3A: Sites	Product development and marketing	Short term: ≤1 year

3 MONITORING OUTDOOR RECREATION USE IN SWEDEN

Sweden has a broad, but non-systematic, scheme of collecting outdoor recreation that has evolved over the years [4]. Based on the spatial levels presented above, Sweden has attempted to address data needs primarily at levels 2 and 3 (Table 2), and below is a discussion of how these levels have been addressed.

Statistics Sweden collects information on outdoor recreation participation as part of the national census – "Undersökningar av levnadsförhållanden, ULF" [15]. This has been done in 1976, 1982-83, 1990-91, 1999, 2006-07 with a sample of approximately 7,000 each time. These surveys provide participation data for a selection of activities over time only, i.e. walking, forest hiking, gardening, outdoor swimming, boating, fishing, mountain backpacking and hunting. Data has been analyzed with regard to socioeconomic groups as well as trends over time.

Surveys on *forest recreation* have studied different forest characteristics vis-à-vis outdoor recreation, the distance to the closest recreational forest, and changes in forest recreation use between 1977 and 1997 [8].

TABLE 2

EXAMPLES OF MONITORING AT DIFFERENT SPATIAL LEVELS IN SWEDEN

Spatial Level	Case Examples	Vertical integration	Trend data
Level 2: Country	Statistics Sweden	no	yes
	Outdoor Recreation in Change Program	yes	(no)
	Forest Recreational Use Survey	no	yes
	Mountain tourism Survey	no	(yes)
2A: Sub-regions	Outdoor Recreation in Change Program	yes	no
Level 3: Municipality	Outdoor Recreation in Change Program	(yes)	no
3A: Sites	Numerous on-site surveys	(no)	(yes)

These studies are based on mailed surveys to samples of the national adult population in the range of 1000-3000 individuals each time.

Outdoor Recreation in Change is an interdisciplinary, national research program for the study of outdoor recreation and nature-based tourism in Sweden [13]. The program uses case studies of various outdoor recreation sites in combination with a national / regional postal and follow-up Internet inquiry to provide information on participation in outdoor recreational activities as well as associated motivations, constraints, economic and social factors. The postal survey was distributed to 7000 Swedish citizens (age 18-75), including a national sample of 4700 and regional oversampling in three regions (two urban proximate and one coastal) of 2300. E-mail addresses collected in the questionnaire were used for a web-based follow-up last visit survey distributed during one years time.

A study of *visitors to the mountain region* collected data in two phases; 1) a telephone survey to identify visitors and non-visitors to the Swedish mountain region followed by, 2) mailed surveys to collect additional information about the trips reported in the telephone survey [7]. The sampling frame was all households in Sweden outside the mountain region with a registered household telephone. A questionnaire which targeted activity participation was mailed to both mountain visitors and non-visitors who gave their address in the telephone survey. This study also repeated a survey by the Swedish Environmental Protection Agency in the mid 1980s, and includes information on changes in mountain tourism [5].

A large number of *on site visitor surveys* have been made in Sweden, and several different outdoor recreation settings have been subject to these studies, with special focus on (i) urban proximate nature, (ii) forests, (iii) mountains and (iv) coastal areas [1]. Notably, some of these studies have monitored outdoor recreation over time, while only one focused on winter based outdoor recreation activities (snowmobiling and cross-country skiing). All these studies represent large variations in methodology and quality, which clearly indicates a need for improved standards. In addition to data collection, some of these studies have also focused on visitor monitoring method development.

The studies above show that Sweden has tried to address the various data needs at Levels 2 and 3 but not in a systematic fashion. These studies were usually not coordinated and did not build on each other. In addition, little work has been done in a formal sense to address Level 1 data needs. Based on the most current literature, it appears that Sweden is not unique in the challenges in its collection and management of outdoor recreation data. As such, there is a need for a broader spatial based understanding of outdoor recreation in Sweden just like in most other EU countries.

4 OBSERVATIONS

Many countries have developed sophisticated techniques for collecting data at Level 2

(country level and sub region levels). Some examples are national manuals [10], the Nordic-Baltic visitor monitoring project [9], Cost Action E33 [14]. These efforts would be termed as "horizontal harmonization" (e.g. across country, region etc). The emphasis is to examine recreation use at a particular level without much consideration of its relationship or applicability to other levels. For example, there is often an emphasis on collecting nation wide data for use in policy or funding aspects. These data are then disaggregated to a sub level for use by municipalities. Unfortunately, the data at this stage is usually not valid or reliable due to small sample size and representativeness to the population. Very few Level 3 data collection efforts occur in a systematic accurate fashion. Examining the literature above, little evidence was found of any attempt to improve vertical integration of different spatial levels in outdoor recreation monitoring. Data that is collected at the macro level often is limited in its applicability at the micro level. Finally, very little emphasis has occurred for Level 1, EU level data collection. It is acknowledged that this change will occur slowly given the many countries in the EU.

It is suggested that vertical integration is just as important to planning efforts as horizontal harmonization that is currently emphasized by many countries. Recognizing the various data needs at different spatial levels will require a new paradigm shift in the way that recreation data is collected and monitored.

A recently proposed Swedish national program for Outdoor Recreation Monitoring has attempted to address vertical integration (though only for levels 2 and 3) through a process of spatial aggregation [12]. In essence there are three phases of this program; (1) a national survey of outdoor recreation use will occur; (2) on a rotational basis, a certain number of sub-regions will be over sampled; and (3) this oversampling will then identify clusters of areas at Level 3 with high demand that will subsequently be further on-site surveyed in the future. The idea is to identify those Level 3 areas and sites that are in the greatest demand. This process takes into account the need for a systematic method to have Level 3 data but acknowledges the limitations of collecting data for all sites.

5 Conclusions

The social, cultural and natural resource diversity that defines the many countries in the EU provides a multitude of important recreation and tourism opportunities. It is this diversity that makes a systematic understanding of outdoor recreation so important, and so difficult to achieve. This paper has made a call for a broad spatial understanding of outdoor recreation use. In examining the literature on outdoor recreation data collection, and as a case example, how Sweden has addressed the data needs, we would make the following recommendations for future outdoor recreation monitoring:

- Harmonization attempts have missed vertical integration between levels 1-3 which should be further addressed in systematic monitoring designs,
- An integrated approach is needed to address deficiencies in both horizontal harmonization and vertical data integration,
- Stimulation for better vertical integration may include;
  - Share data collection costs among different agencies and NGOs
  - Develop standardized data collection methodologies that can be used by a multitude of diverse recreation providers
  - Encourage data collection by recreation providers that can be stored in a central database
  - Encourage the collection of both macro level baseline data and aggregated micro level data
  - Discourage the use of disaggregated macro level data for micro level decision making.

REFERENCES

[1] Anon, 2006. Monitoring Outdoor Recreation in the Nordic and Baltic Countries. Tema Nord, 2006:530. Nordic Council of Ministers, Copenhagen.

[2] Bell, S., Tyrväinen, L., Sievänen, T., Pröbstl, U., and Simpson, M. 2007. Outdoor recreation and nature tourism: a European perspective. Living Reviews in Landscape Research. Online article, http://www.livingreviews.org/lrlr-2007-2.

[3] Cordell, H. K. (principal author). 2004. Outdoor recreation for 21st century America. Venture Publishing: State College, PA, 293 pp.

[4] Emmelin, L., Fredman, P. & Sandell, K. 2005. Planering och förvaltning för friluftsliv – en forskningsöversikt. Naturvårdsverket, rapport 5468.

[5] Fredman, P. & Heberlein, T.A. 2003. Changes in Skiing and Snowmobiling in Swedish Mountains. Annals of Tourism Research, 30(2) pp. 485-488.

[6] Garber-Yonts, B. 2005. Conceptualizing and measuring demand for recreation on National Forests: A review and synthesis. United States Department of Agriculture Forest Service Pacific Northwest Research Station General Technical Report PNW-GTR-645, November 2005.

[7] Heberlein, T.A., Fredman, P. & Vuorio, T. 2002. Current Tourism Patterns in the Swedish Mountain Region. Mountain Research and Development, 22(2), pp 142-149.

[8] Hörnsten, L. 2000. Forest recreation in Sweden – Implications for Society and Forestry. Acta Universitatis Agriculturae Sueciae. Silvestria 169.

[9] Kajala, L., Almik, A., Dahl, R., Diksaite, L, Erkkonen, J., Fredman, P., Jensen, F. Søndergaard, Karoles, K., Sievänen, T., Skov-Petersen, H., Vistad, O. and Wallsten, P. 2007. Visitor monitoring in nature areas – a manual based on experiences from the Nordic and Baltic countries. Nordic Council of Ministers, Copenhagen.

[10] Lindhagen A. & Ahlström I. 2005. Användningen av rekreationsområden. Hur mäter man friluftslivets omfattning och kvalitet? - En handbok. Skogstyrelsen, rapport 3/2005.

[11] Monz, C. & Leung, Y. 2006. Meaningful measures: developing indicators of visitor impact in the National Park Service inventory and monitoring program. The George Wright Forum, 23(2), 17-27.

[12] Naturvårdsverket. 2008. Remiss av ett förslag till program för insamling av statistik om friluftsliv (regeringsuppdrag 2006/42). Manuscript.

[13] Outdoor Recreation in Change, 2006. Outdoor Recreation in Change. Landscapes, Expereinces, Planning and Development. Program Plan, 2008-08-18. www.friluftsforskning.se

[14] Sievänen, T., Arnberger, A., Dehez, J., Grant, N., Jensen, F.S. & Skov-Petersen, H. 2008 (eds.) Forest Recreation Monitoring – a European Perspective. Working Papers of the Finnish Forest Research Institute, 79.

[15] Statistics Sweden, 2004. Fritid 1976-2002: Levnadsförhållanden, rapport nr. 103. Stockholm.

[16] Yuan, M. 2004. Review of Outdoor Recreation for 21st Century America: A Report to the Nation, The National Survey on Recreation and the Environment (H. Ken Cordell). Journal of Park and Recreation Administration, 22 (4), 139-142.

Michael Yuan Mike Yuan is a professor and Program Coordinator of the Honors Bachelors of Environmental Studies Program in Parks and Tourism at Lakehead University, Canada. He received his PhD from the University of Illinois in 1989.

Peter Fredman is a professor of nature naturism at Etour and the Mid-Sweden University. He is a program coordinator of the Swedish Outdoor Recreation in Change Program. He received his PhD from the Swedish University of Agricultural Sciences in 2000.

MMV4 PROCEEDINGS
PERCEPTIONS AND PREFERENCES

Re-examine the measure of values Cross-culturally: the case of recreation visitors in Hong Kong and Taiwan

Chieh-Lu Li, Yi-Chung Hsu, Chi-Chuan Lue, and James D. Absher

Abstract — Parks and recreation areas around the world increasingly serve as international visitor attractions and play an important role in the international tourism industry. Given the increasingly diverse visitors, changes in racial and ethnic composition have confronted the management of parks and recreation areas. Since values presumably influence perceptions and behaviors among members of different cultures, studying values among culturally diverse visitors are important if we are to understand their influence on perceptions as well as parks and recreation behavior. We are not aware of any measure of recreation or leisure values that has been validated cross-culturally. In order to better understand this issue, the purposes of this study are to examine two different types of broad values measures (i.e., Hofstede's measures of values and Kahle's List of Values [LOV]) that have been validated cross-culturally, and test values' utility to predict service quality, satisfaction, and behavioral intentions, both in Hong Kong and Taiwan. In 2005-2008, the visitors to Pokfulam Country Park in Hong Kong and Taroko National Park in Taiwan were surveyed. Using a convenient purposive on-site sampling approach, at sites known to be heavily used by visitors with diverse ethnic backgrounds, we obtained a sample combining the Hong Kong and Taiwan recreation visitors. The results from data analyses showed that Hofstede's measure of values, as employed in the park and recreation context, needs to be further elaborated and refined to provide acceptable validity and reliability. On the other hand, we found the LOV to be a meaningful and useful measure of values in both settings. The findings also showed LOV's four dimensions of values, i.e., Respect, Harmony, Achievement, and Hedonism, predicted visitors' perceptions of service quality, satisfaction, and behavioral intentions. Discussion of the findings and implications are provided.

Index Terms — Hofstede's measure of values, Kahle's List of Values, customer service, parks and recreation

1 Introduction

Parks and recreation areas around the world increasingly serve as international tourist attractions and play an important role in the international tourism industry. The diverse visitors also bring various values visiting parks and recreation settings. Since cultural values are presumably central to cultural differences that may exist among ethnic and national groups [1], [2], [3], [5], [7], and allegedly influence perceptions and behaviors, we assume that this is true with respect to park visitation behavior and engaging in recreation. Research on factors contributing to a better understanding of values among diverse clienteles will help improve park management on the one hand and promote a positive cultural understanding on the other [4], [6], [8]. Taking from the perspectives of cultural anthropology and service marketing, the purposes of this study are two folds, first, to examine two different types of broad values measures (i.e., Hofstede's measures

Chieh-Lu Li is with the Department of Forestry, National Chung Hsing University, 250, Kuo Kuang Road, Taichung, Taiwan.
Email: cxl345@gmail.com or clli@nchu.edu.tw. Phone: +886-4-22840345 ext. 143
Yi-Chung Hsu is with Institute of Tourism and Recreation Management, and Chi-Chuan Lue with Department of Sports and Leisure Studies, National Dong Hwa University, Taiwan.
James D. Absher is with US Forest Service, Pacific Southwest Research Station, Wildland Recreation and Urban Cultures.

of values and Kahle's List of Values [LOV]) that have been validated cross-culturally, and second, test values' utility to predict service quality, satisfaction, and behavioral intentions, both in Hong Kong and Taiwan [9].

2 Methods

In 2005-2008, the visitors to Pokfulam Country Park in Hong Kong and Taroko National Park in Taiwan were surveyed. Using a convenient purposive on-site sampling approach, at sites known to be heavily used by visitors with diverse ethnic backgrounds, we obtained a sample including the Hong Kong and Taiwan recreation visitors (N=1782). In the Hong Kong sample (n=702), we mainly focused on three cultural groups, i.e., Hong Kong residents, Mainland China visitors, and Westerns; whereas, we focused on Taiwan residents, Japanese visitors, and Westerns in the Taiwan sample (n=1080).

3 Results

We used reliability analysis to test Hofstede's measure of values and LOV. The results showed that Hofstede's four dimensions of values, either following the theoretical patterns (i.e., reversely coding the latter two items in each dimension) or the initial response styles (i.e., data without reversely coding the items), were not reliable according to their Cronbach's alpha values of dimensions (the rule of thumb for acceptable alpha values is 0.70). On the other hand, LOV four dimensions showed acceptable alpha values in the parks and recreation context (Table 1). We then used multiple regression analysis to test the predictive power of LOV's four dimensions of values on service quality, satisfaction, and behavioral intentions indices. The results showed all the multiple regression models were significant at the 0.001 level, but the R-square values ranged from 0.07 to 0.33 (Table 2). Lastly, when service quality and satisfaction indices joining LOV dimensions to predict behavioral intentions, the R-square value reached 0.52 (Table 3). In other words, the combined effects of LOV dimensions, service quality and satisfaction indices accounted for 52 percent of variance in explaining behavioral intentions.

4 Discussion

The testing of Hofstede's measure of values and the List of Values suggests that values, as measured in the parks and recreation context, need to be further refined to be more meaningful and useful. If, for example, we consider criterion-related validity, with predicting service quality, satisfaction, and behavioral intentions as the criterion, then Hofstede's measure fails. On the other hand, the combined effects of LOV dimensions of values predicting service quality, satisfaction and behavioral intentions ranged from 7% to 33% (R-square) of the variance suggested that there was, in fact, something there but the measurement method of values dimensions was simply not accounting for it very well. The measurement of values in parks and recreation must be improved for greater variance to be explained.

TABLE 1

THE RELIABILITY ANALYSIS OF HOFSTEDE'S MEASURE OF VALUES AND LIST OF VALUES

Hofstede's four dimensions of values[a]	**Cronbach's alpha**
Power distance	0.09
Individualism	0.01
Masculinity	0.13
Uncertainty avoidance	-0.42[b]
Hofstede's four dimensions of values[c]	**Cronbach's alpha**
Power distance	0.49
Individualism	0.55
Masculinity	0.61
Uncertainty avoidance	0.64
List of Values	**Cronbach's alpha**
Respect	0.87
Harmony	0.82
Achievement	0.80
Hedonism	0.88

Note:

[a] The latter two items in each dimension were reversely coded to keep the same directional measurement.

[b] When a negative Cronbach's value was derived, the reliability model assumption was violated.

[c] The analysis results without reversely coding of the latter two items in each dimension.

We found hedonism dimension repeatedly predicts perception of service quality and behavioral intentions. The values such as "fun and enjoyment" and "excitement" were important to predict service quality and behavioral intentions. In particular, we may conclude that combination of the values dimensions such as LOV along with perceptions of service quality and satisfaction were useful to predict visitors' behavioral intentions such as repeated visits. The findings have implications for management of diverse visitors in parks and recreation. The value dimensions found in this study were meaningful enough to offer managers, translating abstract values into actionable portraits on which to base service and product development, communication strategies, and other marketing actions to match different visitors' value orientations. We advocate future research continues to explore this line of investigation so as to provide niche services and maximize customer satisfaction.

TABLE 2

MULTIPLE REGRESSION OF SERVICE QUALITY, SATISFACTION, AND BEHAVIORAL INTENTION ON RESPECT, HARMONY, ACHIEVEMENT, AND HEDONISM DIMENSIONS OF VALUES

Dimensions of values [a]	Service quality index [bc]				
	Beta	**P-value**	**F-value**	**Model P-value**	**R-square**
Respect dimension	0.13	0.002			
Harmony dimension	-0.09	0.027			
Achievement dimension	0.12	0.012	56.91	< 0.001	0.18
Hedonism dimension	0.28	< 0.001			
Dimensions of values	**Facility index**				
	Beta	**P-value**	**F-value**	**Model P-value**	**R-square**
Respect dimension	0.09	0.055			
Harmony dimension	0.02	0.634			
Achievement dimension	0.04	0.479	19.21	< 0.001	0.07
Hedonism dimension	0.17	< 0.001			
Dimensions of values	**Service index**				
	Beta	**P-value**	**F-value**	**Model P-value**	**R-square**
Respect dimension	0.10	0.027			
Harmony dimension	-0.04	0.339			
Achievement dimension	0.13	0.009	35.65	< 0.001	0.13
Hedonism dimension	0.20	< 0.001			
Dimensions of values	**Information index**				
	Beta	**P-value**	**F-value**	**Model P-value**	**R-square**
Respect dimension	0.14	0.001			
Harmony dimension	-0.11	0.007			
Achievement dimension	0.10	0.038	55.27	< 0.001	0.18
Hedonism dimension	0.30	< 0.001			
Dimensions of values	**Management index**				
	Beta	**P-value**	**F-value**	**Model P-value**	**R-square**
Respect dimension	0.11	0.010			
Harmony dimension	-0.12	0.006			
Achievement dimension	0.16	0.019	41.38	< 0.001	0.14
Hedonism dimension	0.26	< 0.001			
Dimensions of values	**Satisfaction index**				
	Beta	**P-value**	**F-value**	**Model P-value**	**R-square**
Respect dimension	0.05	0.180			
Harmony dimension	0.25	< 0.001			
Achievement dimension	0.14	< 0.001	56.35	< 0.001	0.13
Hedonism dimension	-0.05	0.108			
Dimensions of values	**Behavioral intentions index**				
	Beta	**P-value**	**F-value**	**Model P-value**	**R-square**
Respect dimension	012	< 0.001			
Harmony dimension	-0.12	< 0.001			
Achievement dimension	0.14	< 0.001	192.76	< 0.001	0.33
Hedonism dimension	0.46	< 0.001			

Note: [a] Respect, harmony, achievement, and hedonism dimensions served as the independent variables.
[b] Service quality, facility, service, information, management, satisfaction, and behavioral intentions index served as the dependent variable, respectively.
[c] Service quality index was created by taking the mean of four service quality dimensions; facility, service, information, and management index created by taking the mean of service quality items within the same dimension; satisfaction index, created by taking the mean of three satisfaction items, and behavioral intentions index, created by taking the mean of five behavioral intentions items.

TABLE 3

Multiple regression of behavioral intentions on respect, harmony, achievement, and hedonism dimensions of values, and service quality and satisfaction indices [a]

Dimensions of values [b]	Behavioral intentions index [c]				
	Beta	P-value	F-value	Model P-value	R-square
Respect dimension	0.08	0.012			
Harmony dimension	-0.20	< 0.001			
Achievement dimension	0.16	< 0.001			
Hedonism dimension	0.47	< 0.001	180.60	< 0.001	0.52
Service quality index	0.22	< 0.001			
Satisfaction index	0.12	< 0.001			

Note:

[a] The same dimension and index construction as the note shown in Table 2.

[b] Respect, harmony, achievement, and hedonism dimensions, and service quality and satisfaction indices served as the independent variables.

[c] Behavioral intentions index served as the dependent variable.

References

[1] G. Chick, "Cultural Complexity: The Concept and Its Measurement," *Cross-Cultural Research*, vol. 31, pp. 275-307, 1997.

[2] G. Chick, "Leisure and Culture: Issues for an Anthropology of Leisure," *Leisure Sciences*, vol. 20, pp. 111-133, 1998.

[3] G. Chick, "Editorial: Opportunities for Cross-cultural Comparative Research on Leisure," *Leisure Sciences*, vol. 22, pp. 79-91, 2000.

[4] Y. Hsu, C., Li, and O. Chuang, "Encounters, Norms and Perceived Crowding of Hikers in a Non-north American Backcountry Recreational Context," *Forest, Snow and Landscape Research*, vol. 81, no. 1/2, pp. 99-108, 2007.

[5] C. Li, H. Zinn, G. Chick, J. Absher, A. Graefe, and Y. Hsu, "Segmentation of Culturally Diverse Visitors' Values in Forest Recreation Management. *Forest, Snow and Landscape Research*, vol. 81, no. 1/2, pp. 19-29, 2007.

[6] C. Li, J. Absher, A. Graefe, and Y. Hsu, "Research Reflections — Services for Culturally Diverse Customers in Parks and Recreation. *Leisure Sciences*, vol. 30, no. 1, pp. 87-92, 2008.

[7] C. Li, G. Chick, H. Zinn, J. Absher, and A. Graefe, "Ethnicity as a Variable in Leisure Research. *J. of Leisure Research*, vol. 39, no. 3, pp. 514-545, 2007.

[8] C. Li, P.C. Lai, G. Chick, H. Zinn, and A. Graefe, "Cross-cultural Models of Customer Service: The Case of Hong Kong Country Park Recreation. *J. of Park and Recreation Administration*, vol. 25, no. 3, pp. 41-6, 2007.

[9] A. Parasuraman, V. A., Zeithaml, and L.L. Berry, "SERVQUAL: A Multiple-item Scale for Measuring Consumer Perceptions of Service Quality. *J. of Marketing*, vol. 64, no. 1, pp.12-40, 1988.

Chieh-Lu Li holds a M.S. from the Department of Forestry and Natural Resources of Purdue University and Ph.D. from the Department of Recreation, Park, and Tourism Management of The Pennsylvania State University. He has been the recipient of several research grants and worked in several funded research projects on forests, parks and recreation. Findings of his projects can also be found in the journals such as *Journal of Leisure Research, Leisure Sciences, Journal of Park and Recreation Administration, Journal of Sports & Leisure, e-Review of Tourism Research, Forest, Snow and Landscape Research, Journal of Tourism Studies, and US Forest Service General Technical Report.* His research focuses on natural resource base tourism and recreation, cross-cultural analysis of customer service, ethnicity analysis in leisure research, and park and protected areas recreation management.

Yi-Chung Hsu received his Master degree from University of North Carolina and Ph.D. from Clemson University. He is currently a professor and the director of Institute of Tourism and Recreation Management, National Dong Hwa University, Taiwan.

Chi-Chuan Lue received his Master degree from National Taiwan University and Ph.D. from Texas A&M University. He is currently a professor at Department

of Sports and Leisure Studies, National Dong Hwa University, Taiwan.

James D. Absher received his B.S. and B.A. from Stanford University, M.A. from San Jose State University and Ph.D. from University of California, Berkeley. He is currently a Research Social Scientist at US Forest Service, Pacific Southwest Research Station, Wildland Recreation and Urban Culture

The recreation perspective. A recreationalists typology on visitors and their behaviour by the example of Berchtesgaden National Park

Sabine Hennig

Abstract — To perform its tasks management needs information on visitors. They provide insight into the recreational situation of protected areas and support management decisions. Therefor, data on visitor use and visitation behaviour have to be analyzed and mapped. However, information on visitors should not be reduced on singular variables. It is important to combine these different characteristics and build up types of visitors respectively visitor behaviour. In favour of this the approach of recreation perspective is elaborated. The concept takes account of existing typologies on (nature-based) tourism and their attributes (e.g. size, age). Furthermore, visitor behaviour is integrated. Distinguished in macro and micro behaviour it is expressed by choice of activity, destination, type, location and duration of extended stops etc.. Considering these aspects visitors can be categorized into several types. The recreation perspective is worked out and applied to the German Berchtesgaden National Park.

Index Terms — visitor characteristics, recreational behaviour, typologies, management, statistical analysis

1 Background

Today rising visitor numbers as well as changing visitor demands pose challenges for visitor management in protected areas. Due to these changes the management is confronted with the complex task to handle recreational and ecological requirements in a sustainable way. Knowledge and understanding on visitors, their behaviour, and visitation processes provide decision support to the management. However, instead of just characterizing visitors by single attributes, it can be even more helpful to classify visitors and visitations by combining attributes.

S. Hennig is with the Department of Geography, Friedrich- Alexander University of Erlangen- Nürnberg, visting researcher at Austrian Academy of Sciences/ GIScience Salzburg, E-mail: Sabine.Hennig@assoc.oewaw.ac.at.

Here, typologies are a useful tool. They reflect existing situations more realistic by considering visitors and their visitations as a whole. In order to elaborate typologies for recreation and recreationalists it frequently occurs in the style of tourist characterizations. Today several tourist typologies exist. They base on variables like social-demographic factors, motivations and purposes behind visitation etc.. The attributes used in tourist typologies can be seen as important factors to describe visitors, but they neither integrated nor explain behaviour of visitors. In order to understand and classify visitors the integration of behaviour can be considered important (see O`Connor, Zerger & Itami 2003; Romeiß-Stracke 1986). The approach of recreation perspective takes this into account. The concept is elaborated and applied to Berchtesgaden National Park focusing on nature-based recreational activities on foot.

2 Study area

Berchtesgaden National Park is situated in the southeastern German part of the Alps bordering Austria. The extent of the park area comprises 21,000 hectares. Its altitude ranges from 600 m AMSL at Lake Königssee to 2,700 m AMSL at the summit of the Watzmann massif. The large protected area is accepted by IUCN as management category II. Consequently main management objectives are environmental education and recreation.

The region of Berchtesgaden is one of the oldest holiday destinations in the Alps (Job et al. 2003). Each year circa 1.3 Million visitors come to Berchtesgaden National Park. During summer (high season) main recreational activities like walking, hiking, and mountain climbing take place in the alpine environment. In the park 236 kilometers of trails, numerous alpine huts, alps, and other facilities and services like national park information centers are available. Natural and landscape attractions are viewpoints, waterfalls, lakes, alpine meadows, wildlife viewings etc. (BayStMLU 2002).

3 The concept of recreation perspective

The recreation perspective is described as the perspective of recreationalists on their individual visitation. This approach includes "personal" attributes used also in tourist typologies. Further on, behavioural characteristics are integrated. Before and during the visitation the recreation perspective is manifested in visitor decisions. They result in certain behaviour of visitors. It can be distinguished in macro and micro behaviour (Jubenville, Twight & Becker 1987). Here, purpose and motivation behind the respective visitation is important and responsible to explain behaviour. Both are variable and specific for each visitation - even of the same person. One person can visit a recreation or protected area at different days for different reasons. In consequence varying behaviour for each visitation results (Hammitt & Cole 1998; Jubenville, Twight & Becker 1987). Accordingly, the recreation perspective focuses on visitations and not just visitors. Depending on the recreational situation of a protected or recreational area the concept consists of different types of recreation perspective.

3.1 Recreation motivation and activity

Depending on the motivation behind visitations recreationalists select an appropriate activity. A person looking for physical challenge will select another activity than a person searching relaxation and tranquility.

Generally, recreation activities differ in mobile and stationary ones. Mobile activities are e.g. walking, biking, skiing. Stationary activities can be classified into three groups: activities according to resting (including e.g. playing and observing), getting information and orientation. Normally, stationary activities occur in combination with mobile ones. Examples are resting on a hiking tour or using information opportunities on walks (see Ammer & Pröbstl 1991; Hoisl, Nohl & Engelhardt 2000). However, the performance of hiking, walking or climbing can be different. This depends on the cultural, social, and natural environment. Naturally, hiking in north-American wilderness is characterized in another way than hiking in Central European cultural landscape. Table 1 refers to characteristics of walking and hiking in Central Europe.

3.2 Macro behaviour

Macro behaviour sums up frame decisions made in the run-up to visitations. It is characterized by purpose and motivation behind a visitation. Both lead to decisions concerning activity and destination, starting time, and duration of stay. The aspects are associated with each other. By selecting a summit destination the recreationalist will exercise climbing and not walking. While climbing requires to start early in the morning, walking occurs independent from daytime.

Nature-based recreation is mainly carried out by groups (family, friends etc.) and not by single persons. Due to its size and structure

TABLE 1

SELECTED CHARACTERISTICS OF RECREATIONAL ACTIVITIES: WALKING AND HIKING IN CENTRAL EUROPE

Activity	Walking	Hiking
Duration	1 – 2 hours	Primarily half-day
Target group	*Every one, without previous knowledge or special skills*	
Path length	2 – 5 km	> 5 km, up to 50 km
Travel speed	Leisurely	Speedy and perseveringly
Extended stops	Many	Few
Infra-structure	Benches, seatings	Signages, destinations like stops for refreshment/ meals
Trials	Comfortable, plane, hard surface	With sloop, natural state, challenging
Main motivation	"To go for a blow"	Nature experience, corporal challenge

(Ammler & Pröbstl 1991; LUBW 1994; Nohl 2001)

a group selects activity and destination. One single group member can be responsible for determining visitation constraints. It depends on his or her specific demands or physical abilities. For example, kids or seniors frequently have influence on choice of activity and destination. Comprehensible, a family excursion with kids will be designed in a totally different way than a trip of a sportive rambling club. Concerning seniors, it is imperative, that travel speed slows down remarkable for persons being older than 55 years. Accordingly, group structure should be considered to understand recreational behaviour.

3.3 Micro behaviour

Aspects of micro behaviour comprise the comportment during a visitation. It corresponds to mobile and stationary activities. In order to define micro behaviour the following factors are considered significant:

- performed types of extended stops,
- frequency of extended stops,
- duration of extended stops and
- speed of travel.

Micro behaviour reflects and depends on motivation behind a visitation. It is expressed through the chosen activity and destination: The stop behaviour during a long and exhausting hike and during a leisurely walk will be different. Especially, on walks observing nature and getting information are main aspects for a stop.

Furthermore, micro behaviour depends on existence and appearance of recreational infrastructure within an area. For example, conditions of path variables show effect on visitor behaviour. Walking speed depends not only on the physical abilities of visitors but also on material, condition and steepness of trails.

4 METHODS

In order to identify types of recreation perspective data on recreational behaviour was collected in Berchtesgaden National Park. As shown in Table 2 several methods of visitor monitoring were used.

Information on visitor behaviour was gained, in particular by time-lapse videos. It includes data collection on macro and micro behaviour. According to macro behaviour recreationalists were counted at entrances depending on starting time of the visitation.

TABLE 2

DATA COLLECTION METHODS ON VISITORS AND VISITATIONS IN BERCHTESGADEN NATIONAL PARK

Method	Data Type
Interviews with visitors	Group size, Age/ group structure Motivation & activity form Trip duration Trip destination Usage of infrastructural elements (frequency and duration of use)
Interviews with experts	Usage and duration of usage of infrastructural elements
Time-lapse video	Usage and duration of usage of infrastructural elements
Literature research	Characteristics for mobile activities Usage and duration of usage of infrastructural elements

Concerning micro behaviour stationary activities occurring at specific sites equipped with infrastructural elements (national park information tables, picnic areas, and natural attractions etc.) were investigated. Number of groups, their size, and duration using the infrastructure was measured. This data and data collected by visitor interviews were analyzed statistically using SPSS 12.

In order to build up types of recreation perspective the mean activities on foot in Berchtesgaden National Park were deployed. They were used to classify data on macro and micro behaviour. Furthermore, the determined types were expanded by information on visitor behaviour provided by literature.

5 Singular criterions on recreation perspective

Before the types of recreation perspective are examined in detail below, first an outline of selected aspects on visitor behaviour collected on-site will be provided.

5.1 Group size and structure

In Berchtesgaden National Park the majority of visitors (56%) come in groups of two, 13% in groups of three, 15% in groups of four persons, whereas 7% search recreation just by themselves. Taking into account the age three groups can be distinguished:

- family groups with kids (31%),
- adult groups with members between 18 and 55 years (40%) and
- senior groups having one member older than 55 years (29%).

5.2 Characteristics on extended stops

Based on classifications of stationary activities, extended stops vary in three types: resting, getting information, and orientation.

In context of getting information and orientation about 30 to 40% of the visitors make use of the according infrastructural elements. Use on specific infrastructural elements accounts for 10% of the visitors. However, visitors spend little time on these kinds of stationary activities. They use these elements for the duration of about two minutes in average. Infrastructure for resting in form of e.g. benches with tables is used by about 12% of the passing visitors. On average 10 minutes were spent at such offers. Sites with possibility for refreshment and meals (alpine huts, restaurants) play an important role for 52% of the recreationalists.

6 Types of recreation perspective

Concerning activities on foot five types of recreation perspective can be distinguished: Walking, hiking as family or senior group, hiking as group of adults, mountain climbing, hiking on several days duration.

They are defined based on the three main activity forms, their destination types and duration of stay as well as group structure. Further on, they are combined with the before defined types of extended stops characterized by stop frequency and duration. Here, data collected on-site is completed with data provided in literature (e.g. comportment on extended stops: Brämer 1998, O`Connor, Zerger & Itami 2003; walk speed: Roth et al. 2003). The example of hiking of several days duration shows the recreational perspective and the resulting visitor behaviour (see Table 3).

7 Discussion, conclusion and outlook

In Berchtesgaden National Park the recreation perspective is applied in several ways. Applying the approach measures taken by the management can be more specific. Planning of facilities and services can be better adapted to visitor demands. The knowledge gained is used for the design and choice of position of information shelters and natural trails, and the conception of information boards at alpine huts. Furthermore, the recreational types can be used in computer simulation models. By

TABLE 3

RECREATION PERSPECTIVE AND SELECTED CHARCTERISTS IN BERCHTESGADEN NATIONAL PARK BY THE EXAMPLE OF SEVERAL-DAY HIKING

Attribut	Value
Motivation/ pupose	Nature experience, corporal challenge
Age ∅	38 years
Group size ∅	3,44 persons
Group structure/ age	16% family groups 60% adult groups 25% senior groups
Start time ∅	At alpine huts 7:00 – 9:00 a.m.
Duration ∅	3 days
Travel destination	Alpine huts, summits
Extended stops types	Situations for resting (by infrastructure including nature attractions)
Extended stops duration ∅	20 minutes

them information needed to map recreation demand and visitor use pattern is made available by them (e.g. trip distribution, model split). The recreation perspective can find its expression in an agent-oriented computer-simulation approach.

At the moment definition and characterization of the different types of recreation perspective base partly on expert knowledge. For the description of micro behaviour in contrast to macro behaviour only little data exists (Jubenville, Twight & Becker 1987; Roth, Krämer & Schäfer 2003). One reason is that data collection on micro behaviour is more complicated than on macro behaviour. Further research on adequate methods is needed to improve and extend this typology. Here, the application of GPS and handy tracking concerning micro behaviour would be an interesting aspect to include.

References

[1] U. Ammer and U. Pröbstl, “Freizeit und Natur. Probleme und Lösungsmöglichkeiten einer ökologisch verträglichen Freizeitnutzung“, Hamburg and Berlin. 1991

[2] BayStMLU Bayerisches Staatsministerium für Landesentwicklung und Umweltfragen (BayStMLU), ”Nationalpark Berchtesgaden. Nationalparkplan,“ München, 2001

[3] R. Brämer, “Profilstudie Wandern. Gewohnheiten und Vorlieben von Wandertouristen”, Studien aus Wissenschaft und Praxis, Nr. 62, Marburg, 1998

[4] W.E. Hammitt and D.N. Cole, “Wildland Recreation. Ecology and Management”, New York, 1998

[5] R. Hoisl, W. Nohl and P. Engelhardt, ”Naturbezogene Erholung und Landschaftsbild. Handbuch,“ Darmstadt, 2000

[6] H. Job; D. Metzler and L. Vogt, ”Inwertsetzung alpiner Schutzgebiete. Eine regionalwirtschaftliche Analyse des Tourismus im Alpenpark Berchtesgaden“, Münchner Studien zur Sozial- und Wirtschaftsgeographie Band 43, 2003

[7] A. Jubenville; B.W. Twight and R.H. Becker, “Outdoor Recreation Management. Theory and Application Revised and Enlarged”, Philadelphia, 1987

[8] LUBW Landesanstalt für Umweltschutz Baden-Württemberg, “Umweltverträgliche Sport- und Freizeitanlagen/-aktivitäten. Orientierungsrahmen für Planungen und Beurteilungen. Untersuchungen zur Landschaftsplanung“, Band 27, 1994

[9] W. Nohl, ”Landschaftsplanung. Ästhetische und rekreative Aspekte“, Berlin and Hannover, 2001

[10] O`Connor, A. Zerger and B. Itami, “Building better agents: Geo-temporal tracking and analysis of tourist behavior. Conference Proceedings MODSIM International Congress on Modeling and Simulation. Townsville, Australia: 1148-1154, 2003

[11] R. Roth; A. Krämer and A. Schäfer, ”Wander-Handbuch. Ein Leitfaden für Kommunen, Sportorganisationen und touristische Leistungsträger“, Feldberg, 2003

[12] F. Romeiß-Stracke, ”Freizeitnachfrage-Naturbedürfnis-Siedlungsstruktur“, Schriftenreihe des Bundesministeriums für Ernährung, Landwirtschaft und Forsten, Heft 332, 1986

S. Hennig Dipl. Geogr., Dr. Current Research interest: conceptualizations and modeling of nature-based recreation concerning its management and monitoring.

Understanding the recreation preferences and constraints of low participation social groups

Rachel Parry, Sue Williams, John A. Watkins

Abstract – Current research has indicated that participation in informal outdoor recreation is relatively low among certain groups, such as young people, older people, women, ethnic minority groups and people with disabilities. There is pressure on policy makers and practitioners to address this apparent imbalance. This paper reviews the findings of an international literature review which highlighted that there has been a focus on ëconstraintsí rather than on ëpreferencesí, particularly in relation to participation in outdoor recreation in the UK. It would appear from the literature that there is a presumption that the main reasons for low participation are related to structural barriers (such as lack of transport) rather than a lack of understanding of the recreation preferences of non-traditional participants. This has raised the question of whether it is achievable to change the prevalent attitude amongst the countryside sector from one of ëwe expect people to want what we provideí, to one of ëwe will provide for what people wantí. Would such a paradigm shift be successful in achieving more equitable outdoor recreation participation?

Index Terms – constraints and preferences, participation, under-representation and exclusion.

1 Introduction

Existing research has indicated that participation in informal outdoor recreation is relatively low among certain groups. In particular, young people, older people, women, ethnic minorities, lower socio-economic groups and people with disabilities have been found to visit the outdoors less often than other social groups. Addressing this inequality poses a significant challenge for the outdoor recreation sector, particularly in relation to understanding the determinants of non-participation, and ascertaining the role of the public sector in developing policies and interventions to increase participation.

As with many other public agencies, the Countryside Council for Wales has been charged with delivering a government priority to achieve 'widespread and equitable access to the countryside and coast' [1]. Although there have been individual projects that have been successful in encouraging various low participation groups to visit the outdoors, this does not appear to have led to a sustained change and overall participation in outdoor recreation in Wales remains skewed towards white, middle class, educated and able-bodied males. In considering how to address this inequality and increase participation, a number of key questions have been raised:

1. What are the specific constraints associated with low participation social groups?

R. Parry is Recreation Policy Officer with the Countryside Council for Wales, Maes Y Ffynnon, Bangor, Wales, LL57 2DW E-mail: r.parry@ccw.gov.uk
S. Williams is Senior Recreation and Social Research Officer with the Countryside Council for Wales, Maes Y Ffynnon, Bangor, Wales, LL57 2DW E-mail: su.williams@ccw.gov.uk
J.A. Watkins is Head of Recreation Policy with the Countryside Council for Wales, Maes Y Ffynnon, Bangor, Wales, LL57 2DW E-mail: j.watkins@ccw.gov.uk.

2. Are the leisure-time activity preferences different for non-participants compared to those of current recreationalists?
3. What is the relative balance between constraints and preferences? Does one have a greater influence on participation in outdoor recreation than the other?
4. Is low participation from certain social groups a result of exclusion or an expression of under-representation?
5. What is the role of the public sector in either influencing preferences or removing constraints?

2 Method

To begin to address these issues, an extensive systematic review was undertaken of the existing evidence/knowledge base arising from research on different segments of the population and informal outdoor recreation in relation to participation, motivations, benefits, preferred experiences and activities, constraints and strategies for overcoming constraints [2]. The priority was to review the research that has been published in the last ten years (in or after 1997).

After a two-stage screening process, a final 119 titles met the inclusion criteria, and 68 were subject to full review and data extraction.

It was agreed that all the UK or Eire papers selected (42 papers covering 41 studies) would be subject to full review and data extraction, while only 27 of the non-UK ones were reviewed in such detail. These were chosen on the basis that they appeared both applicable to the UK and relevant to the groups least well covered in the UK research.

The aim of the review was identify the current 'state of knowledge' and degree of consensus in the following four areas:

1. The constraints to participation experienced by each priority group in relation to the three main areas of constraint: intrapersonal, interpersonal, and structural [3].
2. The motivations, experience and activity preferences of each of these groups, considering both participants and non-participants.
3. The evidence relating to the differences between participants and non-participants, and the strategies that have been used by those who do participate to overcome the barriers.
4. The effect of belonging to multiple groups on motivations, experience and activity preferences.

3 Findings

3.1 Constraints

The review found that the majority of the research into non-participation had concentrated on constraints. Of the 68 included studies, 57 considered the constraints to participation experienced by each of the priority groups in relation to three main areas: intrapersonal, interpersonal, and structural. The constraints identified in the studies fall into 13 generic headings, which could be classified under each of the 3 main types:

Intrapersonal Constraints:
- Fear for personal safety & security
- Lack of knowledge
- Lack of time
- Poor health or fitness
- Lack of confidence
- Lone person
- Finding the weather disagreeable

Interpersonal Constraints:
- Concern about anti-social behaviour
- Feeling unwelcome
- Being put off by a bad experience

Structural Constraints:
- Poor provision of facilities and management
- Lack of transport
- Costs too high

3.2 Strategies

A large number of the reviewed studies had considered strategies to overcome non-participation, but despite this coverage there was found to be little solid evidence of the effectiveness of different strategies. Follow-up evaluation was not a focus of many of the studies but a number of them did give a good analysis of current constraints and the measures to address them.

Though formal analysis was not appropriate, the review identified some general conclusions on strategies for service providers that are likely to be effective in overcoming constraints to participation identified from the studies, based on the following ten areas:

- Focused information and events
- Site enhancement and maintenance
- Awareness raising and staff training
- Outreach and skill development
- Empowerment of target group
- Coordination and infrastructure
- Base-line data
- Offset costs
- Role models and staffing to reflect target population
- Sustainable legacy

3.3 Preferences

The reviewed studies did cover motivations and preferences but there was rarely any clear distinction made between the specific groups or between participants and non-participants. However, some general conclusions could be drawn based on the majority of studies.

In relation to motivations, it was found that 'fresh air and exercise' was the primary motivator for older people and low social class groups. This contrasted in particular with young people, who ranked 'socializing with friends' in first place.

'Lack of interest' was assessed in the review as an expression of preference (although it could also be considered a constraint). The review found that ethnic minority groups expressed the greatest lack of interest, followed by people from areas of multiple deprivation, and then young people. The review identified two aspects to lack of interest or motivation: those associated with cultural setting and those with social context. There may be no cultural habit of using the countryside, for example for some ethnic minority groups visiting the countryside for recreation is an alien concept. Alternatively, there may be no social context for a visit to the countryside; for example younger people may perceive the countryside as boring or not for them and they may have other recreation preferences.

In relation to 'activity preferences' the review found that the majority of studies either did not specify any particular activity, or concentrated only on walking. The conclusions on activity preferences were therefore not particularly strong, but some key points were highlighted. All groups place walking for leisure first, with this activity being particularly important to older people and ethnic minority groups. Sightseeing and appreciating landscape or good views comes second over all, with people with disabilities and people from areas of multiple deprivation showing a particular preference. The third most preferred activity over all is observing nature and particularly by ethnic minority groups. The more energetic activities are preferred by young people, as is picnicking.

3.4 Multiple group membership

The review considered the effect of belonging to multiple groups on motivations, experience, and activity preferences. However, it was found that only four of the selected papers considered the combined effects on constraints and each had sampling weaknesses. Therefore, there was not enough data upon which to draw any firm conclusions.

4 Conclusions

There are a number of key conclusions and associated questions that have arisen from this systematic review of international research into low participation by specific social groups.

Firstly, the review has highlighted that the research to date has focused predominantly on constraints, particularly 'structural barriers', rather than on 'motivations' or 'preferences'. Motivations or preferences have mainly been considered in relation to the desires of current participants, thereby reinforcing a continuation of the needs of these groups rather than non-participants. It appears that there is an assumption in the countryside recreation sector that the main reasons for low participation are related to structural barriers (such as poor provision of facilities or lack of transport) rather than a lack of understanding of the preferences of non-traditional participants. This in turn suggests that 'we expect people to want what we provide', rather than 'we will provide for what people want'. Whether or not the outdoor recreation sector is either able, or willing, to initiate such an organizational paradigm shift is currently subject to debate.

Responding to this issue will raise some significant challenges, both within the research community, and in the recreation policy and delivery sectors. In particular, a research program into the preferences of these target audiences will be required in order to complement the previous focus on barriers. A key component of this will be to understand the relative balance between the 'pull' of preferences and the 'push' of constraints. From a policy perspective, it is likely that decisions will have to be made as to how far 'recreation opportunities' can be modified to accommodate potentially significantly different preferences and activities. This will need to include consideration of the impact of any such changes on existing participants.

Secondly, the review has indicated that there is little understanding as to whether the current inequality in participation is a result of under-representation or exclusion. Similar to the assumption that underpins the emphasis on constraints, is the implication that the inequality is a result of exclusion: that these social groups would like to participate, but are subject to barriers which prevent this. An alternative view is that a proportion of non-participants do not actually wish to take part in outdoor recreation, and prefer alternative leisure time pursuits. This view would support the hypothesis that some non-participation is actually under-representation rather than exclusion. Determining the extent of 'exclusion', which would represent potential, albeit unexpressed, latent demand, will be a significant challenge for recreation research to quantify.

Finally, the review concluded that there is relatively little robust evaluation in relation to whether interventions by the outdoor recreation sector have been successful in overcoming constraints or influencing preferences, and whether they have therefore led to sustained participation from the targeted social groups. Although there have been many projects aimed at achieving these objectives, monitoring has concentrated on the effects on participation during the duration of the project, and not on whether project participants have sustained visits to the outdoors following the end of the intervention. This will require the development of longitudinal evaluation programmes that will need to be built in to pilot intervention projects.

References

[1] Welsh Assembly Government, *Environment Strategy for Wales*, 2006.

[2] OPENSpace Research Centre, Edinburgh College of Art, Heriot-Watt University *Review of Evidence – Participation in Outdoor Recreation by WAG Priority Groups*, CCW Policy Research Report No. 08/15, 2008.

[3] D.W. Crawford, E.L. Jackson and G. Godbey, "A Hierarchical Model of Leisure Constraints," *Leisure Sciences,* vol. 13, no. 4, pp. 309-320, 1991.

Rachel Parry PGDip Countryside Management (1998); MA English and Culture (1990); BA (Hons) English Literature and French (1990). Recreation Policy Officer, Countryside Council for Wales.

Sue A. Williams PhD, 2002; MSc Environmental Sustainability, 1997; BA (Hons.) English, 1992. Senior Recreation and Social Research Officer, Countryside Council for Wales.

John A. Watkins MSc Rural Resource Management, 1997; BA (Hons.) Leisure Management, 1994. Head of Recreation Policy, Countryside Council for Wales.

Safeguarding rural tourism experience. Do different quality norms exist?

M. Partalidou, O. Iakovidou

Abstract — Despite the growing body of research on rural tourism in Greece none is focused on managing quality experience. Towards this direction visitors' norms can be of great importance and a rather useful tool in order to safeguard the overall experience in rural settings and help everyday managers of rural tourism as well as practitioners and policy makers. Whereas developed in sociology and social psychology, norms have been used as an organizing concept in outdoor recreation research and management. In this paper we try to use this concept of visitors' norms in order to determine what rural tourism should offer for a unique experience. Self administered questionnaires were distributed randomly across seven well known rural tourism destinations of rural Greece. Day trippers were excluded and sample size was set at 339 rural tourists, according to estimations of the proportion of rural tourists to the overall number of visitors at each destination. Personal interview was used and statistical analysis gave answers to a multiple set of research questions.

Index Terms — management, quality, norms, rural tourism.

1 Introduction

Rural environments have a long history of being used for recreation and their beautiful landscapes are becoming increasingly more attractive as a place of escape in a stressful and urbanized world [1]. Many aspects of rural tourism have been elaborated for several years in an extensive body of literature related to definitions, relationship between tourism and agriculture, benefits and problems, influences on rural community development and economic restructuring of rural areas [2].

Nevertheless, there are still many questions unanswered; especially when considering quality issues. According to Reichel et al. [3] quality is acknowledged as an important factor for rural tourism development. Local traditions must be kept in rural tourism sites but *"no bugs in the bed"* [4].

In Greece, the lack of a national policy for rural tourism and especially for quality management led providers and managers in shaping rural tourism services according to their personal experiences and definitions of quality. This practise did not differentiate rural tourism from mass tourism patterns and therefore failed to satisfy customers and consequently led to business failure [5].

The review of the literature shows that the individual elements making up a strategy on quality must be founded on a thorough understanding of the customer [6]. Visitors can give us an insight on what is presumable in rural tourism, in contrast with mass tourism. In other words, their norms can be the guiding principle for any quality management action. The later is the main purpose of this study, in which the concept of norms is used in order to determine what rural tourism should offer for safeguarding a quality experience.

M. Partalidou holds a Ph.D. in Rural Tourism. She is a part-time researcher at Aristotle University of Thessaloniki, Greece. E-mail: prog1@halkidiki.gov.gr.
O. Iakovidou is with the Department of Agricultural Economics, School of Agriculture, Aristotle University of Thessaloniki, Greece, E-mail: olg@agro.auth.gr.

2 Rural tourism in Greece

Rural tourism in Greece is originated by national and EU initiatives in the late 80ies. Up till now a great number of rural tourism businesses is scattered all over Greece, offering a variety of services. One can find rural tourism accommodation by the simple type of "rooms to let", small hotels, big hotels etc. Operators can be either locals or foreigners; not necessarily occupied in agriculture. Farm experience or other leisure activities are some times incorporated into the product offered but not necessarily [7].

Great issues under consideration which make management decisions even difficult are the problems of poor statistical bases for total number of rural tourism enterprises and overnight stays as well as the predominantly domestic character and the great level of ambiguity in the operator's attitude towards their guests [5].

Quality has been acknowledged as a vital attribute towards the development of rural tourism but there is still no common understanding of what quality should be and how to achieve it. When it comes to rural tourism Williams [9] argues that its nature raises a number of issues relating to experiencing quality and service delivery.

3 Quality and norms

Quality is an elusive and abstract concept, especially when applied to a service context is usually intangible and ambiguous [8]. Rural tourism can include remote locations, a large number of relatively unorganized small businesses, resource constraints and often a lack of management skills as well as the heterogeneity of consumer preferences adding to a further complexity of quality delivery [9]. In fact providers, managers and decision-makers involved in rural tourism are trying to *"balance on the same time between the values of the past and the demands of the present; between the expectations of city dwellers and the reality of the countryside"* [10].

According to Balestrieri [11] the most important concept of quality in rural tourism refers to comfort of the accommodation, beauty of the landscape, closeness to cultural and architectural sites, appropriateness of building restoration, furniture adoption and closeness to rural life. Others [12] believe that quality is mainly focused on the simplicity and authenticity of rural people. Fleischer and Pizam [13] include the operator's attitude towards guests.

But what about different perceptions of visitors towards rural tourism quality experience? Do all attractions and services are important to all rural tourists? Do visitors have different quality norms?

Contemporary literature has answered similar questions using the theory of norms for a number of other leisure activities (boating, hiking) and different settings (national parks, rivers, lakes, protected areas, etc). [14]. Primarily developed in the field of sociology and social psychology, norms have attracted considerable attention as an organising concept in outdoor recreation research and management [15]. Visitor's norms have been used to study an expanding range of outdoor and wilderness management attributes including crowding, ecological impacts and management practices [16].

In this study norms are used to evaluate the importance of a set of potential attractions in rural tourism for delivering a quality experience.

4 Methodology

4.1 Study area and sampling

A focused group discussion by ten experts determined a set of potential attractions for quality rural tourism experience: V_1=landscape, V_2=local people, V_3=cultural heritage, V_4=gastronomy, V_5=outdoor activities, V_6=verbal and customs culture, V_7= architectural and historical heritage V_8= accommodation,

V_9=authenticity, V_{10}=basic infrastructure.

Data was gathered as part of a survey administered in seven well known rural tourism destinations in Greece. Due to the lack of official data for the actual number of rural tourism bed spaces or tourist flows in the study area, sample size was set according to estimations of the proportion of rural tourists to the overall number of visitors at each destination [17].

339 self-administered questionnaires were distributed randomly in rural tourism lodgings. Visitors were asked to evaluate the importance of the above attractions in order to safeguard that rural tourism feels like rural tourism experience!

4.2 Statistical analysis

Categorical Principal Component Analysis (CatPCA) was used to identify important quality norms. It takes into consideration non-linear relationships, most commonly found in sociological researches [18]. By reducing the dimensionality of the data to a smaller set of uncorrelated components helps interpret a few components rather than a large number of variables.

The results of the CatPCA were further analysed and used in Two Step Cluster Analysis; which handles successfully categorical and continuous variables [7], in order to provide answer to the other research question of identifying market segments with different quality norms.

5 Study Results

5.1 Basic Quality Norms in Rural Tourism

The results of CatPCA show that the algorithm stopped after 30 iterations reaching the convergence test value (0.00001) excluding observations with extreme values. The final correlation matrix (Table 1) for the transformed variables suggests, with very few exceptions, relatively high figures for the correlation coefficient. A three dimension solution

TABLE 1
CORRELATION MATRIX TRANSFORMED VARIABLES

Variables	V_1	V_2	V_3	V_4	V_5	V_6	V_7	V_8	V_9	V_{10}
V_1	1.000									
V_2	.153**	1.000								
V_3	.194**	.361**	1.000							
V_4	.148	.105	.104	1.000						
V_5	.111*	-.055	.095	.157**	1.000					
V_6	.149**	.218**	.392**	.163**	.137*	1.000				
V_7	.186**	.149**	.431**	.147**	.019	.328**	1.000			
V_8	.176**	.022	-.039	.289**	.058	.045	.244**	1.000		
V_9	.080	.211**	.175**	.134*	-.010	.150**	.235**	.264**	1.000	
V_{10}	.094	.047	-.033	.204**	.063	-.039	.093	.495**	.349**	1.000
Dimension	1	2	3	4	5	6	7	8	9	10
Eigenvalue	2.482	1.653	1.150	.894	.863	.805	.638	.601	.506	.407

*Statistical important at *a=0.05 and ** a= 0.01*

(with eigenvalues greater than 1) was found useful to the model maximizing also the Variance (52.85%). The large value of the total Cronbach's Alpha (0.901) indicate a reliable model.

Similar loadings along the dimensions indicate a similarity between those variables with respect to that dimension Table 2). Large loadings (above .500) in each dimension indicate that the variable is associated heavily with that dimension.

The first dimension (Q1) separates, with relatively large positive scores the variables "architectural and historical heritage" "cultural heritage" "authenticity" and "verbal and customs". The second dimension (Q2) separates clearly "basic infrastructure" and "accommodation" since those variables are the two clumps with very high positive scores. The third dimension (Q3) separates only the variable-attraction "outdoor activities". The results indicate that three different set of attractions are important for safeguarding a quality rural tourism experience.

5.2 Segmenting rural tourists with different quality norms

Using the three dimensions as continues variables and a set of other ten categorical vari-

TABLE 2
COMPONENT LOADINGS

Variables	Dimensions		
	1	2	3
V_1	.440	-.048	.266
V_2	.460	-.331	-.355
V_3	***.587***	-.564	-.053
V_4	.473	.237	.362
V_5	.197	.014	***.781***
V_6	***.540***	-.442	.155
V_7	***.642***	-.207	-.086
V_8	.517	***.634***	.006
V_9	***.558***	.248	-.404
V_{10}	.433	***.682***	-.124

In italics and bold large loadings (above 0.500) indicating which variable is associated heavily with which dimension.

ables of basic demographic and other characteristics of the visitors the results of the Two Step Cluster Analysis gave us a three cluster solution. Of the 339 total cases, 4 were excluded from the analysis due to missing values, leaving 325 to distribute. 190 were assigned to the first cluster, 96 to the second and 39 to the third.

According to the "by variable" importance, produced by the analysis, analysis from the centroids, standard deviations and mean values as well as frequencies we can describe the profile of the three segments.

The dominant segment is that of visitors with quality norms towards the unique rural experience, male, between 36-55 years old, working in private sector, higher annual net incomes and travelling with family. Second segment is indifferent to quality norms and are mostly urban youngsters, between 19-35 years old, travelling with a companion, attracted to isolated destinations. Finally, the third segment is visitors with norms for a quality leisure experience in rural tourism, are between 19-35, of higher educational level, still university students, come from all over Greece and travel with friends.

6 Conclusion

Visitors have a different perception of what rural tourism must feel like. The aggregation of the important attractions into three separate dimensions set also three different quality norms. Study findings suggest that there is the first one for which delivering quality has to do with localities, rurality and authenticity in the rural tourism experience. This norm is the one that clearly separates rural tourism from mass tourism due to the fact that is based on the special features of the destination and not on an homogenised tourism product. Another norm that exists is the one referring to tangible aspects of quality, most commonly found to all forms of tourism. Finally there is the norm of quality delivering through the opportunity to take part in activities and extreme sports offering a very different athletic experience.

As far as the market segmentation is concerned, it seems that the dominant market segment is of visitors who think highly of the local identity in rural tourism and safeguarding their quality experience means that special interest must be placed upon characteristics of the rural tourism destination, incorporated into the tourism product. Locality and rurality come along with families and heavy spenders.

What remains to be studied is the minimum and maximum acceptable conditions in rural tourism experience. More research on measurable quality standards that will further help everyday management, is also needed.

References

[1] L. Roberts and D. Hall, D. *Rural Tourism and Recreation: Principles to practise*, CABI Publishing, London, 2001.

[2] M. Partalidou and O. Iakovidou, "Crafting a policy framework of indicators and quality standards for rural tourism management", *Int. J. Tourism Policy*, vol. 1, no. 4, pp.353–367, 2008.

[3] A. Reichel, O. Lowengart and A. Milman, A., "Rural tourism in Israel: service quality and orientation", *Tourism Management*, vol.21, pp.451-459, 2001.

[4] EuroGites, "Conclusions of the 1st European Congress on rural Tourism", http://www.europeanrtcongress.org, 2003.

[5] M. Partalidou and O. Iakovidou, "Quality as a prerequisite for the development of rural tourism", *Greek Review of Social Research*, vol. 108-109, pp.325-345, 2002.

[6] European Commission, *Towards Quality Rural Tourism. Integrated Quality Management (IQM) of rural tourist destinations,* Enterprise Directorate-General Tourism Unit, Brussels, 1999.

[7] M. Partalidou, "Quality Norms as Factor of Managing and Marketing of Rural Tourism", Phd dissertation, Aristotle University of Thessaloniki, Greece, 2005.

[8] J. La Lopa and R. Marecki, "The critical role of quality in the tourism system" *Quality Progress*, august, pp 37-41, 1999.

[9] F. Williams, "Quality rural tourism. Niche markets and imagery: quality products and regional identity', L. Roberts and D. Hall eds, Rural Tourism and Recreation: Principles to Practise, CABI Publishing, London, pp.214–215, 2001.

[10] H. Grolleau, "First the experience", *Leader Magazine*, vol.4, pp.14-16, 1993.

[11] G. Balestrieri, "Quality of Agri-Tourism in Tuscany, Conf. A key option for the Rural Integrated and sustainable development strategy, I.A.E.R.T., Perugia, pp. 125-138, 2000

[12] I. Frochotc, "A benefit segmentation of tourists in rural areas: a Scottish perspective", *Tourism Management*, vol.26, pp.335-346, 2005.

[13] A. Fleischer and A. Pizam, "Rural tourism in Israel", *Tourism Management*, vol. 18, no. 6, pp.367–372, 1997

[14] D. Whittaker and B. Shelby, "Evaluating in stream flows for recreation: applying the structural norm approach to biophysical conditions", *Leisure Studies*, vol. 24, pp. 363-374, 2002.

[15] D. Orminston, A. Gilbert and R. Manning, "Indicators and standards of quality for ski resort management", *Journal of Travel Research*, vol 36, pp. 35-41, 1998.

[16] S. Lawson and R. Manning, "'Tradeoffs among social resource and management attributes of the Denali wilderness experience: a conceptual approach to normative research", *Leisure Sciences*, vol.24, pp.279-312, 2002.

[17] T. Yamane, *Elementary Sampling Theory*, Prentice – Hall Inc., Englewood Cliffs, 1967.

[18] I. Ferreira, P. Nazare, M. Alves, F. Mota, C. Reu, S. Cunha and B. Oliveira, "Quince jam quality: microbiological physicochemical and sensory evaluation", *Food Control*, vol. 15, pp.291–295, 2004.

M. Partalidou. Agriculturist, MSc in Agricultural Economics, PhD in Rural Tourism. Seven years of academic work and part time researcher at 7 projects and assistant teaching; 6 years in a Local Action Group in EU Initiatives. Currently working in Public Service, Dep of Management and Development. She has published 7 papers in academic journals and 8 in international and national conferences. She has contributed with a chapter in 2 books. Her research interests include rural tourism development, quality, management and marketing of rural tourism as well as rural sociology and women's entrepreneurship in rural areas.

O. Iakovidou. Agriculturist, D.S.P.U., D.E.A., MSc, PhD Professor at the University of Thessaloniki, Greece, Faculty of Agriculture. During her presidency of the Mediterranean Association for the Sociology of Tourism she has organized the 5th Mediterranean Conference "Mediterranean Tourism Beyond the Coastline: New Trends in Tourism and the Social Organization of Space".

Comparison of natural landscapes appreciation between Russia and Japan: methods of investigation

Elena Petrova, Yoji Aoki, Yury Mironov, Anastasia Petrova, Katsunori Furuya, Hajime Matsushima, Norimasa Takayama

Abstract — The research focusing on the aesthetic evaluation and appreciation of natural landscapes in recreational and protected areas is of great importance. While selecting landscapes for special care and protection one should take into consideration not only objective appraisal of their natural peculiarities, significance, and usefulness but also their aesthetic features. People belonging to different cultures differ by their landscape preferences due to a number of ethno-cultural factors as well as historical, social, and environmental peculiarities. The purpose of this study is to compare the landscapes appreciation in Russia and Japan, in two countries with deep-rooted traditions of landscape appreciation. The photo database of landscapes both similar and unique for Russia and Japan was made using the same methods. The respondents in both countries are suggested to classify and group photo images of different landscapes according to their personal perception as well as to estimate the attractiveness of given landscapes images. The results of the study will help us to answer: do representatives of different cultures – people in Russia and Japan – like similar landscapes due to aesthetic appreciation laws, which are common for the whole humanity, and if they don't – then why not?

Index Terms — aesthetic evaluation, appreciation of landscapes, landscape preferences in Russia and Japan

1 Introduction

Geography and other geosciences regard natural landscapes as geosystems having common origin and development history, homogenous basement, the same dominant relief type, similar climate and soil conditions, plant communities, and local geosystems. Geographical, geological, and biological studies investigate various natural components of landscapes, their interrelationships, spatial distribution, and temporal development. Ecological studies take into account potential resources of landscapes and environmental conditions. An approach considering not only the natural processes and patterns in the natural landscapes, but also their aesthetic features, which determine emotional perception by people of their beauty and particular qualities, is relatively new for geosciences.

This approach focusing on aesthetic evaluation and appreciation of landscapes is of great importance especially for the research in recreational and protected areas. While selecting landscapes for special care and pro-

E. Petrova is with the Faculty of Geography at the Lomonossov Moscow State University, 119991 GSP-1 Moscow, Russia; Email: epgeo@mail.ru
Y. Aoki is with the Social and Environmental Systems Division at the National Institute for Environmental Studies, Tsukuba, Japan; Email: yojiaoki@nies.go.jp
Y. Mironov is with the Vernadsky State Geological Museum of the Russian Academy of Sciences, Moscow, Russia; Email: mironov@sgm.ru
A. Petrova is with the Institute for Oriental Studies of the Russian Academy of Sciences, Moscow, Russia; Email: al_maat@mail.ru
K. Furuya is with the Chiba University, Japan; Email: k.furuya@faculty.chiba-u.jp
H. Matsushima is with the Hokkaido University, Japan; Email: matts@res.agr.hokudai.ac.jp
N. Takayama, Researcher, is with the Forestry and Forestry Products Research Institute, Tsukuba, Japan; Email: hanri@ffpri.affrc.go.jp

tection one should take into consideration not only objective appraisal of their natural peculiarities, significance, and usefulness but also their aesthetic originality, because it is very important to preserve beautiful landscapes for the next generations. The beauty and attraction of a landscape for visitors play the most important role in choosing natural objects for recreational purposes too. The scenic beauty and high aesthetic value of a landscape is for example one of the key prerequisites for giving to the territory a National Park status.

The purpose of this study is to compare the appreciation on natural landscapes in Russia and Japan, in two countries that are situated so close to each other but differ so greatly in cultural aspects, in two countries, which both have deep-rooted traditions of landscape appreciation.

2 Conception of landscape appreciation

2.1 Factors affecting landscape preferences

During the last decades, a large number of studies devoted to psychological and aesthetic evaluation of landscapes have been published [1]. However, the concept of landscape appreciation has not yet been defined clearly, nor has agreement on methods of evaluation, factors of landscape preferences, and the steps of the appreciation (i.e., what the phenomenon of landscape is, how people experience landscape, what attributes affect the landscape appreciation and why) been found [2].

Majority of researchers agree that people from various cultures prefer natural environments better than built or other wise human-influenced ones. Such phenomenon has been interpreted as supporting evolutionary theory of human landscape preferences. Several studies conclude that similarities in evaluations of natural scenes exceed greatly the differences across cultures or smaller groups [3]. However, some other studies recognize individual and inter-group distinctions in environmental preferences within an evolutionary framework, in addition to these similarities. Thus, both cultural and genetic factors may contribute to evaluative responses to environmental types [4]. Bourassa [5] suggested that the difficulties in understanding landscape derive from human evolution, being affected by both ontogenesis and phylogenesis. He proposed the need for three steps of clarification: biological, cultural, and personal landscape acquisition.

It was ascertained that two kinds of respondents' attributes could influence on landscape preferences [2]. The first involves identities of a human group, e.g. the nationality, human race, living environment, gender, age, etc. The second includes individual characteristic, e.g. hobby, social location, personal history, educational level, professional interests, etc. According to the famous Russian ethnologist and the founder of ethnogeny theory Gumilyov [6], ethnos and its landscape surrounding are indissoluble, so this relationship can influence upon people appreciation of the world as a whole and natural landscapes in particular.

With regard to the authors cited above, in our conception of landscape appreciation we assume that people belonging to different cultures differ by their landscape preferences due to a number of ethno-cultural factors as well as historical, social, and environmental peculiarities. The "outside view" of another culture representatives allows us to see unusual in usual, to assess originality and beauty of familiar landscapes, and to find out new aesthetic features. A good example is the effect that Russian literature made on the forest landscapes in Japan. In Meiji era, Japanese writers became interested in Russian literature and translated some novels into Japanese. The poetic descriptions of forest by Russian writers helped them to see the beauty of deciduous forests surrounding Tokyo City, called Musashino, and to praise it in their works [7], though in previous time people in Japan used the forest (*zokibayashi* in Japanese) only for firewood without regarding any

aesthetic value in it. In that way, Russian appreciation of forest landscapes was the first step to starting of preservation of these natural landscapes in Japan.

2.2 Russian traditions of natural landscapes appreciation

The Russian philosopher Berdyaev referred to the power of space over the Russian soul. He said, that scenery of Russian land and "scenery" of Russian soul were inseparably linked [8]. According to him, landscape thinking is natural for Russian ethnos, and it is caused mainly by immensity of Russian expanses. The Russian writer Bunin [9] also believed that Russian people "are liable primeval to influences of nature".

From ancient time, people in Russia worshiped remarkable natural objects and landscape components (high hills, rocks, lakes, rivers, forest, big trees, large stones, etc.). For example, people in Pereslavl-Zalessky (Central part of Russia) worshiped the "blue stone" – a boulder of glacier origin lying on the lakeside. Even nowadays, some people believe in his wonder-working forces, that is how strong these beliefs are.

While choosing a cloister site or a place to settle, people traditionally took into account its natural surroundings, they preferred attractive landscapes and beautiful view.

A question of spiritual harmony of Russian people with Nature is among favorite themes of Russian classic literature. Famous Russian writers such as Ivan Turgenev, Anton Chekhov, Ivan Bunin, Lev Tolstoj, etc. devoted many high-sounding words to this theme. The poetic descriptions of Russian natural landscapes are also traditional for Russian literature. The best examples of such descriptions one can find in the works of Turgenev, Prishvin, Paustovsky, etc.

Russian paintings and music also reflect this love to Nature. There are many Russian folk songs and classical musical compositions about nature (for example, "The Seasons" of Tchaikovsky). Some Russian artists specialized in drawing landscapes: everyone knows the names of Shishkin and Ayvazovsky, but there are also many others.

2.3 Japanese traditions of natural landscapes appreciation

The Japanese people highly appreciate the nature and its phenomena. It's essential for Japanese to pay respect to natural objects (mountains, trees, lakes, etc.) and to landscape places, many of which are well known throughout Japan for their scenic beauty: for example, Yoshino Mountains are extremely famous because of Cherry blossom trees; hundreds of Japanese visit the area every April for admiring them. These traditions of natural phenomena and scenery admiration are reflected in poetry, paintings, and in people every day life – some traces can be found even in Japanese language. There exist special words such as hanami (which means "admiration of flowers"; having in mind "to look at the flowers and enjoy"), tsukimi ("admiration of moon"), yukimi ("admiration of snow"). One can say there is an aesthetic cult for flowers, moon, and snow in Japan, which include special features and traditions [10].

The Japanese people often try to imitate nature in their garden. There are stone garden, water garden, moss garden, and scenery garden as a whole. The main components of these gardens are symbolic; they form a metaphorical landscape that evokes associative aesthetic appreciation.

Japan's indigenous religion Shinto, what means "the Way of the Gods", is an animistic belief system. It worships not only anthropomorphic deities, but also the spirits of awe-inspiring elements of nature, especially certain mountains and trees. Some Shinto shrines, like Miwa Shrine (Nara Prefecture) and Tsukubasan Shrine (Ibaraki Prefecture) have as their central object of worship the mountains behind them [11]. In the case of Tsukubasan Shrine, Mt. Tsukuba is the god of the Shrine. Nature is sacred; to be in contact with nature is to be close to the kami, meaning gods or spirits. For example, Mount Fuji is regarded as the spirit of a particular place.

The landscape appreciation of Japanese was greatly affected by the western cultures after the opening of their country at the end of Edo era, i.e. the middle of 19 century. The landscape appreciation popularized in Europe including the appreciation of Russian cultures was introduced to Japanese and it changed the way of landscape appreciation of Japanese completely. Then Japanese has three types of landscape appreciation in their culture, e.g. the traditional landscape appreciation on natural phenomenon, the Chinese landscape appreciation of "Sansui paintings" including "Eight Views" and the western landscape appreciation.

3 Methods

Taking into consideration both Russian and Japanese traditions of natural landscapes appreciation, we will try to find out differences between aesthetic evaluation of landscapes by representatives of both cultures. Very important point of our research is method of visual landscapes presentation. In the early stages of landscape studies in Russia, Japan, and other countries, the on-site approach prevailed, when respondents visited the sites and described their impressions. However, this approach limited the number of respondents, visits, and sites that could be used [1]. Thus, we have chosen another approach focusing on the use of colour pictures. At the first step of our investigation, we have made a photo database of natural landscapes. Both Russian and Japanese researchers have been taking pictures of landscapes both similar and unique for Russia and Japan using the same methods of taking pictures. All the pictures were taken at eye level, with a focal distance of 28-35 mm (in equivalent of 35 mm film camera) that corresponds to spanning angle of human eye. Then we have selected landscapes images for the questioning. The selected photo images were printed in post card format for respondents' conveniences.

The next step of investigation is forming respondent groups in different regions of Russia and Japan similar by their age, education, and social level in order to reveal their landscape preferences resulting from ethno-cultural reasons.

Additionally, a questioning will be carrying out. The respondents in both countries are suggested to classify and group photo images of different landscapes according to their personal perception, give their appraisal for every obtained group, and explain their classification criteria as well as to estimate the attractiveness of given landscapes images.

4 Results expected

Our research project is not finished yet. We are expecting to obtain the first results this autumn. Using the methods referred above, we will try to answer the following questions: do representatives of different cultures – people in Russia and Japan – like similar landscapes due to some aesthetic appreciation laws, which are common for the whole humanity, and if they don't – then why not?

The results of the study will help us to find out: 1) new criteria for protection of natural landscapes with consideration of aesthetic features basing on comparison of their appreciation and evaluation by the Russians and the Japanese; 2) the most aesthetically valuable and attractive components of landscapes for the purpose of their protection and careful use basing on comparative analysis of landscape preferences of the two cultures representatives; 3) new developed classification of natural landscapes according to their attractiveness.

Conclusion

We are now at the entrance of clarifying landscape appreciation. We hope that our results will be helpful for finding a common and consistent scientific language for landscape appreciation to assist comprehension between cultures and across linguistic boundaries, to understand better the world surrounding us,

the world we live in and have to protect and keep in its complete beauty for the generations to come.

Acknowledgements

Russian Foundation for Basic Research (RFBR Project No. 08-05-91204) and Japan Society for the Promotion of Science (JSPS) supported the research reported here.

References

[1] Y. Aoki, "Review Article: Trends in the Study of the Psychological Evaluation of Landscape", *Landscape Research*, vol. 24, no. 1, pp. 85-94, 1999.
[2] Y. Aoki, "Recent Trends of English Paper on the Psychological Evaluation of Landscape", *J. of Environmental Information Science*, vol. 35, no. 5, pp.181-188, March 2007.
[3] R.S. Ulrich, "Biophilia, biophobia, and natural landscapes". S.R. Kellert and E.O. Wilson, eds., *The Biophilia Hypothesis*, Washington DC: Island Press, pp.73-137, 1993.
[4] B.P. Kaltenborn and T. Bjerke, "Associations between environmental value orientations and landscape preferences", *Landscape and Urban Planning*, 59, pp.1-11, 2002.
[5] S.C. Bourassa, *The Aesthetic of Landscape*, London: Belhaven Press, pp.168, 1991.
[6] L.N. Gumilyov, *Ethnosphere: History of Humans and History of Nature*, Moscow: Ecopros, 1993.
[7] *D. Kunikida, Musashino (The Musashi Plain), 1901.*
[8] N.A. Berdyaev, *The Fate of Russia (Sud'ba Rossii)*, Moscow: Sovetsky pisatel, 1990.
[9] I.A. Bunin, *Life of Arsenyev*, Moscow: Santaks, p. 68, 1994.
[10] N.T. Fedorenko, *Japanese notes*, Moscow: Sovetsky pisatel, p. 243, 1974.
[11] N. Kazuo and H. Kazuo, *What is Japanese Architecture? A Survey of Traditional Japanese Architecture*, Tokyo - New York - London: Kodansha International LTD., p. 40, 1983.

Elena Petrova is Doctor of Philosophy in Geography (1989: Lomonosov Moscow State University). She is Senior Researcher at the Faculty of Geography of the Lomonosov Moscow State University. She had research grants from the DAAD (1991) and the RFBR (2004; 2008). She has more than 60 published papers related to social and economic geography, ecological tourism, educational nature path, and social and economic dimensions of natural and man-made risk. Her current research interests include aesthetic evaluation and appreciation of natural landscapes. She is associated with Russian Geographical Society, DAAD-Alumni, and European Geosciences Union.

Yoji Aoki is Doctor of Engineering (1976: Tokyo Institute of Technology). He is Special Senior Researcher of Social and Environmental Systems Division at National Institute for Environmental Studies in Tsukuba, Japan. In 2006, he took the prize by the head of Academic Committee at Center of Environmental Information Science. He is associated with National Parks Association, Tourism Research Association of Japan, International Haiku Association, Japan IFLA, and some other.

Yury Mironov is Doctor of Philosophy in Geology and Mineralogy (1996:TsNIGRI). He is Senior Researcher at the Vernadsky State Geological Museum of the Russian Academy of Sciences. His research interests include geodynamics and magmatism of active continental margins as well as imaging of geological objects and landscapes for exhibition.

Anastasia Petrova was graduated from the Faculty of History of the Lomonosov Moscow State University in 2004. From 2005 till now she is Postgraduate in the Institute for Oriental Studies of the Russian Academy of Sciences. Her research interests include history of the Orient and orientalistic.

Katsunori Furuya is Doctor of Philosophy (1991: the Chiba University). He is Associate professor at the Chiba University. His research interests are evaluating visitors' perceptions and relation with open-spaces.

Hajime Matsushima is Doctor of Philosophy in Agriculture (2002: the Hokkaido University). He is Associate professor at the Laboratory of Environmental Horticulture and Landscape Architecture of the Research Faculty of Agriculture of the Hokkaido University. His research interests are establishment of management methods for sustainable use of neighborhood nature, especially coastal and wetland areas, to conserve their environmental and recreational value.

Norimasa Takayama is Doctor of Philosophy in Agriculture (2007: the University of Tokyo). Now he is Researcher at the Forestry and Forest Products Research Institute (F.F.P.R.I.) in Tsukuba, Japan. His major interests are the forest scenery and effects of the forest therapy.

Walking trails in recreational and protected areas: an exploratory study of the tourist's perception of natural areas

Áurea Rodrigues, Elisabeth Kastenholz and Apolónia Rodrigues

Abstract — Nowadays, there is a growing demand for leisure, recreation and tourism activities in nature, with hiking being one of the most popular activities. Walking on a trail through nature, besides providing contact with nature, fruition and relaxation, also constitutes an effective way of interaction between men and nature that could awake an increased environmental awareness (Siqueira, 2004). However, tourists that visit natural areas are not a homogeneous segment (Wight, 2001). Specific motivations and personal characteristics make people look for natural areas with different desires. This understanding is very important for those responsible for the planning and management of natural areas. In this context there are two sides to be considered: supply and demand. One of the most efficient ways to manage flows of visitors in natural environments focuses on the careful design of walking trails. However, for that development to be planned and managed in a sustainable manner it is necessary to know the hikers' profile. This paper presents the results of an exploratory survey of Portuguese and foreign hikers in Portuguese natural areas of different landscapes. Differences between the national and international visitor group could be identified as far as environmental preferences and nature perception is concerned, implying differentiated destination marketing strategies for protected areas.

Index Terms — Hiking, destination marketing, visitor survey, market analysis, natural areas

1 Introduction

According to UNWTO [23] tourism has become a major economic sector since the second half of the twentieth century and all indicators show that it will continue growing in the years to come. The relevance of the sector is reflected not only by its economic impacts, but also by its consequences on a social, cultural and environmental level, namely by its potential to balance inter-regional development, to value and help preserve cultural and environmental heritage as well as to enhance the well-being of the local residents' population, aiming at a sustainable development of the destination.

The growth of tourism has led to a diversification of tourism products and destinations with increased demand for nature tourism. On the other hand, tourists are becoming increasingly sophisticated in their demands especially in terms of having meaningful experiences, including aspects of such as cultural authenticity, contacts with local communities and learning about fauna and flora, special ecosystems, natural life in general and its conservation. Hiking could be one of

Áurea Rodrigues, ISPGaya, Av dos Descobrimentos, 333, 4400-103 Santa Marinha, Vila Nova de Gaia, mail: aurea@netvisao.pt
Elisabeth Kastenholz, University of Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, mail: elisabethk@ua.pt.
Apolónia Rodrigues, Rede Europeia de Turismo de Aldeia, Genuineland, Rua de Aviz 90 | 7000 - 591 Évora, E-mail: genuineland@gmail.com.

the major activities that can be undertaken in a natural protected area. Consequently it is important for those responsible for the planning and management of natural areas to know the characteristics of hikers. This paper presents the results of an exploratory survey to Portuguese and foreign hikers in Portuguese natural areas with different landscapes in North, Central and Southern Portugal.

Most of the respondents prefer landscapes with water features. Comparing portuguese hikers with those of other nationalities we found some significant differences concerning their behaviour, environmental attitudes and behaviour in the holidays context. These results may contribute to the development of walking trails as touristic infra-estrutures within a perspective of sustainable management, based on the capacitiy of adaptation to the preferences of each group.

2 Protected areas and Hiking Tourism

In all parts of the world, people have developed ways to seek a balance between the interest of individuals and the larger interest of society. Many societies throughout history have recognized certain geographical areas of special importance and some have protected those areas against the abuse of individuals through religious sanction [15]. Since the nineteenth century the industrialized countries and governments began to set aside areas of particular scenic beauty or uniqueness exclusively for conservation [9].

During the 20th century, the world's protected areas increased from 5 to 200 million hectares, and today represent 12% of the total land area of the globe (UNEP-WCMC, 2005 in [9]). According to CBD (Convention on Biological Conservation) [31] a protected area is "a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives". But the definition of the IUCN World Commission on Protected Areas [30] is more precise with respect to what is protected: "An area of land and/ or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means". In practice, protected areas are managed for a wide variety of purposes which may include: scientific research, wilderness protection, preservation of species and ecosystems, maintenance of environmental services, protection of specific natural and cultural features, tourism and recreation, education, sustainable use of resources from natural ecosystems, and maintenance of cultural and traditional attributes.

According to Green and Pane [5] there are over 1,388 different terms known to be used around the world to designate protected areas, each of which is defined within respective national legislation with respect to its objectives and legal protection. Most of them have been marked off, interpreted, museumlized and labelled for touristy purposes and society. Many areas have become tourism products and had been sold as tourism attractions. Several studies [9], [6], [23], [29], [17], [32] state that the designation of protected area results in rapid increase in recreational use. Walking trails are a tool that can be used for managing the resulting visitor flows in natural areas.

This walking trail may be used in the context of leisure and recreation of the local population, but may also be considered part of a tourism product [14]. In this context it can be viewed as a relatively inexpensive infrastructure, which corresponds to the new or renewed trends in tourism demand.

The walking trail permits the tourist the development of an activity in direct contact with nature, thereby making it fit well into tourism forms based on nature as the main attraction, such as ecotourism. It may represent a challenge and thereby be integrated into adventure tourism. It may further permit direct contact with local communities and the existing heritage along the way and thereby be part of a cultural tourism offer.

The walking trail may thus complement other tourism activities and sustain the demand of tourism businesses, such as those

related to accommodation, restaurants, handicraft shops and enterprises offering sports or recreational activities. Tourism development around the hiking theme may correspondingly provide economic benefits for the local population, while simultaneously furthering the preservation of natural and cultural heritage, thereby fostering sustainable tourism principles. The number of pedestrians or hikers in Europe is relatively large. To name an example, about 30% of the Swedish population is used to walk through the forest and in the countryside and about 50% of the British also regularly walk in natural surroundings [13]. A study undertaken by Mintel [16] showed that the European market of adventure tourism is growing and that the core product being developed for this market in Europe is the walking trail or packages that include it as a main ingredient.

In Portugal hiking was first associated with the camping movement and has never assumed the relevance and popularity as in countries like France or Great Britain. The activity has been practised on a variety of trails, but it was only by 1997 that the first walking trail was officially registered in the country [4]. Portugal is actually a country where the "sun and beach" leisure and tourism activities prevail, but it also disposes of a series of nature resources that should be most adequate and interesting for hiking.

The discovery of this activity may actually, in a context of developing rural and natural destinations, represent a source of alternative income for the increasingly marginalized interior regions of the country, contributing to new dynamics and help to fix the young population, attracted to the more urbanized coastal zones. On the one hand, it may foster traditional trade in these areas, but also the development of companies developing recreational programs, restaurants and accommodation units. It may further be a source of direct employment and income, for example, through the employment of those responsible for designing, sing-posting and maintaining the trails, according to international norms, those who will undertake the fieldwork needed to study the landscape and existing resources to integrate into these trails. Once designed and conveniently prepared, the trails need to be promoted, good quality information must be produced (e.g. maps), and interpretation facilities and activities developed and continuously provided.

The walking trail- based tourism product may be viewed as a very complex and heterogeneous product, aggregating elements quite diverse in nature. For once, there are the before-mentioned more commercial aspects of supply. However, on the other hand, the relevance of the so-called "free goods" which are not commerciable, like the landscape, natural and cultural heritage elements integrated in these trails must be stressed, since these resources constitute the main part of the product. These are elements, the value of which is difficult to assess and many of which pertain both to the private and public sector. Correspondingly, they depend frequently on an effective cooperation between diverse entities, such as municipalities, associations and private economic agents. In this context, the development of a management process based on partnerships is most important.

Being the walking trail an infrastructure that may cause economic, socio-cultural and environmental impacts, it is further important to foresee and possibly avoid any potential negative impacts, trying to maximize the positive outcomes. Market studies and those focusing on the identification of carrying capacities may be relevant contributions to this concern. In the present article, a market analysis is presented focusing on both the national and international effective market attracted to walking trails in Portugal.

3 An exploratory study about pedestrianism in Portugal

In the context of an exploratory study, 300 questionnaires were administered in the following way: 100 "non-hiking" Portuguese, 100 Portuguese hikers and 100 hikers from other nationalities. However, in this paper we

focus on analyzing the profile, attitudes and behaviors of the hikers interviewed, trying to identify differences between the domestic and foreign visitors of Portuguese walking trails. For this purpose, respondents were interviewed on several walking trails located in geographical areas with different landscapes in the North, Center and South of the country, namely in the Gerês National Park (North Portugal), the Serra da Estrela Natural Park, São Jacinto, Buçaco, Arouca (Central Portugal) and in Borba (the Alentejo).

The questionnaire aimed at obtaining information concerning:

- The respondents' socio-demographic profile (nationality, district of residence, habitat, gender, level of education, occupation);
- The respondents' general holiday behavior (spread of holidays along the year, activities undertaken during the holidays) and general holiday motivation;
- The respondents' environmental preferences and ecological sensitivity;
- The respondents' behavior related to the specific hiking trip (motivation for hiking, main source of information for choosing a trail, main means of transportation, constitution of travelling group, organization of trip, accommodation, distance of walking trail, pattern of expenditure, important features for visiting a walking trail);
- As well as factors restraining respondents from hiking.

Responses were obtained from a survey, with direct administration of questionnaires at the presence of an interviewer. In an attempt to avoid biases there was a concern about diversifying the walking trails included in the approach, trying to interview all hikers that were encountered on specific days on these trails. The approach may thus be considered a cluster sampling procedure, with clusters defined by space and time, which may be considered an appropriate approach for sampling tourists and visitors, given the lack of prior statistical information about the universe under study [11].

The data was then analyzed with the statistical program SPSS (version 11.0). A univariate analysis was undertaken, analyzing distributions and indicators of central tendency (means and standard deviations), whenever possible. Bivariate analysis was also undertaken for identifying relations between variables, using the following techniques: the Chi-Square test, in case of nominal variables and the non-parametric test Mann-Whitney, in case of ordinal variables.

Apart from this, a principal components analysis was carried out in order to identify the underlying dimensions of a series of items used to measure environmental sensitivity.

3.1 Global survey results

Respondents present, globally, the following **socio-demographic characteristics**:

- **Gender**: approximately balanced distribution between men and women;
- **Age:** respondents were in their large majority situated in an age range of between 25 and 54 years;
- **Level of education:** 63% owned a title of higher education;
- **Occupation:** mostly top or mid management (29.3%), students (19.6%) or service and industry employees;
- **Place of residence of Portuguese hikers:** mainly Central Region (56%);
- **Nationality of foreign hikers**: basically Europe (98%), namely French (54%), Dutch (11%), German (9%) and English (9%);
- **Habitat:** 58.5 % live in cities.

The main **holiday motivation** indicated was "escaping daily life" (49.5%).

Respondents further referred to the following **general holiday behavior**:

- **months of holidays:** holidays were most frequently spent in the summer months;
- **week-end-breaks:** all along the year;

When hiking respondents reveal the following behavioral patterns:

- **Main motivations** are linked to the enjoyment of nature: "to observe and enjoy the beauty of the landscape", "to breath pure

air" e "to know and interpret nature in an involving way"

- Respondents base themselves on **informal information sources** for collecting data on walking trails, specifically "recommendations by friends and relatives";
- The main **means of transportation used** to travel to the walking path visited is the car (the own or a rented one);
- **Group constitution**: respondents tend to hike either with friends or in a couple;
- **Trip organization**: a large part of respondents did not undertake any previous planning of the hiking trip;
- **Accommodation**: hikers, staying overnight, reveal a preference for camping sites;
- **Pattern of expenditures:** large part of hikers spent some amount of money on the site visited, however to a limited degree, with expenditure levels being mainly "up to 10 euros" as well as varying between "10 and 25 euros" per day;
- **Distance of the visited trail**: respondents tend to prefer short-range walking routes (PR)
- **Factors motivating hiking on a specific trail**: hikers value particularly aspects such as: "quality and conservation of the landscape", "existence of information about the trail", "well-signed trail" and "silence".
- **Factors that may constitute an obstacle to using a specific walking trail**: the main aspects identified as potential obstacles were associated with safety, namely the items: "to walk through very dangerous places", "difficulty of assistance in case of accident" e "lack of security of the trail";
- **Factors that might be improved in a walking trail**: respondents revealed also in this dimension a large concern about the trail's safety, specifically reflected in the item "in case of disorientation or accident existence of control/ security"

Globally, respondents associated sensations such as serenity, relaxation, tranquility and fun with nature, revealing mostly positive feelings. However, some aspects revealed a more pronounced dispersion in answers, as in the case of associating enigma, suspense or even fear.

It was further possible to identify a factorial structure reflecting diverse dimensions of environmental perception, based on a Principal Components Analysis of the total of 300 responses to a series of 24 Likert-type scales, indicating diverse items of environmental perception, identified in literature about environmental psychology [20], [10].

References

[1] Gonçalves, J., Percursos Pedestres de Portugal – passo-a-passo, Federação Portuguesa de Campismo, Instituto Nacional do Desporto, Lisboa, 2002

[2] Green, M. and Paine, J., State of the world's protected areas at the end of the twentieth century, paper presented at "Protected Areas in the 21st Century: From Islands to Networks", Albany, Australia, Nov. 24-29, avaiable on line http: www.unep-wemw.org/protected_areas/albany.htm, (consulted in 1/06/08), 2007

[3] Hall, M, "World heritage, tourism and implementation : what appens after listing?", in Managing world heritage sites, A. Fyall and A. Leask, eds., pp. 18-32, Oxford: Butterwoth-Heinnemann, 2006

[4] Hill, M. M. e Hill, A., *Investigação por questionário*, Ed Sílabo, Lisboa, 2000

[5] ICEP, Turismo, indústria de futuro, in Informar (Portugal e o UEFA EURO 2004, uma vaga de oportunidades), ICEP, Portugal, 2004

[6] K. Ghimire; M. Pimbert and United Nations Research Institute for Social Development, *Social Change and Conservation*, Earthscan, 1997

[7] Kaplan, R., The Green Experience, in Humanscape: environments for people, Ed. Stephen Kaplan and Rachel Kaplan, University of Michigan, 1982

[8] Kastenholz, E., *The role and marketing implications of destination images on tourist behaviour: the case of Northern Portugal*, Dissertação de Doutoramento/ Universidade de Aveiro, umi dissertation service, 2002

[9] Kastenholz, E., "«Management of Demand» as a Tool in Sustainable Tourist Destination Development", in Journal of Sustainable Tourism, Vol 12 (5), pp.388-408, 2004

[10] Kouchener, F. and Lyard J., A valorização do turismo de passeio pedestre nos territórios rurais – Guia pedagógico sobre elaboração e execução de um projecto de passeio pedestre, Observatório Europeu LEADER/ AEIDL, 2000

[11] Lane, B. (1999) Trails and Tourism: the missing link – issues in partnering with the tourism Industry: A European perspective, avaiable on line http://www.americantrails.org/resources/economics/TourismUKecon.html (consulted in 10/06/03)
[12] McNeely, J.; Harrison, J and Dingwall, P., *Protecting nature: regional reviews of protected areas, 1992 , Caracas*, IUCN, 1994
[13] Mintel, "European Adventure Travel – special length focus", Travel and tourism analyst, October 2003, in Travel and Tourism Analyst, nº 5, Mintel, 2003
[14] Hall, M and Piggin, R., "Tourism Business Knowledge of World Heritage Sites: a New Zealand case study", International Journal of Tourism Research, Vol. 4, pp. 401-411, 2001
[15] Rambler's (2003) Walking in Great Britain in http://www.ramblers.org.uk, 2003
[16] Reinius, S. and Fredman, P., "Protected areas as attractions", *Annals of Tourism Research*, Vol 34 (4), pp 839-854, 2007
[17] Russel, James A. e Lanius, Ulrich F., "Adaptation Level and the Affective Appraisal of environments", *Journal of Environmental Psychology*, Vol 4, pp 119-135, 1984
[18] Serrão, L., *Trekking, Canyonning e Salto de Pontes*, Temas e Debates, Lda, Lisboa, 1997
[19] Solnit, R.(2000) Wanderlust: a history of walking, Penguin Books
[20] Weiler, S. and Seidl A., "What's In a Name? Extracting Econometric Drivers to Assess the Impact of National Park Designation", *Journal of Regional Science*, 44(2), 245-264., 2004
[21] Aaker, D. A.; Day G. S., *Marketing Research*, Fourth Edition, Wiley, 1990
[22] Bruzek, M., *Rapport d'activité 2002*, FFRP, 12/04/03, Paris, 2003
[23] Buckey, R., "The effects of World Heritage Listing on tourism to Australian national parks", *Journal of Sustainable Tourism*, Vol 12, pp. 70-84, 2004
[24] Chistie, M. and Matthews, J., The economic and social value of walking in England, in http://www.ramblers.org.uk, 2003
[25] WTO, *Sustainable Development of Tourism – facts and Figures* , in http://www.world-tourism.org , 2003
[26] Eagles, P; McCool, S. and Haynes, C., *Sustainable tourism in protected areas: Guidelines for planning and management*, UICN, 2002
[27] IUCN, *1993 United Nations Listo of National Parks and Protected Áreas*, IUCN, 1994
[28] Ravenel, R. and Redford, K., "Understanding IUCN Protected Area Categories", Natural Areas Journal, Vol. 25 (4), pp. 381-389, 2005
[29] Eagles, P. and McCool, S., *Tourism in National parks and Protected Areas*, 2002

Aurea Rodrigues is a Professor in Tourism at the Gaya Polytechnic Institute (Vila Nova de Gaia- Portugal). She holds a Degree in Tourism Management and Planning and a Master's Degree in Tourism Management and Development from the University of Aveiro and is at present lecturing at the ISPGaya, where she also coordinates the undergraduate programme in Tourism and also a PhD Student at University of Aveiro. Her research interests include rural, nature tourism, sustainable tourism, consumer behaviour in tourism..

Elisabeth Kastenholz is a Professor of Marketing and Tourism at the University of Aveiro (Portugal). She holds a Degree in Tourism Management and Planning from the University of Aveiro, an MBA from the University of Oporto and a Doctoral Degree in Tourism, also from the University of Aveiro. Her research interests include rural, nature and sustainable tourism, tourism destination marketing and consumer behaviour in tourism. She is at present the coordinator of the undergraduate programme in tourism at the University of Aveiro.

Apolónia Rodrigues is Coordinator of the European Network of Village Tourism | Genuineland and National Expert of Sustainability at the TSG, DG Enter, European Commission. She holds a Degree in Tourism Management and Planning from the University of Aveiro. Her research interests include networks, rural, nature tourism and sustainable tourism.

MMV4 PROCEEDINGS
POLICY

What do people want in National Landscapes

Martin Goossen

Abstract — The European Landscape Convention (ELC) is the first European Treaty that is aimed specifically at the landscape. The aims of this Convention are to promote landscape protection, management and planning. A main point is that the landscape contributes to the shaping of local cultures. Landscape is a basic component of European nature and cultural heritage. Landscape contributes to the well-being of people and the strengthening of the European identity. This produces everyone rights and responsibilities for protection, management and planning of the landscape. The ELC promotes the involvement of citizens at "their" landscape and stimulates the regional and national governments in Europe to create good conditions for the development and the management of the landscape. The ELC cover all landscapes, urban or rural, nicely or ugly. On the 10th of June 2005 the Dutch minister of Agriculture, Nature and Food quality announced that The Netherlands will ratify the European Landscape Convention. The Dutch landscape policy has been renewed and is entirely in line with this Convention. There are 20 National Landscapes in the Netherlands, which cover approx. 25% of the surface. In the Netherlands important spatial changes are in preparation, varying from new house construction projects to catching the impact of climate change. So involvement of citizens is very important. Therefore the government was interested in the opinion of inhabitants of these National Landscapes, and what their attitude is and what their preferences are. An on-line research with 4000 respondents was carried out to give the answers. The most important result is that the inhabitants agree with the policy. Their attitude is that (economic) development must continue, but with great care of the typical characteristics of the landscape. The preferences depend on the different recreation motives, but the desire for nature development is very popular.

Index Terms — European Landscape Convention, protection, policy, Netherlands.

Martin Goossen is Senior researcher recreation and tourism, Alterra, Wageningen University and Research centre The Netherlands, Email: Martin.goossen@wur.nl.

The European Charter for Sustainable Tourism (ECST) integrated with other voluntary tools can facilitate a more effective tourism management in Natural Parks

Lucia Naviglio

Abstract —The European Charter for Sustainable Tourism (ECST), promoted by Europarc in EU protected areas, considers the natural resources conservation as the reason for tourist attractiveness and tourism economy. The main goal is to create a network between public and private subjects in order to individuate and to promote new sustainable tourism offers and to define common, shared, strategies and action plans able to improve local economy preserving natural resources. The ECST implementation can be improved by using procedures and approaches typical of other voluntary tools like ISO 14001/EMAS and Local Agenda 21 (LA21). In particular, the environmental analysis should be more addressed to the existing relationships between pressures produced by tourism and other human activities and the state of the environment (the DPSIR scheme proposed by EEA could be useful for that). A evaluation of criticisms and a rank of priorities should be introduced in the process (as in ISO 14001) and local stakeholders involvement can be referred to LA21. ISO 14001/EMAS should provide references also for monitoring plans and for the management of procedures aimed at using the "park logo" (http://qualitypark.casaccia.enea.it) as award for best practices.

Index Terms — sustainable tourism, protected areas, voluntary tools, public/private shared strategies

1 Introduction

Tourism fluxes in Natural Parks and, generally, in areas with high ecological values, can strongly affect the environmental quality and biodiversity. Tools able to promote tourism and to control its pressures at the same time could be useful for an effective territorial management.

Voluntary tools for sustainability are those standards, methods and approaches which can be followed by private or public subjects in order to improve the environmental performances and, as a consequence, the environmental quality. They help to go beyond the requirements of the international and national laws and to spread sustainable behaviours.

The European Charter for Sustainable Tourism (ECTS), promoted by Europarc, the Federation of European protected areas, is a specific voluntary tool created for managing tourism fluxes in natural parks. Other tools useful for tourism management are 1) the international standard ISO 14001 which introduces the Environmental Management System (EMS), 2) the European regulation EMAS (761/2001/CEE – Environmental Management and Audit Scheme

L. Naviglio is with the National Agency for New Technologies, Energy and Environment (ENEA), Casaccia Research Centre, Via Anguillarese 301, 00123 ROMA, Italy.
E-mail lucia.naviglio@casacccia.enea.it.

- which uses the ISO 14001 as system), and 3) Local Agenda 21 (LA21).

All of them have common items: a general statement (strategy, policy) as starting point, to stress the importance of communication, to ask for training (in order to improve quality in management, service and products), to require a final plan for actions (named "Environmental Programme" in ISO 14001 and EMAS, "Plan for sustainable tourism" in ECTS and "Plan for local actions" in LA21) and to promote awareness and involvement of local stakeholders, in order to share strategies and plan for actions between public and private subjects.

Some are more "strategic" tools, like LA21 or ECST, because they ask public or private organisations to achieve a stated objective, like sustainable tourism (ECST) or the improvement of the environment condition and human life quality (LA21), without giving specific procedures. ISO 14001 and EMAS are more "operational" explaining how to reach the stated goals and listing the requirements to be followed according a "process" approach

2 VOLUNTARY TOOLS SIMILARITIES AND DIFFERENCES

The European Charter for Sustainable Tourism (ECST) is the application of the World Charter for Sustainable Tourism, established in Lanzarote in 1995, to protected areas in order to produce an effective and sustainable tourism management. The core of the Charter is a *Strategy* for sustainable tourism shared with local stakeholders (mainly tourism operators) and a common *Plan for Action* based on the results of an analysis of the environmental and tourism constraints and opportunities. The ECST requires a stakeholder participation but do not clearly ask the establishment of a Forum organised according stated procedures. Moreover, the ECST does not give a clear method for the analysis of the relationships between the state of the environment and tourism, the assessment of priorities and on how effectively manage actions and processes.

The EMS, being an operational tool, strengths very much the "process approach". An evaluation of the environmental analysis results is required in order to check the "significance" of the environmental impacts and of the "environmental aspects": pressures on the environment originated by the human activities. The EMS allows an organisation to have a list of priorities useful for individuating the short- and long-term targets and objectives to include in the *Environmental Programme.* It facilitates also the individuation of the steps the organisation must undertake in order to improve its environmental performances. Unfortunately no specific, common methods for the environmental analysis and for the evaluation procedure are proposed by ISO 14001 and EMAS regulation.

LA 21 stresses the importance of sharing common principles (the Aalborg Charter) and a plan for action with local stakeholders. The Forum is the place where public and private organisations discuss and share policies and objectives. LA21 is based on the results of an environmental analysis too. The major problem affecting LA21 effectiveness is that no criticisms assessment is required and often the list of priorities is established by the Forum participants independently from the environment analysis results. Another problem is that A21 does not require procedures for monitoring the activities effectiveness and the Plan for Action results. Therefore, many organisations which approached sustainability tools, implemented an EMS after LA21 in order to better manage the process. The Forum and stakeholder involvement is a very interesting step of LA21. It can be useful in the EMS implementation too, for obtaining more effective results, mainly if applied to a public administration like a Park organisation.

Figure 1 shows as the implementation of all those tools follows similar steps: after a statement of the general objective (strategy, policy), each tool requires an analysis of the state of the environment and human pressures (specially focussed to tourism in

ECST), then specific objectives have to be individuated and a Plan for Action useful to achieve results has to be stated.

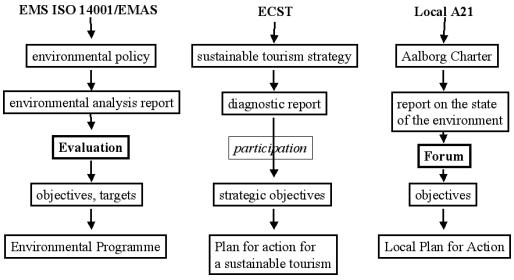


Fig. 1 Comparison of the different steps needed for the implementation of some voluntary tools

Many other volunteer tools were developed in order to promote sustainability.

All of them can be integrated and if a good environmental/economic analysis is undertaken from the beginning it is easier, for an organisation, to get benefit from their implementation.

3 OPPORTUNITIES FOR ECST INTEGRATION WITH ELEMENTS OF OTHER TOOLS

As introduced, ECST is a specific tool for improving relationships between tourism and environment conservation in protected areas. Its implementation can take advantage by the integration with elements of the other cited tools because each one has its own specificity.

ENEA carried out experiences on voluntary tools implementation undertaking specific researches on methods useful to improve the effectiveness of the environmental analysis, the evaluation of criticisms and listing of priorities, the stakeholder involvement through a Forum and how to find a way to "award" those people carrying on best practices useful to the environmental quality improvement [1], [2], [3], [4], [5], [6], [7], [8]., [9], [10].

The project "qualitypark" was specific on that: http://qualitypark.casaccia.enea.it .

The project Archicharter introduced a first attempt to integrate the ECST with other tools: http://infosig3.frascati.enea.it/archicharter.

3.1 The DPSIR scheme and the environmental analysis

The environmental and socio-economic criticisms assessment must start from the analysis of the relationships between the state of the environment and human pressures. The negative impact exists only if pressures overcome the environment carrying capacity. The DPSIR scheme (Driving forces, Pressures, State, Impact, Responses) is a logic scheme proposed by the European Environmental Agency for the environmental analysis and reporting and can help to improve the environmental analysis quality.

The ENEA's experiences demonstrated the utility of using the DPSIR scheme (Figure 2) for an effective analysis of the ecological and socio-economic conditions and for individuating indicators useful to be related among them, in order to monitor the results of the Plan for Actions implementation.

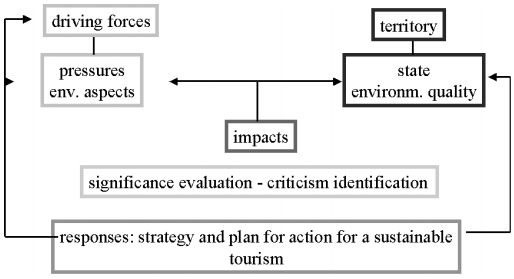


Fig. 2 The DPSIR scheme and the relation among the different steps

A matrix relating the "environmental aspects" of the human activities with the environmental condition (natural and socio-economic resources) allows to better individuate the real impacts and their origins.

The initiatives, projects, plan for actions included in the management plans (Envi-

ronmental programmes, Plans for Actions) of the protected area's organisations are the "responses" forwarded to overcome the environmental criticisms.

In order to obtain real results they have to be strictly related to the existing impacts and to their importance (list of priorities). The existing impacts can be measured on the basis of the "state of the environment" analysis, both from the naturalistic and socio-economic point of view. Any driving force (ex. tourism, agriculture, forestry, urbanisation etc.) has its "environmental aspect". They are the processes of an activity which influence the state of the environment with its pressures.

After making a theoretical matrix with the relationships between driving forces and their environmental aspects (measured with performance indicators), it is possible to individuate "who" is responsible for the major ecological (or social) problems. The use of this scheme allows: to avoid useless descriptions and analyses not being strictly related with the existing problems, to avoid a lot of data not related among them and to find useful indicators to be included in the monitoring plans.

3.2 The priorities assessment and monitoring

The Responses of the DPSIR scheme can be addressed to the improvement of the environmental quality (restoration, habitat management etc.), to changes of driving force (ex, changing agriculture from intensive to extensive) or to a decrease of pressures thanks to better environmental performances.

The effectiveness of the responses depends on the "significance" evaluation and criticism identification according an importance rank (priorities).

Many experiences exist of evaluation of the environmental aspects of a private company; the evaluation becomes much more complicated when it is necessary to take into account not only the "direct aspects", that means the activities undertaken by an organisation directly affecting the environmental quality, but also the "indirect aspects", that are the whole pressures coming from all the other human activities affecting the territory quality.

This is the core problem when a voluntary tool is applied to an organisation responsible of the landscape and ecosystems quality.

In fact, a public organisation like a Park administration can not be responsible of all pressures exerted on the environment and can not directly modify pressures produced by other organisations and companies, ex. tourism companies.

Therefore, a method able to evaluate the entity and priorities of pressures produced by all human activities (tourism, agriculture etc.) must be included in the evaluation processes in order to identify those subjects which are responsible of the major problems and must be involved in common strategies and programs of environmental quality improvement.

The application of the DPSIR scheme and the priorities assessment allows also to identify the more important indicators to introduce in the monitoring programs in order to check the success of the Plan for Actions.

3.3 Stakeholders involvement and the "Park logo" as award to best practices

The stakeholder involvement for sharing strategies and policies or plan for actions is not an easy process and must be linked to a mechanism of "award".

In fact, the involvement of already aware and sensitive people is not enough for obtaining good results and more and more subjects must be interested, trained and made aware.

To give value to those people co-operating and contributing to the environmental improvement with best practices is important for attracting more and more subjects and have the opportunity to involve them. This process can be obtained using the protected area's label as "award" to people "making something in the same direction of the protected area's policy". They can be considered "environmental quality providers" and the requirements needed for obtaining the award must

be decided and shared together, in a Forum.

For the success of this process it is essential that the award management follows the "quality rules" and is managed according transparent and clear procedures, like in an environmental management system. In a short time many people can be awarded with the Park label and a competition mechanism can afford very good results.

4 Conclusion

The integration of ECST with procedures and principles of the EMS and LA21 can improve its implementation and obtain a more effective management of tourism and environment (natural and socio-economic).

Experiences of integration of ECST, EMS and LA21 and the use of the DPSIR scheme in environmental analyses were successfully undertaken by ENEA.

The complexity and the variability of situations require more applications in order to spread the method and give value to environmental analyses and to criticisms and priorities assessment.

The explained approach should allow public administrations to save money avoiding environmental analyses duplication.

More experiences in different environmental and socio-economic conditions should be useful in order to obtain more appropriate indicators and to further validate the method integrating the Charter with other voluntary tools.

References

[1] Naviglio. F. Bruzzesi, S. Paci, G.L. Rossi, S. Sibilio, S. Rigoldi, D. Pernigotti, A. Volpato, S. Busatta, P. Pellizzari, G. Pensiero, M. Conti and S. Pia, "Applicare la norma UNI EN ISO 14001 nelle aree protette". *UNI, Gestione Ambientale, Linea Guida 1*, pp. 1-108, 2001

[2] L. Naviglio, "Italian experiment in using ISO 14001 to promote sustainable development protected areas", *ISO Management System*, ISO (3-4), pp. 41-44, 2003

[3] L. Naviglio, "The use of ISO 14001 Standard to Promote Sustainable Development in Protected Area: an Italian Experience" in *Culture and Science of Mountains*, Editor Lestari, Kuala Lumpur, Malaysia, pp. 207-212, 2003

[4] L. Naviglio and E. Martini, 2004 – Il Comune di Acquapendente, la Riserva di Monte Rufeno e la Carta Europea per il Turismo Durevole. Parchi (43), pp. 33-40, 2004

[5] L.. Naviglio and M. Castorina, " Indicatori per il sistema di gestione ambientale di un ente territoriale. *Proceedings of the meeting of the "Associazione Analisti Ambientali"*, November 14 2003, Roma: 54-59, 2005

[6] L. Naviglio "Sustainable management of protected areas could be more effective with an integrated methodological approach of voluntary tools", *Proceedings of the International Conference on Environmental Management, Engineering, Planning and Economics*. Skiathos (GR), June 24-28, 2007:, pp. 1495-1500, 2007

[7] L. Naviglio, "I Gruppi di Azione Locale e le opportunità rappresentate dalla certificazione ambientale", *Quaderni INEA*, pp. 85-152, 2007

[8] L. Naviglio, "La gestione integrata del territorio e il contributo degli strumenti volontari per la sostenibilità", *De Qualitate* (4), pp. 28-33, 2007

[9] D. Boschi, L. Naviglio L. and S. Paci "La valutazione della significatività degli aspetti ambientali negli studi riguardanti enti territoriali ed imprese", *De Qualitate* (12), pp. 82-95, 2008

[10] L. Naviglio and M. Solinas "Turismo, aree protette e marchi: come e quando il "Marchio del Parco (o Emblema del Parco) può contribuire al Turismo Sostenibile", *De Qualitate* (4), pp. 79-95, 2008

L. Naviglio: with a degree in Natural Sciences in 1971, the Author worked in the Rome University (1971-1977), in the Abruzzo National Park (1971-1986) and in ENEA (1986 up to now) as a researcher, project manager and director of operational units in the field of applied ecology, environmental analyses and assessment, environment and biodiversity conservation, promotion of voluntary tools for nature protection and sustainable management of protected areas; she published around 152 didactic and scientific papers and made around 218 presentations in courses, seminars, congresses, etc.

Green strategies against increased land consumption in Germany

Ulrike Pröbstl, Wolfgang Rid

Abstract — Excessive land consumption is one of the more serious threats to the environment in Germany. Each day about 110 ha of cultural landscape are transformed to roads or settlement. This paper focus on two "green" strategies devised to address this issue: 1) the mandatory obligation to compensate for each impact, and 2) the opportunity to involve private house buyers in order to achieve more density. It is shown that the obligation to compensate has a significant effect on land consumption. The involvement of private home buyers via a multi-attribute survey demonstrates that green spaces and social infrastructure are crucial elements when considering less consumptive development alternatives. Therefore, the traditional planning tools, which are mostly reactive, should be expanded to include conservation strategies and state-of-the-art social science methods to explore the demand for non-existing developments and to influence the future market.

Index Terms — Land consumption, compensation measures, open space, new concepts for urban green.

1 Introduction

Each day about 110 ha of cultural landscape in Germany are transformed into roads or settlements. Since 1992 about 430 km² of land have been converted in this manner annually. This imense land consumption is one of the most severe threats to the environment in Germany as well as in other European countries.

Several strategies have been proposed to combat the problem:
- to consider the topic in regional and master planning processes,
- to reduce land consumption by converting former industrial or military zones, and
- to develop new concepts of intercommunal cooperation.

These ideas also represent the main approaches by the responsible German authorities for housing and development (see [1], [2]).

This paper will discuss two "green" strategies devised to address the issue of land conversion in the field of housing development:
- the mandatory obligation to compensate each impact, and
- the opportunity to investigate the preferences of private house buyers.

2 Possible new stragegies

2.1 The effects of compensation

In 1998 the federal German building code was amended to include mitigation and compensation for land consumption due to housing development. The options for compensation were designed in an adaptable manner, and each state implemented this legal requirement differently. Using the State of Bavaria

U. Pröbstl is with the BOKU-University, (University of natural ressources and applied life sciences),Vienna, Austria, Institute for Landscape Development, Recreation and Conservation Planning. Peter Jordanstr. 82, 1190 Vienna E-mail: ulrike.proebstl@ boku.ac.at.
W. Rid is with the Department of Architecture, Technical University Munich, Germany
E-mail: W_Rid@yahoo.de.

as a case study, where the strategy has been applied for the past eight years, I will investigate whether this legal instrument and the local adaptation actually achieve the goal of reducing land consumption.

2.2 Involvement of private house buyers

A second possible strategy can be built on the analysis of the decision making behaviour of private house buyers in order to influence the market. The discussion of this strategy is based on a recent study ([3], [4]), which included a large questionnaire and covered ecological, social and economic dimensions.

3 RESULTS

In the following the statistics of the land consumption across Bavaria is presented. In addition to the new regulations on compensation, the Bavarian Ministry on Housing and the Ministry on Environment, as well as the Bavarian associations of municipalities and communities jointly initiated a communication campaign in order to increase the acceptance of a new guideline on compensation and to improve awareness about increasing land consumption. An evaluation of the implementation strategy of the new guideline on compensation measures revealed that it was implemented correctly ([5]).

Figure 1 shows that the Bavarian regulation on compensation was successful and had – compared to other German states

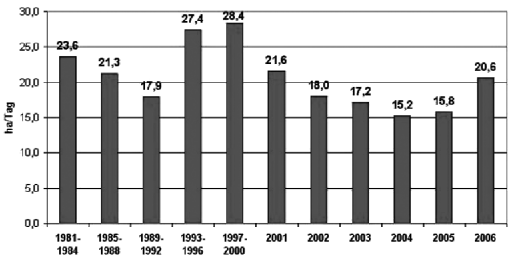


Fig. 1. Development of land consumption in Bavaria (ha/day). [5]

Attribute	Status Quo	Scenario 1: „High Density“			Scenario 2: „High Density and high Quality of Green Space“			Scenario 3: „High Density and high Quality of Green Space and Center for local supply.“		
Density	Low Density	High Density			High Density			High Density		
Quality of green space	Low quality	Low quality			High quality			High quality		
Center	No center	No center			No center			Center for local supply		
Infrastructure	Privat car park	Parking lot			Parking lot			Parking lot		
Public transport	Good and frequent connection	Good and frequent connection			Good and frequent connection			Good and frequent connection		
Technical Infrastructure for Resource Protection	given	given			given			given		
Social Mix	Low social Mix	Social Mix given			Social Mix given			Social Mix given		
Costs	Higher Costs than Scenario 1-3	Lower Costs that Status Quo			Lower Costs that Status Quo			Lower Costs that Status Quo		
Market share of Szenario:		**SQ**	**Sz. 1**	**N/N**	**SQ**	**Sz. 2**	**N/N**	**SQ**	**Sz. 3**	**N/N**
„environmental friendly“ Respondent:		3 %	91 %	6 %	3 %	92 %	5 %	1 %	97 %	2 %
„non environmental friendly“ Respondent:		51 %	28 %	11 %	44 %	47 %	9 %	42 %	49 %	9 %
All Respondents:		41 %	49 %	10 %	36 %	55 %	9 %	34 %	59 %	7 %

Explication: „SQ“ means „Status Quo-“, „Sz.“ means „Scenario“ and „N/N“ means „neither-nor-Alternative“

Fig.2. DSS Analysis of the different scenarios compared with the Status Quo

– the desired effect. Land consumption was reduced from 28,4ha per day from 2000 to 15,8ha in 2005; it seems to increase again thereafter. The reduction was observed immediately after the introduction of the new regulation on compensation measures in the year 2000.

The trends in figure 1 led to the impression that the communities became partly accustomed to the compensation and that therefore the reduction of land consumption is now not as strong as it was initially.

A detailed analysis [6] of the land consumption shows that it is not directly linked to population growth. While the land consumption increased from 1980 to 2006 to 40%, the population growth for the same period was only about 14%. Complex socio-demographic and societal reasons were cited as reasons by governmental bodies [6].

Consequently research was undertaken on the societal background to these trends, in order to see how they could be influenced.

It turned out, that the majority of private home buyers is still dreaming of a detached house. Almost 90 % of the respondents who wish to purchase residential property in rural or sub-urban regions would like to buy or build a single family house rather than live in an appartment.

The study used a discrete choice experiment to investigate the preference of potential home buyers for a wide range of possible planning scenarios. These options described

more sustainable forms of housing development in which densities would still be acceptable to respondents. The resulting decision support system (see fig.2) showed that a dense type of settlement would only be accepted if private gardens and green spaces around the buildings are maximized.

Secondly, the implementation of a local small neighbourhood centre in close proximity to new homes is another strong attraction for denser built-up spaces instead of detached house developments. A high level of interest also exits for cost effective, environmental friendly new technology, which can be achieved easier in cooperation with neighbours in closer proximity.

4 Conclusion

Four main strategies have been presented to reduce land consumption. Regional planning and communal master planning have traditionally served as key instruments for directing land consumption in Germany. However, these instruments do not react easily to societal trends, and are hardly used in a forward-looking strategic manner. Since intercommunal cooperation is only helpful to create joint industrial zones and the amount of convertible land is quite limited, the effects of all these strategies are confined.

Therefore new strategies must be explored to include latent demands for fundamentally new development alternatives. The paper also shows that instruments of nature conservation as well as green building concepts may influence these issues significantly. Compensation leads to reduced land consumption, and building codes which include attractive green spaces improve the acceptance of denser built environments. Communities and developers will not succeed with new housing concepts unless they take the interests of their future residents into account. Among them, the role of green spaces such as small parks and other forms of public green play a major role.

References

[1] C. Hillenbrand, “Wege zu einer intelligenten Flächennutzung” Fachtagung vom 25.4.2006,

[2] Bundesamt für Bauwesen und Raumordnung in Kooperation mit dem Umweltbundesamt und dem Projektträger Jülich (eds.), *Mehrwert für Mensch und Stadt. Flächenrecycling in Stadtumbauregionen* Strategien innovative Instrumente und Perspektiven für das Flächenrecyling und die städtebauliche Erneuerung. Saxonia, Freiberg, 2006.

[3] W. Rid, U. Pröbstl, W. Haider, *discrete choice Experiment unter Verwendung von 3D-Visualisierungen: Ein Ansatz zur Analyse von Präferenzstrukturen privater Bauherrn hinsichtlich Themen der zukunftsfähigen Siedlungsplanung, 2005,* in: http://www.corp.at/html/corp2005_papers.html#RR

[4] W. Rid, 2008, *Analyse von Präferenzstrukturen privater Bauleute im Hinblick auf nachhaltige Siedlungskonzepte unter Verwendung eines discrete choice experiment*, Dissertation at the institute for landscape ecology, Technical University Munich

[5] U. Pröbstl, P. Schölzke, P., M., Schneider, (2007): Zur Wirksamkeit von Leitfäden - Anspruch und Wirksamkeit. In: Naturschutz und Landschaftsplanung, 39 (5)2007, 138-142; ISSN 1437-0220

[6] http://www.stmugv.bayern.de/umwelt/boden/flaechensparen/daten_flaechverbr.htm (accessed at the 25.7.2008)

Ulrike Pröbstl studied landscape planning in Munich, Germany. After her PhD in forestry in 1988 she was the director of a planning and research office in Germany. After her habilitation at the Technical University in Munich in 2000 she received the call to the new Chair in Landscape Development Recreation and Tourism at the BOKU University in Vienna, Austria. She is member of several national and international professional bodies. She published 6 books and more than 20 papers; current research interests deal with conservation planning, landscape development, adaptation to climate change, and nature based tourism.

Wolfgang Rid studied geography in Munich, Germany. He finalized his PhD 2008 at the Technical University in Munich. He is working there in several research projects. His current research interests include landscape development, sustainable city planning and adaptation to climate change.

Urban greens for recreation, outdoor activities and nature experience

Stefan Türk

Abstract — A modern management of recreational areas for communities should be understood as a useful planning tool. Only an active management of such natural areas nearby settlements, used for outdoor and recreational sports and nature experiences, will fulfill long-term recreation planning in communities and will yield in an increasing quality of life and environmental issues for its habitants. However an integrated concept is needed, which means all categories of recreational issues have to be brought together throughout all departments in a reasonable way. That accounts for all communities independent of its size and structure. Management of recreational areas is not a further inconvenient development planning tool; it is an effective instrument for advancing natural orientated recreational areas.

Index Terms — Urban greens, management concepts, guidelines.

1 Introduction

Most of our urban greens are areas for sportive or recreational activities for people at all times and seasons. But generally, they were not planned or developed for these activity forms, even if they are used preferentially in this way. Mainly in densely populated areas the intensive use of greens will cause ecological stresses by direct or indirect damages. Regarding the value of urban greens (table 1) it becomes more and more important both to protect the nature and to ensure recreation activities in the same area of urban green.

But who is responsible for these processes of planning or development? Is it the municipal department of sport, the department of nature conservation, or the department of urban development? To overcome these inhibitions of segmentation in the public administration, towns and municipalities have to look for adequate concepts to develop their greens and open spaces.

TABLE 1

What is the Value of Urban Greens?

ecological aspects
- habitat of animals and plants
- melioration of bio-climate, e.g. filtering of air pollutants and respirable dusts, optimizing humidity, balancing temperature, etc.
- generation of groundwater

economical aspects
- appreciation of the business location
- increasing of the local or regional image
- contribution to the health care of the inhabitants

social aspects
- increasing quality of life
- precision of environmental awareness
- nature experiences
- positive cultural development

Stefan Türk is employed at the Institute of Outdoor Sports and Environmental Science, German Sports University Cologne. D-50933 Köln. E-mail: tuerk@dshs-koeln.de

2 BUILDING BLOCKS FOR A MANAGEMENT OF RECREATIONAL AREAS

2.1 Political framework for action

Local affairs are the basement for the public administration. The political framework for action is responsible for all the planning and construction processes in urban greens. It will be necessary to install a coordination office, to which deputies of all involved administration departments belong. The coordination office controls the planning processes, develops aims, targets, and new strategies, balances offers and demands, and controls the success.

In public administrations three different types of coordination offices exist, each whith its own pros and cons. 1) Most of the administrations prefer the task force type. The work in teams is well established, and the flexibility in structure and composition is very attractive. But often the frequency of meetings is not high enough or there are too many topics to handle with. 2) Another type is found in the network. In any order expandable and flexible, it must be directed and controlled very intensively. 3) At last only in some administrations separate departments exist. Such departments are able to handle also extensive processes and optimize the planned operations. But to build up a separate department structure is expensive in time and money.

2.2 Stock and need

An effective management needs data. By the analysis of stock and need a lot of information about sports, activities and recreation on urban greens will be sampled (table 2). For the data collection, which is normally done by specialized independent, freelancing consultants, different sampling methods are useful. Studies of the behaviour of sportsmen are well done by interrogation. Also by direct measurements, e.g. personal counting, counting via infrared camera or video, or at turnstiles and gates significant results will be obtained. Another possibility is the use of drones, resulting in impressive video analysis of visitors flow and behaviour. Within the interpretation of these data ratings for a future development are possible.

TABLE 2

SPORTS WITHOUT ARENAS

- more than 70% of all sports activities will be self organized and done without being sports club member
- nearly 50% of the costumers of activity and recreation areas do not visit sport arenas or fields anymore
- traditional reason for sports as success, competition, effort will be displaced by fun, health and experience

For an ideal case all the data will be collected and offered in a digital information system of areas for activity and recreation for the whole administration. Urban green information systems are a special type of geographical information systems, and combine sociological data with the environmental ones. Sustainable development processes, e.g. for trails or recreation sites, can be simulated, possible conflict areas can be defined, costs for building and maintenance can be calculated. And last but not least this type of information system is very useful in public relations.

2.3 Offer

No space for recreation and sportive activity is like another. That means that the following questions must be answered for the development of attractive offers: Which demands will people really have on future areas for activity and recreation? Is it possible to balance different interests on the same area or space? Where and how a municipal administration can realise these demands? Answering these questions different criteria for urban greens are of interest: 1. the site, which e.g. means reachability, catchment area, site development, structure and dimensions,

natural cover, etc.; 2. psychosocial aspects as open or hidden spaces, public or non public places, visible marks of different user groups; 3. environmental factors, e.g. emissions or pollution by noise, chemical concentrations, etc. 4. rights of private or public properties within leasing or renting, agreements and contracts, regulations by law; and 5. the declared aims of the urban development.

Based on these criteria the local affairs must result in precise strategies and guidelines. In this context it is a matter of fact that the customers satisfaction depends on the frequency and variety of the experiences, which the offers allow. The attractiveness is strongly correlated to the realised ideas and infrastructure. Well used areas offer modern trail concepts or typified playing grounds for all the demanded activities. That range from walking trails over climbing trees in a park to an open air fitness course. By being active in urban greens the experience of nature and landscape plays an important role. But it is not the ecological value, it is more the experience of seasons and weather. And especially large greens stimulate the sense of their visitors in a unique way because they are in contrast to the settlement.

It is elementary that the costumer feels himself comfortable staying in an activity area. Therefore, it is necessary to regard the psychological needs, as sites for resting, silence, facilities, the social needs as meeting points, look around, and at last the security demands as actual routing and maps, illuminated trails.

2.4 Realisation and further development

The core of the realisation is a catalogue of measures to achieve the declared aims (table 3). This catalogue must be specific to every town or municipality.

Each target group needs its own strategies. And it is necessary to know as much as possible about the requirements of the activity areas of the target groups. Basically it could be shown that independent of the activity form the following points must be regarded to minimise conflicts: a) a good sign posting for orientation, b) an in time maintenance of trails and grounds, c) a participation of users during the planning procedures, d) defined rules of liability, and e) the regulation of traffic, especially car-traffic crossing the urban greens.

TABLE 3

THE AIMS OF THE MANAGEMENT CONCEPT

short term
◆ better and intensive communications within the administration
◆ grouping relevant information for planning and development
◆ detecting of local deficiencies in planning and development
medium term
◆ generation of sustainable offers for activities and recreation in order to the real demand
◆ optimizing the urban greens for recreation as well as for nature conservation
◆ continuous optimizing and upgrading of the functions of urban greens
long term
◆ increasing the quality of life for inhabitants
◆ increasing the effiency of planning processes
◆ reducing the administrations costs

To solve problems or conflicts while building up activity and recreation areas sometimes only a small and single step has to be done, other times it results in a huge project of town development. Often models are helpful to generate attractive spaces for activity and recreation.

2.5 Monitoring and evaluation

A continuous optimizing and upgrading of the quality of the areas of activity and recreation can be realised using the PLAN-DO-CHECK-ACT-circle. In detail the contents of Plan-Do-Check are listed in 2.1 to 2.4. In consequence the phase of ACT results

in controlling the former phases to confirm the success or uncover lacks. Clearly documented conflicts and problems as well as positive effects are of an important role in order of their relevance for further development.

TABLE 4

THE BENEFIT OF A MANAGEMENT SYSTEM FOR ACTIVITY AND RECREATION AREAS

- the communication within the departments of the administration will be more effective
- decision making will be faster and secure in case of the optimized data base
- administration expenses will be optimized while costs will be reduced and quality increased
- conflicts will be solved earlier or avoided
- information will be more believable

Only by an early monitoring process it will be possible to prevent and counteract aberrations; and to give details for improvements and mending. Sustainable strategies need such instruments of evaluation and quality management. And then the proposed management system for activity and recreation areas will work and the benefits became perceptible for both the administration and the costumer (table 4).

REFERENCES

[1] H. Kretschmer, "Naturorientierte Bewegungsaktivitäten im urbanen Raum. Ein Beitrag zur Planung von siedlungsnahen Erholungsflächen." Dissertation, Deutsche Sporthochschule Köln. 162 P. http://zb-sport.dshs-koeln.de/Dissertationen/2007/ Holger-Kretschmer.html 2007

[2] R. Roth, S. Türk, H. Kretschmer, F. Armbruster, and G. Klos, "Menschen bewegen – Grünflächen entwickeln. Ein Handlungskonzept für das Management von Bewegungsräumen in der Stadt. Bundesamt für Naturschutz 54 P., 2008

[3] R. Roth, S. Türk, H. Kretschmer, and G. Klos, "Siedlungsnahe Flächen für Erholung, Natursport und Naturerlebnis. *Naturschutz und Biologische Vielfalt NaBiV.* Bonn, Heft 51, 112 P. 2008

[4] R. Roth, and S. Türk, "Move people – develop green spaces". In: R. Roth, and E. Jakob, (editors). Congress Report "Environment, Conservation and Sport in Dialogue". Biodiversity and Sport – Prospects of Sustainable Development. 4th Congress at the German Sport University Cologne on 4 and 5 March 2008. Institute of Outdoor Sports and Environmental Science, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Federal Agency for Nature Conservation (Publishers): Series "Outdoor Sports and Environmental Science" Vol. 23 (ISSN 1612-2437) pp. 63-67. 2008.

[5] S. Türk, "Sustainable development of sports and exercise areas". In: R. Roth, and E. Jakob (editors). Congress Report "Environment, Conservation and Sport in Dialogue". Biodiversity and Sport – Prospects of Sustainable Development. 4th Congress at the German Sport University Cologne on 4 and 5 March 2008. Institute of Outdoor Sports and Environmental Science, Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Federal Agency for Nature Conservation (Publishers): Series "Outdoor Sports and Environmental Science" Vol. 23 (ISSN 1612-2437) pp. 91-94. 2008.

Dr. Stefan Türk Since 1999 assistant lecturer and researcher at the Institute of outdoor sports and environmental science at the German Sport University Cologne. Deputy head of Institute. Main research topics are the use of near natural landscapes by outdoor sports and recreation activities as well as the arrangements of landscape as sport areas. Member of the expert group for the design and development of the master study "Sport tourism and leisure activities" at the German Sport University. Lecturer in the additional study „Sport and Environment - Management" and trainer in shooting (air gun, air pistol, .22 pistol). Since 1998 sworn expert of the forestry commission of North Rhine-Westphalia.

Nature and environment in Finland's and Lapland's tourism strategies

Seija Tuulentie

Abstract — Nature is regarded as one of the main tourism attractions in Finland as well as in many other destinations. This makes tourism especially important for rural areas, such as Lapland. Rural communities in sparsely populated areas have to deal with environmental changes caused by the increase in the use of natural resources and also by global issues, e.g. climate change. Anticipation and adaptation are important for the strategic tourism planning. Strategic development work is part of the planning system at many geographical levels. The purpose of this study is to evaluate how recent national and regional tourism strategy documents take into account issues related to those natural surroundings where tourism takes place in Finland. What is the role of national parks and other protected areas in tourism planning, which natural features are emphasised, and how such environmental issues as climate change are anticipated? The results of the textual analysis of three tourism strategy documents show that tourism development is often discussed only in economic and marketing terms and not much from the point of view of environmental or socio-cultural issues. For example, strategy documents refer to climate change in a very cursory way. National parks and other protected areas are noticed as attractions but their role has not been developed further. Forests are seldom mentioned which is especially interesting in the case of Finland where the use of forests has caused conflicts between tourism and forestry in Northern Finland. The concept of wilderness, which was present in the earlier tourism strategy of Lapland, has almost disappeared from the latest strategy document.

Index Terms — Climate change, nature tourism, rural development, textual analysis, tourism strategy.

1 Introduction

In regional development, tourism is often seen as a mechanism for the economic survival of peripheral communities [1], [2], [3], and this is also the policy target in Finland at both the national and regional levels. Government regards tourism as a mechanism for implementing their redistribution policy.

Tourism is the biggest promise in the areas where nature has remained relatively untouched which means especially remote rural areas. However, the benefits of the growth of tourism are seldom questioned in policy documents although the local residents will gain unequally, if they gain at all, and for some may even be harmed [4].

In the present paper, three tourism development strategy documents from the 2000s are analysed in order to determine how they deal with issues concerning nature and rural environment, and how they anticipate changes, such as climate change, in their operating environment. Firstly, I analyse how the environmental and natural are features referred to in the strategy documents, secondly, I evaluate the role of national parks and protected areas in the documents and, thirdly, I discuss the anticipatory dimensions of the documents.

In the case of Finland, Lapland is the most important tourism region although Helsinki and some other cities are more visited. Also, tourism is more important for the development of Lapland than other more central regions

Seija Tuulentie is with the Finnish Forest Research Institute METLA. E-mail: seja.tuulentie@metla.fi

[5]. The biggest and the most visited national parks are situated in Lapland as well.

2 Data and methods

The three documents that are used here as main data are 1) Finland's Tourism Strategy to 2020 (Ministry of Trade and Industry), 2) Lapland Tourism Strategy 1 (2003-2006) (Regional Council of Lapland) and 3) Lapland Tourism Strategy 2 (2007-2010) (Regional Council of Lapland). The fourth document, I also pay attention to the draft version for the Lapland Tourism Strategy 2, and here especially interesting is the process of transformation from the draft version to the final version.

The importance of analysing such documentary texts lies in the nature of these documents. Documents such as tourism strategies are 'social facts' in that they are produced, shared, and used in socially organized ways. They constitute specific types of representation that apply their own conventions. Documents are often used to create a certain kind of predictability and uniformity out of a wide variety of events and social arrangements, and thus they do not simply describe classes and systems, but are actually active in creating and shaping them. This view is close to the social constructionist idea of society as a human product, in the sense that textual products can be seen as actions that change the world and consist of many kinds of choice [6, [7] Thus, analysis is needed to show what kinds of choice have been made and how the documents claim whatever authority may be attributed to them. We should ask what are the premises for the argumentation in the documents. The analysis should both examine the text as a whole and also reveal the choices made using specific linguistic means.

The validity of the documents is based on the declaration that a large number of parties were involved in the preparatory process. The audiences can be regarded as the "nation" or "region" for which the strategy demonstrates that tourism is an important part of the economic life. The documents also include the statement that the purpose is to appeal to the financers [8]. The most important underlying assumption both in the national and the Lapland Tourism Strategies is that they present the positive impacts of tourism on regional development in a powerfully emphasized manner, and tourism is regarded as a blessing for remote and peripheral areas.

In this paper, I focus on the contents of the documents. What kind of issues is chosen to the strategies and what is the role given to the questions regarding nature and environment? Qualitative content analysis is used to describe the choices made in the texts. In the beginning of the analysis I also made a quantitative content analysis of the texts to show the amounts of the different topics related to nature and environment. Please, pay attention to this detailed submission guidelines for MMV4 conference. All authors are responsible for understanding these guidelines before submitting their manuscript. Submission of a manuscript is not required for participation in a conference whereas the payment of the conference fee is required for including one's own paper in the proceedings volume. In case you have submitted an abstract for poster presentation you can both choose to write again a short paper following this template or not.

3 The role of nature in the documents

Nature as such is frequently mentioned in the strategies – in the national strategy 61 times and in the regional strategies about 50 times in each text. However, what is meant by "nature" remains somewhat open. Nature is related to such adjectives as *clean*, *varied*, *silent* and *peaceful*. In the Lapland Strategy the adjectives "Arctic" and "northern" are often related to nature. Cleanness is the feature most strongly emphasized in both the national and regional strategies. Nature-based activities are regarded as an important development branch in tourism.

From the point of view of rhetoric, "nature" is a useful concept: there is such a univer-

sal agreement that nature is good and is a thing that tourists look for, that the different actors can agree on the idea that clean, unique nature is what Finland – and especially Lapland - can offer to tourists [9]. However, when it comes to the question of "real" nature and its features, it is not so easy to write about it.

To summarise the information on selected issues in the documents, the number of references to different concepts in the four documents is calculated (Table 1).

4 Forests, wilderness and national parks

One important aspect of Finnish nature, the country's forests, are mentioned only a couple of times in each strategy. This is especially interesting because tourism entrepreneurs in Lapland have recently demanded that the forests in certain areas should not be used for forestry, but should instead be set aside for tourism and outdoor recreation use. The use and the nature of forests thus seem to be a contested issue, and one that is conveniently avoided in the strategy documents. However, there are some signs that the forestry issue is also entering the strategy speech: Lapland's Second Tourism Strategy deals with the more contested forestry issues and refers to the possibility of the trade in natural values [10], [11].

The Lapland Tourism Strategy 1 mentions forests only a few times, but the concept of wilderness is frequently used and can be regarded as including forests, its main function being as a more attractive and romantic as word for this type of natural surrounding. "Vast" and "clean" are adjectives used together with wilderness [12]. Somehow, however, the word "wilderness" has vanished from the latest version of the Lapland Tourism Strategy. Nor does it appear in Finland's Tourism Strategy. This may be due to the fact that the official wilderness nature protection areas were established in northern Lapland in 1991, and they were more actively discussed at the time when the first Lapland Tourism Strategy was formulated.

National parks are mentioned in both the national and regional tourism strategies, and they can be seen as referring to the sort of natural environment that will continue in the future in the form that it is in now. In Finland, and also in international marketing, Lapland with its many large national parks represents "high nature" and an exotic resource for tourism, whereas in Finland's Tourism Strategy both national parks and Lapland receive little mention.

5 Anticipation of environmental changes

Being *strategy* devices for the future of a livelihood, it is to be expected that the anticipation of changes in an operating environment is important. Indeed, each of the docu-

TABLE 1.

Concepts related to nature and nature-use in the strategies.

Strategy	Finland's Tourism Strategy	Lapland Tourism Strategy 1	Draft for Lapland Tourism Strategy 2	Lapland Tourism Strategy 2
Nature	61	48	23	49
Wilderness	-	11	-	-
Forest	2	1	3	3
Scenery	8	13	5	7
Natural value trade	-	-	1	1
National park	4	16	18	20
Protected area	2	6	7	7

ments includes a chapter on anticipation.

The anticipation of possible changes such as climate change is an interesting topic since it is dealt with very differently in the Finland's Tourism Strategy and in the Lapland Tourism Strategy. In the former, climate change is a part of a long list demonstrating the threats to the tourism industry. In the latter, Lapland Tourism Strategy 2, climate change is mainly understood as a positive factor, although the problems for Southern Lapland are mentioned. The final version of the Lapland Tourism Strategy 2 mentions climate change sixteen times, and in nine of these the message is that climate change will benefit tourism in Lapland. Three of the mentions see climate change as a possible threat (for tourism in Southern Lapland), and the rest are more or less neutral.

The ideal of sustainability is firmly integrated into the tourism strategies. Sustainability, sustainable development, and sustainable tourism are often mentioned and their principles are explained in chapters dedicated to this topic. Sustainability was about to be omitted from the Lapland Tourism Strategy 2: the draft version had only six mentions and they were mainly related to ecological issues. However, the final version of the strategy increased the number of mentions to the level of the previous strategy. Also, an entire chapter dedicated only to sustainability was reinstated in the text. This shows how easily a text can address only a specific audience in a certain sector of life, whereas in actual fact the audience is usually far wider. A broader perspective was reinstated in the second Lapland Tourism Strategy in the course of circulating the draft version among stakeholders.

Sustainability and sustainable development are dealt with in the form of generalities with little concrete content. They are used in a very flexible manner to justify a wide range of issues. For example, the Lapland Tourism Strategy 2 states that "sustainable development is powerfully present in tourism in Eastern Lapland because of regional planning and the awarding of the international Pan Parks certificate." Here sustainable development is understood in a very narrow sense only in relation to national parks. To define sustainability in this way in a region that suffers from many drastic societal, economic, and ecological changes, and a lack of tourism investments compared to other parts of Lapland, diminishes the argumentative power of sustainability. In general, despite all the research done around these concepts, the use of the term sustainability and its different versions seems to remain at the level of abstract values, e.g. beauty or justice, but not as concrete values belonging to a specific being, object, or group [13].

TABLE 2.

THE NUMBER OF MENTIONS OF CONCEPTS RELATED TO THE ANTICIPATION OF CHANGES.

Strategy	Finland's Tourism Strategy	Lapland Tourism Strategy 1	Draft for Lapland Tourism Strategy 2	Lapland Tourism Strategy 2
Climate change				
- Negative	11	-	12	16
- Positive	2	-	2	3 *
- Neutral	-	-	8	9
	9	-	2	4
Sustainability	30	19	6	21
Safety, security	38	27	22	43

* Two negative mentions indicate impacts on regions other than Lapland, but these are also transformed to the benefit of Lapland later on in the document

6 Conclusion

The importance of nature and natural attractions is emphasised in tourism marketing, planning and strategies. However, especially in national level the strategy document does not much develop the role of nature in tourism. Such important issues as forests and national parks are seldom dealt with.

Such issues as natural value trade and climate change are new, and relation to them is quite ambivalent. In the national level climate change is regarded more serious a problem than in regional level.

In future strategies, it would be important to discuss the totality of tourism, rural development and environment.

References

[1] J. Saarinen, "Tourism in peripheries: the Role of Tourism in Regional Development in Northern Finland." *Tourism in Peripheries Perspectives from the Far North and South*. Müller D K & B Jansson (eds.) CAB International, Athenaeum Press, Gateshead, pp. 41-52, 2007.

[2] R. Nash and A. Martin, "Tourism in Peripheral Areas – the Challenges for Northeast Scotland." *The International Journal of Tourism Research* May/June 5, pp. 161-181, 2003.

[3] I. Knowd. "Tourism as a Mechanism for Farm Survival", *Journal of Sustainable Tourism*, vol. 14, 1, pp. 24-42, 2006.

[4] C. M. Hall and J. Jenkins, "The Policy dimensions of rural tourism and recreation" *Tourism and Recreation in Rural Areas*. R. Butler R, C. M. Hall & J. Jenkins (eds.), Wiley, Chichester, pp.19-42, 1998.

[5] Regional Council of Lapland, Employment scenario for Lapland to 2020. Regional Council of Lapland, Rovaniemi, 2002. http://www.lapinliitto.fi/aluekehitys/tvennuste.pdf. 29.3.2007

[6] P. Atkinson and A. Coffey, "Analysing documentary realities", *Qualitative Research: Theory, Method and Practice*. D. Silverman, ed, SAGE Publications, London, pp. 56-75, 2004.

[7] P. L. Berger and T. Luckmann, „The Social Construction of Reality: A Treatise in the Sociology Knowledge", Garden City, New York, 1967.

[8] Finland's Tourism Strategy to 2020. Publications of Ministry of Trade and Industry 21/2006. http://ktm.elinar.fi/ktm_jur/ktmjur.nsf/all/D61DB118241A034C22571800022FEC4?opendocument.

[9]

[10] Draft for Lapland Tourism Strategy 2007-2010, Regional Council of Lapland, (In Finnish), 2007.

[11] Lapland tourism strategy 2007-2010, Regional Council of Lapland. (In Finnish) http://www.lapinliitto.fi/paatoksenteko/lh221007/liite8.pdf.

[12] Lapland Tourism Strategy 2003-2006, Regional Council of Lapland. (In Finnish and in English). http://www.lapinliitto.fi/englanti/matstraeg.pdf .

[13] Ch. Perelman, "The Realm of Rhetoric", University of Notre Dame, London, p. 27, 1982.

Seija Tuulentie Doctorate in sociology 2001; assistant, senior assistant and lecturer at the University of Lapland, Finland 1995-2002; acting professor of nature-based tourism, Finnish Forest Research Institute Metla and the University of Lapland 2003-2005, senior researcher Finnish Forest Research Institute Metla since 2002. Research interests nature-based tourism, social sustainability and environmental conflicts. Member of the MMV3 and MMV4 scientific steering committees.

MMV4 PROCEEDINGS
SOCIO-ECONOMIC IMPACT

Assessing nature of visitors flow and revenue generation at the Central Zoo of Nepal

Tek Jung Mahat, Madan Koirala

Abstract — The only zoo of Nepal, Central Zoo, receives over 800,000 visitors annually. Economic valuation of the zoo was conducted to identify contributions made by the zoo to the economy as well as environmental awareness level of the visitor. The relevant information was collected using questionnaire survey, key informant interview, direct observation, direct count and focus group discussion. Several economic tools, including travel cost method, were employed for analysis. The study shows that a higher proportion of school children and adolescents visit the zoo in comparison to other age groups and professions. Brahmin, Chhetri and Newar were the dominant visiting caste-groups. Access to economical public transports such as buses, tempos and microbuses has facilitated arrivals of high proportion of visitors with relatively low income to the zoo. Most of the visitors are Nepalese and expatriates. The educational level of the visitors and their affiliation with environment related organizations are not significant determinants of the number and nature of their visits. It was found that there is an inverse relationship between the travel cost and the number of zoo visits. The per capita economic value of the zoo was estimated at US $ 3.15. The study recommends that a) the environmental hygiene inside the zoo be improved, b) the satisfaction level of the visitors be assessed, and c) fund raising sources be identified to expand zoo services as well as its territorial area.

Index Terms — Economic valuation, Nepal, payment of environmental services, travel cost method, zoo.

Tek Jung Mahat: MSc Degree in Environmental Science from the Tribhuvan University Nepal with specialisation in environmental economic and mountain environment management and a PG Degree in ëMountain environment and Global Changeí from the University of Torino, Italy. Freelance environment expert working in Nepal in thematic areas like economic valuation, knowledge management, environmental education, NRM and biodiversity conservation and environmental journalism. Additionally he teaches environmental science to graduate level at Tribhuvan University (TU), Nepal.

Madan Koirala Prof. PhD in environmental science from JNU, India and an MSc in Ecology from TU, Nepal. He is teaching at TU for last 20 years and has already headed the Central Department of Environmental Science, TU

Assigning economic value to natural protected areas: an environmental accounting model

Francesco Marangon, Maurizio Spoto and Francesca Visintin

Abstract — The implementation of environmental accounting in Natural Reserves produced some significant results in terms of restrictions. First of all, environmental accounting introduced a limitation in scale, which was inapplicable on a micro scale. A second restriction concerned the physical unit measure that was used instead of a monetary unit measure. Finally, a third limitation was due to the fact that environmental accounting takes into account only costs, not environmental benefits. These three limitations led us to develop an environmental accounting model that considered resources in the Natural Reserve, both consumed and produced. The model applied to Miramare Natural Marine Reserve (Italy) aimed to supplement monetary accounting based on cost and revenue with environmental accounting which reflects not only environmental cost but also environmental revenues, i.e. environmental benefits. Environmental cost took into account anthropic presence, raw materials use, consumption of fuel for motor vehicles and heating fuel, consumption of electricity, water consumption, and administration expenses. Environmental benefits assessed ecosystem functions: gas regulation, nutrient cycling, biological control, food production, recreation, and culture. The difference between costs and benefits, both economic and environmental, represented the value produced or consumed by the Natural Reserve. The model demonstrated that the net benefit for the Reserve was approximately €654,000 covering the amount of public transfer (about €610,000) completely.

Index Terms — Ecosystem functions, environmental accounting, Long Term Financial Plan, natural marine reserve.

1 Introduction

Since 2004 the University of Udine (Italy) and the Italian Association WWF for Nature have collaborated in order to establish an environmental accounting model for the Miramare Natural Marine Reserve (Trieste, Italy) (MNMR). The model aims to investigate what value, and how much, the MNMR had been able to create from the money assigned to it by government and funding bodies.

Environmental accounting issues have been under consideration since the 1990s and in the 2003 the UN, EC, IMF, OECD and the WB [1] undertook a review of the System of National Accounts (SNA) in order to integrate environmental accounting into economic accounting and to analyse the contribution of the environment to the economy and the impact of the economy on the environment in the System for Integrated Environmental and Economic Accounting (SEEA).

Natural Reserves are special subsets of organizations implementing environmental accounting models managing environmental goods and producing environmental services. Their implementation highlighted some issues: each of one required a detailed approach. First of all, the scale limitation. The SEEA models are national accounting sys-

F. Marangon is with the Department of Economics, University of Udine, Via Tomadini 30/a, 33100 Udine I. E-mail: marangon@uniud.it.
M. Spoto is with the Miramare Natural Marine Reserve, Trieste, Viale Miramare 349, 34114 Trieste I. E-mail: spoto@riservamarinamiramare.it.
F. Visintin is with the Centre of Theoretical and Applied Ecology, Gorizia, Via Alviano 18, 34170 Gorizia I. E-mail: francesca.visintin@ceta.ts.it.

tems not applicable to micro scale. Natural resource accounting overcomes this limitation, but introduces the second restriction: physical unit measure instead of monetary unit measure. Finally the third limitation is the accounting of environmental costs but not environmental benefits. Without environmental benefits, environmental accounting system takes into account the effects of the resources consumed but not the resources produced by ecosystems (what happens in natural reserves).

In order to overcome these limitations, we developed an accounting framework for local protected areas by adapting the national framework and taking into account both economic and environmental costs and benefits. We tested the application for the MNMR referring to the 2004 [2] and then we improved the model referring to the 2006 on which this paper reports.

2 METHODOLOGY

The model adapted the economic asset account. The environmental accounting structure for the MNMR includes a natural capital dimension (natural stock account) and a flow dimension (natural flow account) (Table 1).

TABLE 1

ENVIRONMENTAL ACCOUNTING MODEL FOR THE MNMR

Asset accounts for the MNMR		
Natural stock account	Natural flow account	
Natural stock: Quantity	Costs: monetary (reserve costs)	Benefits: monetary (reserve revenues)
Quality	environmental (environmental costs)	environmental (environmental benefits)

Natural stock accounts should be set up based on a long time series. Data should refer to natural resources quality (species) and quantity (density). Physical data on stocks are usually compiled by biologists, who use different methods to estimate the size of these stocks [1].

Natural flow account assesses physical flows between the biosphere and technosphere and is indicated as “Natural resources asset account” [1]. The study analysed biosphere-technosphere flow, which assessed environmental benefits and economic revenue; technosphere-biosphere flow, which assessed environmental and economic costs. In our model, flows from biosphere to technosphere are represented by ecosystem functions [3], [4], [5], [6], [7], and economic valuation of the MNMR ecosystem functions assessed environmental benefits. The flows from technosphere to biosphere describes how humane activities consume natural resources and are traced back to the management goals of the MNMR: protection and enhancement; dissemination, environmental education and scientific research; sustainable development; management.

3 RESULTS AND ANALYSIS

3.1 Natural stock account

Natural stock account assessment involves assigning a monetary value to the Reserve’s natural capital (water, flora, fauna and soil). At this stage we have not yet reached an adequate monetary estimate and in order to overcome this lack, a qualitative (species variety) and quantitative (density) accounting method has been adopted. The qualitative aspect is based on the Initial Environmental Analysis (IEA) of the Environmental Management System (EMS), the quantitative aspect, reference was made to the results of a visual census.

3.2 Natural flow account

In order to allocate monetary values to natural flows, a cost-benefit approach has to be adopted.

In this case costs are:
- monetary (costs contained in the profit and loss account),
- environmental (technosphere-biosphere flows),and benefits are:
- monetary (revenues contained in the profit and loss account),
- environmental (biosphere-technosphere flows).

Monetary costs and revenues have been reclassified according to the four goals that came from the income statement for the period ending 31.12.2004. To do this we used the Long Term Financial Plan (LTFP) approach [8].

Environmental costs are related to management goals which benefit from materials and energy flows from the biosphere and cause impacts upon the following: anthropic presence, consumption of raw materials, motor fuel, heating fuel, electricity, water and administration expenses. In order to translate these impacts into environmental costs, the consumption items have been converted into equivalent tonnes of CO2, and considering a social cost of carbon (SCC) of 33,33 €/tC [9], the monetary value had been calculated.

Factors related to anthropic presence (transport, consumer durables, consumer non-durables) contribute to CO2 production. The human presence has been transformed into CO2 emissions and by using a CO2 production coefficient of kg17,49/inhabitant/day, visits will translate into kg156.818 of CO2 corresponding to €1.458.

For raw materials use, we considered paper consumption (kg968) converted into equivalent CO2 quantities, which amounted to €17.

The fuel consumed in the MNMR is used for both motor vehicles and heating. Consumption converted into equivalent CO2 emissions has been translated into an environmental cost of €164.

Electricity consumption was kWh80.791, which translates into an environmental cost of €530.

Annual water consumption amounted to 248,34m³, which was equivalent to an environmental cost of €1.

Referring to environmental benefits, the continental shelf is the main feature of the MNMR's marine ecosystem, and the following functions have been identified: gas regulation, nutrient cycling, biological control, food production, recreation, and cultural [4].

The gas regulation function measures the carbon content stored by seaweed strata. We assessed that the average yearly primary production of phytoplankton is 130-150 gC/m2 absorbing 1,4 tC/ha and considering the SCC we calculated that the avoided costs are €5.647.

The nutrient cycling function considers the concentrations of phosphorous and nitrogen. Replacement cost is used, i.e. the cost of mechanically removing them. Taking the lowest figure of replacement costs, a value of €777/ha/year is reached. The annual value of its contribution to nutrient cycling can be estimated at €94.049.

Food production takes both fishing and angling into consideration. It has been estimated that professional fishermen catch kg137.690 of fish per year from within the vicinity of the MNMR. By multiplying the total weight of the fish by market value, we obtained an estimate of the monetary value of the food production function of €112.852.

As far as the biological control function is concerned, control exerted by the high trophic levels is at least 30% of the fish catch value. Consequently, taking it results in a figure of €33.856 for the biological control function.

Tourism in the MNMR has been divided into two categories: recreation and culture. Contingent valuation methods have been used to assign a monetary value to the benefits which derive from recreational activities (visitors, scuba divers and snorkellers). The overall benefit is obtained by adding surplus (€71.915) and price (€61.954). Moreover, tourism produces indirect economic effects estimated through the Leontiev multiplier of 1,54 departing from daily tourist spending (accommodation, catering and publications). An overall figure of €258.060 was obtained for revenues produced directly and indirectly

in the MNMR. By adding the benefit (incomes plus surplus), the function's value reaches a figure of €329.975.

The cultural function has been divided into scientific and educational. The former regards research activity with an average value/hectare/year of €31, giving a total of €3.744. The second regards educational activity producing revenues of €44.131. The overall cultural function value therefore amounts to €44.877.

Three main figures emerge from the LTFP: revenues amount to €135.496, public funding amounts to €609.512 and third parties amount to €199.425. The grand total amounts to €1.568.687 for monetary and environmental benefits.

In order to conclude the cost analysis, the income statement costs have to be added to the environmental costs which comes to a total of €2.171. Adding environmental and economic costs, passivity amounts to €914.756. It is now possible to obtain a figure for the net benefit in 2006, limited to flows from the biosphere to the technosphere and vice versa. By subtracting costs from benefits, both monetary and environmental, we can see that the MNMR annual net benefit produced is €653.931.

4 Conclusion

From a methodological perspective, the model takes a few steps forward in the accounting framework by adapting macro to micro scale models and allowing not only environmental costs but also environmental benefits to be assessed.

From an analytical perspective, the MNMR environmental accounting shows net benefits of approximately €654.000. How can this result be interpreted? Generally speaking, it can be said that the Reserve's development model is in line with sustainability on the contrary the balance would be negative. The Reserve's natural capital policies fully achieve its objectives regarding sustainable development, protection and enhancement. If we compare the net benefit figure of €654.000 with the public funding we can conclude that public funding is completely covered, producing wealth by a rate of return of 7%.

From a policy perspective, the model developed for the MNMR provides indicators and descriptive statistics to monitor the interaction between the economy and the environment, as well as serving as a tool for strategic planning and policy analysis in order to identify more sustainable development paths.

References

[1] United Nations, European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, and World Bank, *Handbook of National Accounting Integrated Environmental and Economic Accounting 2003*, available at http://unstats.un.org/unsd/envAccounting/seea2003.pdf, 2003.

[2] F. Marangon, M. Spoto, and F. Visintin F., "An Environmental Accounting Model for a Natural Reserve", *EMA for Cleaner Production*, S. Schaltegger, eds, Springer (publishing).

[3] R.C. Bishop and D. Romano, *Environmental resource valuation: applications of the contingent valuation method in Italy*, Boston, Kluwer Academic Publishers, 1998.

[4] R. Costanza, R. D'Arge, R. De Groot, S. Farber, M. Grasso, B. Hannon, S. Naeem, K. Limburg, J. Paruelo, R.V. O'Neill, R. Raskin, P. Sutton, and M. Van den Belt, "The Value of the World's Ecosystem Services and Natural Capital Nature", *Nature*, vol. 387, pp. 253-260, 1997.

[5] G.C. Daily, T. Soderquist, S. Aniyar, K. Arrow, P. Dasgupta, P.R. Ehrlich, C. Folke, A.M. Jansson, B.O. Jansson, N. Kautsky, S. Levin, J. Lubchenco, K.G. Maler, S. David, D. Starrett, D. Tilman, and B. Walker, "The Value of Nature and the Nature of Value Science", *Science*, vol. 289, pp. 395–396, 2000.

[6] R.S. De Groot, *Functions of Nature: Evaluation of Nature in Environmental Planning, Management and Decision Making*, Groningen Wolters-Noordhoff, 1992.

[7] R.S. De Groot, M.A. Wilson, and R.M.J. Boumans, "A typology for the classification, description and valuation of ecosystem functions, goods and services", *Ecological Economics*, 41, pp. 393-408, 2002.

[8] CFA – Conservation Finance Alliance, *Conservation finance guide*, available at http://www.guide.conservationfinance.org, 2002.

[9] IPCC – Interngovernmental Panel on Climate Change, *Working Group II Contribution to the Intergovernmental Panel on Climate Change*

– *Fourth Assessment Report*, 6 April 2007, Bruxelles, available at http://www.ipcc.ch/SPM6avr07.pdf, 2007.

[10] United Nations, European Commission, International Monetary Fund, Organisation for Economic Co-operation and Development, and World Bank, *Handbook of National Accounting Integrated Environmental and Economic Accounting 2003*, available at http://unstats.un.org/unsd/envAccounting/seea2003.pdf, 2003.

Francesco Marangon. He got a first-class Degree in Economics - 1985. From 1990 to 1992 Researcher of Agricultural Economics and Politics. He has been Associate Professor from 1992 to 2000. Since 2000 he is full Professor at the Faculty of Economics, University of Udine, teaching Environmental and Sustainable Development Economics. His main field of research regards: farm and agricultural economics; European, national and regional agricultural policy, agri-environmental policy, the effectiveness of EU agri-environmental programmes at a local level; multicriteria methods in farm management; natural areas management and planning (Contingent Valuation and Travel Cost applications); monetary valuation of environmental damages. Since 1998 he is the scientific surpervisor of national and regional researches. He is a member of: the International Association of Ecological Economics (Iaee), the International Association of Agricultural Economists (Iaae), the European Association of Agricultural Economists (Eaae), the Italian Society of Agricultural Economics (Sidea) and Centro Studi Estimativi Territoriali (CeSET). He published several books and papers (more than 130) both in Italy and abroad. Recent books edited by him: 1) *Gli interventi paesaggistico ambientali nelle politiche regionali di sviluppo rurale*, FrancoAngeli, Milano, 2006; 2) *Il paesaggio: un valore senza prezzo*, Forum Editrice Universitaria, Udine, 2007.

Maurizio Spoto. He got a first-class Degree in Biology – 1984. From then to 1990 he worked as a professionist in the field of environment analysis and quality evaluation. From 1988 to 1994 he served as president of Shoreline, a cooperative society engaged in management of protected areas and planning of visitor centres. In 1989 he then took up the role of advisor and scientific referent for WWF Italy ONG, the managing body of the Natural Marine Reserve of Miramare, a WWF Oasis placed in the Gulf of Trieste (Northern Adriatic). Since 1996 he is the director of Miramare Marine Protected Area, dealing and planning either the marine conservation programme and the efficient and eco-sustainable management of the natural area. He is author and co-author of some scientific books and papers, mainly dealing with marine biology, fishery, and PA management.

Francesca Visintin. She got a first-class Degree in Economics - 1999. In 2003 she completed her doctoral studies in Comparative Agricultural Economics in Western Europe. From 2003 to 2007 she has been a postdoctoral fellow. Since 2007 she is researcher at the Centre of Theoretical and Applied Ecology.

Regional economic impacts of nature-based tourism in Switzerland – the relevance of activities and landscape elements

Marius Mayer, Luisa Vogt and Marco Pütz

Index Terms — economic effects, nature-based tourism, activities, landscape, destination choice

Most studies concerning regional economic impacts of tourism treat either the impacts of all types of tourism within a defined region (e.g. federal states, national parks) or of temporally limited events (e.g. Olympic Games). There has been a lack of surveys that deal with the economic impact of specific tourism forms and components of tourism supply respectively, which are less tangible and definable – such as nature tourism in general, or more precisely, specific landscape elements and guests' nature activities. However, such knowledge is important for considerations of the appropriate tourism development of destinations, and prospective destinations, such as protected areas.

We approached the issue of the regional economics of nature tourism in two interrelated studies. The first one analyzed the contribution of *nature-based tourism activities* to the regional economy in two valleys in the Swiss Alps, Simmental and Diemtigtal in the Bernese Oberland [1], [2]. The survey can be seen as an ex-ante-evaluation of the intended regional nature-park in the Diemtigtal. Using the results from 2006 the economic impact of this newly established protected area could be evaluated some years later.

The applied method was a value-added analysis following Job et al. [3], [4].

Interviews with 1 314 tourists were implemented to find out the expenditures in the local economy and which activities were practiced. Furthermore, we used a random sampling of visitors at predefined census points throughout the Simmental and Diemtigtal to obtain information on the number of visitors by activity types such as hiking, cycling or skiing. A subset of the passers-by was asked how long they stayed within the region and, if they were overnight visitors, which accommodation type they had booked.

Data from visitor counting and data from 5 087 flash-interviews were used for estimating the total number of visitors and for weighting the structured interviews according to the percentages of the visitor categories. The interview days were chosen according to sea-

Dipl.-Geogr. Marius Mayer, Julius-Maximilians-Universität Würzburg, Institute for Geography, Am Hubland, D-97074 Würzburg/Germany. E-mail. marius.mayer@uni-wuerzburg.de.
Dr. Luisa Vogt, Dr. Marco Pütz, Swiss Federal Research Institute WSL, Zürcherstr. 111, CH-8903 Birmensdorf/Switzerland. E-mail: luisa.vogt@wsl.ch, marco.puetz@wsl.ch.

sonal, weekday and weather criteria, in order to obtain representative data [4].

We compared types of tourism (e.g. overnight visitors vs. day-trippers) and activities with a different degree of infrastructure intensity (e.g. hiking, downhill biking, ski touring, cross country skiing, alpine skiing). One main result is that the economic importance of these activities depends mainly on the respective number of tourists and their chosen accommodation level which determines the spending to a great extent [1].

We concluded that the economic impacts of nature-based tourism are an important contribution to the local/regional economy, but are not to be overestimated. Nevertheless, we were able to reveal potentials for added value [2]: the quality of accommodation and gastronomy should be improved; the possibilities for many nature-based day-trippers to spend money within the region are limited.

The second study is brought to bear on the first study by addressing another feature of nature tourism. We again try to measure the regional economic impact but, in this study, also directly examine the *motives for destination choice*. Is it really nature, which in our case is represented by a specific landscape element (the forest), that motivates a tourist to visit a particular place? Expenditures of guests can be ascribed to this kind of nature tourism if, and only if, forests and their attributes are important for a destination choice. A conjoint analysis is used to determine the motives for destination choice of tourists in two quite densely wooded areas (Sihlwald near the agglomeration of Zurich, a prospective nature park, and the Bergell valley in the Grisons Alps). Do the aesthetics, products (e.g. mushrooms or berries) or other facets of forests (silence, high quality of air) influence the decision of tourists to visit a particular destination? Or is this decision primarily dominated by factors such as the quality of accommodation and the variety of entertainment and activities? Results of this project will be available in late 2009.

References

[1] M. Mayer, K. Wasem, K. Gehring, M. Pütz, A. Roschewitz, D. Siegrist, „Wirtschaftliche Bedeutung des naturnahen Tourismus im Simmental und Diemtigtal – Regionalökonomische Effekte und Erfolgsfaktoren“. Birmensdorf, in preparation 2008.

[2] M. Mayer, M. Pütz, A. Roschewitz, „Regionalökonomische Effekte des naturnahen Tourismus im Simmental und Diemtigtal“, Schweizerische Tourismuswirtschaft, Jahrbuch 2007, pp. 207-229, 2007.

[3] H. Job, “Estimating the regional economic impact of tourism to national parks”, GAIA, vol. 17, S1, pp. 134-142, 2008.

[4] H. Job, B. Harrer, D. Metzler, D. Hajizadeh-Alamdary, “Ökonomische Effekte von Großschutzgebieten. Untersuchung der Bedeutung von Großschutzgebieten für den Tourismus und die wirtschaftliche Entwicklung der Region” (= BfN-Skripten Band 135), Bonn-Bad Godesberg, 2005.

Dependence of tourism destinations non-market value on the visit rate: the contingent valuation case study of Jägala Waterfall

Mart Reimann, Üllas Ehrlich

Abstract - The article discusses the resource utilisation conflict at the example of Jägala Waterfall, which is the highest and greatest natural waterfall in Estonia. There are plans to build a hydro-power plant there, which would conduct most of the water past the waterfall to the power plant's turbines, reducing significantly natural and recreational values of the waterfall. The authors carried out a contingent valuation (CV) study to identify the monetary equivalent of non-market values related with Jägala waterfall. This paper examines the dependence of the respondents' willingness to pay (WTP) on whether or not they have visited the waterfall, indicating thus the significance of nature tourism for the formation of non-market value of natural features. The paper analyses also the dependence of the visit rate on the respondents' sociometric characteristics. Using the Logit-model, it was identified that the statistically significant factors that influence the probability of visiting Jägala Waterfall are education, income and age. Gender and nationality are not statistictically significant factors for the probablity of visiting the Waterfall. It was also identified that visiting rate has positive impact to WTP.

Index Terms - Nature tourism, nature resource utilization, contingent valuation.

1 Introduction

Financial aspects and market values are often dominating in political decision making. Recreational values are hard to compare with direct market values. During the last decades there has been more discussion to make non-market recreational values comparable with market values with contingent valuation [1], [2], [4], [5].

Jägala waterfall is the highest and greatest natural waterfall in Estonia, its height is 8 meters and width is more than 50 meters [3]. The waterfall has become one of the main natural tourism attractions which illustrates numerous materials introducing Estonia as a tourism destination. Also due to the proximity to Estonian capital Tallinn the waterfall is intensively visited by Estonians and foreigners, visitor numbers being between 50 to 100 thousand people per year.

A private capital based enterprise is planning to restore a hydro-power plant, which would conduct most water past the waterfall to the power plant's turbines. As a result, the waterfall will have a minimal flow most of the % year. The expected capacity of the power plant would be 1-2MW, which is less than 0.1% of the total electricity production in Estonia [..]. But the aesthetical and recreational value of the waterfall will be significantly reduced.

To identify the monetary equivalent of the

Mart Reimann is with the Tallinn University, Department of Leisure Sciences, Tallinn, Estonia. E-mail: mart.reimann@tlu.ee
Üllas Ehrlich is with the Tallinn University of Technology, Centre for Economic Research, Tallinn, Estonia. E-mail: yllas.ehrlich@tv.ttu.ee

non-market value of Jägala Waterfall in natural state, the authors conducted in Estonia a representative contingent valuation study (950 questionnaires) of the waterfall. To simulate market scenario two photos of Jägala waterfall were presented. On the first photo the waterfall has a medium natural quantity of water. The second photo depicts the waterfall as it will be when the power plant is working. On the photo the quantity of water running down the waterfall corresponds to the minimal quantity of water the power plant is obliged to grant to the waterfall.

This paper deals with the dependence of the respondents' visiting rate on sociometric characteristics. It is also analysed how the willingness to pay is related to the fact, whether or not respondents have visited the waterfall, indicating thus the significance of nature tourism for the formation of non-market value of natural features.

2 METHODOLOGY

To find out relationships between respondents visiting rate and sociometric features, the logit-model was used.

The logit-model describes the relationship between binary dependent variable and constant or discrete explaining variables. The logit model is based on a logistic distribution function, which guarantees that the probabilities remain (e.g. 0;1). The probability that the event has occurred (person has visited the Jägala Waterfall) is expressed as:

$$P_i = \Pr(y_i = 1 \mid X_i) = \frac{1}{1 + e^{-\beta' X_i}}$$

where y_i is binary dependent variable: (y_i =1 – has visited, and y_i =0 – has not), X_i is the vector of independent variables and β is the vector of parameters.

The logit model is expressed as:

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta' X_i + u_i = \beta_0 + \beta_1 x_1 + \ldots + \beta_n x_n + u_i$$

where $\frac{P_i}{1-P_i}$ is the odds ratio, $\ln\left(\frac{P_i}{1-P_i}\right)$ is the log odds ratio or "logit".

It is somewhat difficult to interpret the Logit model parameters, as the estimated probability is not a linear function of the parameters. We can estimate the direction of the correlation. (In case $\beta>0$ and the value of x is increasing, the probability increases, and vice versa. In the case of binary descriptive variables 1vs0). Therefore is is better to use either the odds ratio or marginal effects.

3 RESULTS

3.1 Dependence of visiting rate on sociometrical characteristics

The variables used are: Gender: SEX (male=1, female=0); education: EDUC (1- primary, 2 – secondary, 3 – secondary specialised, 4 – higher, 5 – academic degree), income: INC(1 – less than 4000, 2 - 4-6 thous., 3 - 6-8 thous., 4 - 8-11 thous.,5 - 11-15 thous., 6 - 15 thous. +), AGE (1 – younger than 23, 2 24-29, 3 30=39, 4 40-49, 5 50-59, 6 60+).

To identify the factors that influence the probability of visiting the Jägala Waterfall we prepared 2 logit models. First we evaluated the model without restrictions where we included all factors –

$$\ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 SEX + \beta_2 NAC + \beta_3 EDUC + \beta_4 AGE + \beta_5 INC + u_i \quad (1)$$

The logit estimates are presented in Table1. The statistically significant factors that influence the probability of visiting Jägala Waterfall are education, income and age ($p<0.1$). With these indicators growing the probablity of having paid a visit to Jägala Waterfall (positive values of beta) is also growing. The odds ratio shows that the growth of education by 1 level increased the likelihood of the visit by approximately 1.5 times (if the other indicators remained the same). Hence,

for example, people with an academic degree are approximately 1.5^4≈5 times more likely to have visited the Waterfall. Gender and nationality are not statistictically significant factors for the probablity of visiting the Waterfall.

Insignficiant factors like gender and nationality have been excluded from Model 2

$$\ln\left(\frac{P_i}{1-P_i}\right)=\beta_0+\beta_3 EDUC+\beta_4 AGE+\beta_5 INC+u_i \quad (2)$$

The values remained the same, the model is statistically significant.

TABLE 1
LOGIT VALUES

	Coef.	Std. Err.	Z	P>|z|	[95% Conf.Interval]	
Model 1:						
gender (male=1)	0.099	0.158	0.630	0.532	-0.211	0.409
nationality (Estonian=1)	0.227	0.194	1.170	0.241	-0.153	0.608
education	0.388	0.092	4.230	0.000	0.208	0.568
Age	0.081	0.046	1.780	0.075	-0.008	0.171
Income	0.110	0.058	1.900	0.057	-0.003	0.224
constant	-1.026	0.355	-2.890	0.004	-1.723	-0.330
Model 2						
education	0.379	0.089	4.240	0.000	0.204	0.554
Age	0.080	0.046	1.750	0.080	-0.009	0.169
Income	0.119	0.056	2.120	0.034	0.009	0.229
constant	-0.796	0.308	-2.580	0.010	-1.400	-0.192

TABLE 2
ODDS RATIO VALUES

	Coef.	Std. Err.	z	P>|z|	[95% Conf.Interval]	
Model 1:						
gender (male=1)	1.104	0.175	0.630	0.532	0.810	1.506
nationality (Estonian=1)	1.255	0.244	1.170	0.241	0.858	1.837
education	1.474	0.135	4.230	0.000	1.231	1.765
age	1.085	0.050	1.780	0.075	0.992	1.187
income	1.117	0.065	1.900	0.057	0.997	1.251
Model 2						
education	1.461	0.131	4.240	0.000	1.226	1.740
age	1.083	0.049	1.750	0.080	0.991	1.184
income	1.126	0.063	2.120	0.034	1.009	1.257

The probablity of visit calculated on the basis of equation

$$\ln\left(\frac{P_i}{1-P_i}\right)=-0.796+0.379 EDUC+0.080 AGE+0.119 INC \quad (3)$$

A 18-23 years old person with primary education who earns less than 4000 EEK/ month: P=0.45.

An older than 60 years person with an academic degree who earns more than 15,000 EEK/month: P=0.91.

3.2 Relations on visiting rate and willingness to pay

The dependence of the willingness to pay (WTP) on the visiting rate is presented on Table 3. The average visiting rate of the respondents is 72%. In general, the WTP to visiting rate ratio can be regarded as positive; higher visiting rate also means higher willingness to pay. (Exceptions in groups with very high (4000-20000 EEK) WTP are statistically unreliable due to the very small size of the groups.) Clearly smaller willingness to pay is in the groups of visitors with the visiting rate lower than 60%. Somewhat surprising is the visiting rate in the groups with 0 WTP - 69%, hence only slightly smaller than average. 0 WTP is obviously caused by other factors than visit to the tourist attraction.

TABLE 3
VISITING RATE AND WTP

WTP,kroons	*Respondents*		*Visiting rate, %*
	number	*%*	
10001-20000	2	0.2	100.0
4001-10000	2	0.2	50.0
2001-4000	10	1.1	80.0
501-2000	73	7.7	74.0
301-500	51	5.4	82.4
101-300	64	6.7	85.9
31-100	256	26.9	77.3
11-30	61	6.4	57.4
1-10	54	5.7	55.6
0	377	39.7	69.2
	950	100.0	72.2

4 CONCLUSIONS

The statistically significant factors that influence the probability of visiting Jägala Waterfall are education, income and age. Gender and nationality are not statistictically signifi-

cant factors for the probablity of visiting the Waterfall.

The average visiting rate of the respondents is 72%. Clearly smaller willingness to pay is in the groups of visitors with the visiting rate lower than average. The exception is 0 WTP group, where visiting rate is close to the average- 69%, which indicates that 0 WTP is obviously caused by other factors than visit to the tourist attraction and need further studies.

Acknowledgemets

This research has been partially funded by Tallinn University Haapsalu College by RIFA project.

References

[1] J. Luttik, "The Value of Trees, Water and Open Space as Reflected by House Prices in the Netherlands". *Landscape and Urban Planning* vol.48 pp. 161-167, 2000

[2] R. Scarpa, W.G. Hutchinson, S.M. Chilton, J. Buongiorno, Importance of Forest Attributes in the Willigness to Pay for Recreation: a Contingent Valuation Study of Irish Forests" *Forst Policy and Econimics* vol. 1, pp. 315-329, 2000

[3] K. Suuroja, "Estonian Waterfalls" Tallinn, 2003

[4] L. Tyrväinen, "Economic Valuation of Urban Forest Benefits in Finland" *Journal of Environmental Management,* vol. 1, pp 75-92, 2001

[5] C. Zoppi, "A Multicriteria-Contingent Valuation Analysis Concerning a Coastal Area of Sardinia, Italy". *Land Use Policy,* vol 24. pp.322-337. 2007

Mart Reimann. MSc (natural geography) Tartu University 2003, PhD student in human geography. Position: lecturer at Department of Leisure Sciences, Tallinn University.
Board member of tourism company Reimann Retked LLC. Member of Estonian tour guides certification committee.
Previous working experiences: Ministry of Environment, expert of nature conservation, Estonian State Forest Management Center, Project manager of planning of Estonian state forest recreation areas

Üllas Ehrlich. PhD (human geography) Tartu University 2007. Position: senior researcher of the Centre for Economic Research at Tallinn University of Technology.

Beyond economic impact research: an actor-oriented analysis of the competitiveness of trekking tourism in the Piedmont Alps (Italy)

Luisa Vogt

Index Terms — Actor-centered institutionalism, economic effects, competitiveness, nature tourism, peripheral rural regions.

The analysis of economic impacts of tourism, and regional economic effects of tourism projects, is one of the most popular subjects in tourism sciences. However, despite the popularity of these studies, only little research has been carried out into the reasons for a given level of economic impact and for the competitiveness of tourism projects. This research gap is surprising as such knowledge is necessary for a successful regional development based upon tourism.

Hence, taking the trekking tourism project "Grande Traversata delle Alpi" (GTA) in the Piedmont Alps (Northern Italy), a peripheral rural region, as an example, I assessed GTA's competitive situation by analyzing different factors influencing competitiveness on the micro and meso level, and examined the actions related to these competitive factors [1]. This analysis focused on the logics and strategies of actions of all (potentially) involved actors in order to explain the reasons for the state of competitiveness. This heuristic presents a conceptual contribution to economic impact/tourism and economics analysis on the basis of Mayntz' and Scharpf's actor-centered institutionalism [2] [3].

Guideline-based interviews were employed to identify the respective logics and strategies of actions and, along with a survey of 320 GTA trekking tourists, served to reveal GTA's competitive situation. Interview participants were 50 actors from the field of regional and tourism politics on different scales in Piedmont, and 34 GTA-accommodation providers. Results show inter alia that various actors lack material and authoritative resources, such as those required for assuming responsibility for mountain trails management. In contrast, some actors do have sufficient resources but they do not positively affect GTA's competitive situation due to opposed preferences. For example, on the Piedmont level, no marketing is done for GTA, for trekking tourism, or even for the Piedmont Alps as a summer destination.

The study concludes that tourism projects are competitive if, and only if, actors possessing both resources (individual resources are more important than financial ones), and preferences for particular actions, assume certain responsibilities. As endogenous actors often lack specific resources, an involvement of exogenous actors is indispensable if desired economic impacts are to be generated.

Dr. Luisa Vogt, Swiss Federal Research Institute WSL, Zürcherstr. 111, CH-8903 Birmensdorf/Switzerland. E-mail: luisa.vogt@wsl.ch.

References

[1] L Vogt, *Regionalentwicklung peripherer Räume mit Tourismus? Eine akteur- und handlungsorientierte Untersuchung am Beispiel des Trekkingprojekts Grande Traversata delle Alpi*. Erlangen: Verlag der Fränkischen Geographischen Gesellschaft, 2008, in press.

[2] R. Mayntz, F. W. Scharpf, „Der Ansatz des akteurzentrierten Institutionalismus," *Gesellschaftliche Selbstregulierung und politische Steuerung*, R. Mayntz, F. W. Scharpf, eds., Frankfurt a. M.: Campus, pp. 39-72, 1995

[3] F. W. Scharpf, *Games Real Actors Play. Actor-Centered Institutionalism in Policy Research*. Boulder, CO/Oxford: Westview Press, 1997.

Luisa Vogt completed her master's degree in economic geography at the University of Munich, Germany, in 2003, investigating the valorisation of national parks in the Alps. She earned her PhD degree at the University of Erlangen-Nuremberg, Germany, in 2007 for a thesis about tourism and regional development in peripheral rural regions. Luisa worked from 2000 to 2003 as student and research assistant at the University of Munich. From 2004 to 2007 she obtained teaching assignments at the University of Erlangen-Nuremberg. Since 2007, Luisa has worked at the Swiss Federal Research Institute WSL. Her studies and her dissertation had been granted by the Cusanuswerk, a German student elite program. Her research interests cover topics around tourism, regional economics and regional development.

MMV4 PROCEEDINGS
PLACES

Recreational functions of rivers in Austria: an approach to the visitors' perspective

Sybille Chiari, Florian Schmid, Andreas Muhar and Susanne Muhar

Abstract — In the past Austrian rivers faced a series of human impacts leading to a loss of both ecological and social functionality. River restoration measures aim to improve this functionality, however, they are currently mostly targeted at ecological functions rather than at recreation. To prevent conflicts between ecological integrity and recreational needs integrated river management is demanded. So far river recreation in Austria is an unknown quantity, as profound data are lacking. The range of present river-based recreational activities can only roughly be estimated. The ongoing project "Future options for the development of riverine landscapes – space requirements for multifunctionality" aims to fill this gap. Concerning recreationists' dispersion, behaviour and preferences data is collected along three rivers (Enns, Drau, Lech). The first step of the methodological approach was an explorative preparatory study conducted in 2007. Qualitative face-to-face interviews should clarify which factors influence river recreationists in terms of how they perceive the river, what they appreciate about the setting and what compromises their quality of experience. Based on these results a semi-standardised questionnaire was developed for a quantitative survey conducted in 2008, covering topics such as visitation motives, use patterns, habits, and perceptive aspects using image-based choice statements. Additionally the extent of river recreation is assessed via peak-day observations documenting recreational characteristics like number of visits, length of stay and activities. Preliminary results indicate that most people associate calmness and relaxation with river recreation rather than adventure and action. In particular, the acoustic scenery and certain natural attributes play a major role. Most people state, that they prefer natural river sections for recreational purposes. However, some ecologically valuable features such as woody debris seem to bother them. Further steps aim to identify key factors for the usability of rivers, integrating both objective factors such as the biophysical setting and subjective issues such as aesthetics and personal preferences.

Index Terms — Behaviour, preferences, requirements, river recreation, user survey

1 Introduction

River management underwent a paradigm shift in the past decades – changing the attitude from regulating rivers to restoring and protecting them. It became obvious that regulated river systems lack both ecological and social functionality. Integrative management approaches should therefore aim to re-establish ecological functions as well as social services of riverscapes.

With regard to Austrian rivers, a weightily part of the social functionality comprises opportunities for recreation and leisure activities such as angling, canoeing, swimming, barbecuing. Recreational activities are assumed to raise the awareness for ecologically intact rivers. There is a high demand to use rivers, but riverine space is rather limited due to river regulation. As a consequence visitors often concentrate in remnant close-

Sybille Chiari is with the Doctoral School Sustainable Development, BOKU University of Natural Resources and Applied Life Sciences, Vienna, Austria,
E-mail: Sybille.Chiari@ boku.ac.at.
Florian Schmid and Susanne Muhar are with the Insti-tute of Hydrobiology and Aquatic Ecosystem Management, BOKU University of Natural Resources and Applied Life Sciences, Vienna, Austria. E-mail: Florian.Schmid@boku.ac.at. E-mail: Susanne.Muhar@boku.ac.at
Andreas Muhar is with the Institute of Landscape Development, Recreation and Conservation Planning, BOKU University of Natural Resources and Applied Life Sciences, Vienna, Austria. E-mail: Andreas.Muhar@boku.ac.at.

to-nature sites that at the same time act as refuge for threatened species. Restored areas where access to the river is provided for recreationists - more or less intended by river managers - therefore quite often become hot spots for recreation. To deal with the sometimes conflicting interests, both social and ecological aspects have to be considered within an integrated management approach. The outcomes of the presented study aim to facilitate and foster this process.

2 Context and Focus of the study

This paper has been prepared in the context of the interdisciplinary research project "Future options for the development of riverine landscapes – space requirements for multifunctionality", conducted in the framework of the Doctoral School Sus-tainable Development at BOKU University of Natural Resources and Applied Life Sciences Vienna, Austria (duration 2007-2010).

Assuming space to be one of the most limiting factors for sustainable river management in Austria, the study focuses on spatial prerequisites for multifunctional riverscapes, considering ecological services and social services in a synergistic rather than competing way. An obstacle when trying to harmonise these two aspects is the imbalance of data that is available. For most rivers biotic and abiotic data are available, whereas data concerning river-based leisure activities are lacking. This fact makes an evaluation of the recreational potential of close to nature river sites or sites that are to be restored rather difficult.

Therefore one major focus of this study is to fill this gap and assess the extent of recreational activities as well as the behaviour and motives of visitors on selected sites. Beside that, particular ecological data are collected, indicating interdependencies between social and ecological functions.

3 Area of Investigation

The study focuses on three Austrian alpine gravel bed rivers: River Enns in Styria, River Drau in Carinthia and River Lech in Tyrol. With this selection different biophysical and managerial conditions can be compared, as the sites cover a wide range of hydromorphological statuses (close-to-nature, restored, impaired) and protection categories (national park, nature park, EU-Natura 2000 sites etc.). In total, nine study sites – three per river – have been selected for closer investigation.

4 Methods

As the study aims to combine ecological data and recreational data a multi method approach was chosen (Fig. 1).

A good part of the data needed for the ecological evaluation of the sites is provided by prior studies (M. Jungwirth et al. 1996; S. Muhar et al. 2008; S. Preis und S. Muhar in prep.; A. Zitek und S. Schmutz in prep). Additionally gravel breeding birds – Common Sandpiper and Little-Ringed Plover – were mapped as indicator species, as they react rather sensitively to human disturbances.

Concerning recreational data, we have to deal with an unknown quantity. Therefore the first step was to assess empirically what issues are commonly relevant for river recreation in particular from the visitors' point of view. Therefore an exploratory study was carried out, in the course of which 46 qualitative, semi-structured interviews were conducted on selected sites at river Enns (Fig. 2) in 2007 (F. Schmid in prep.).

The guideline used for these interviews covered issues like motivation for visiting, perception of the site and activities performed by the visitors. Based on the results of this qualitative study a standardised questionnaire was developed (P. Atteslander 2006) for the quantitative survey (Fig. 3). This survey was carried out in summer 2008 along all three rivers.

To assess the extent and intensity of river

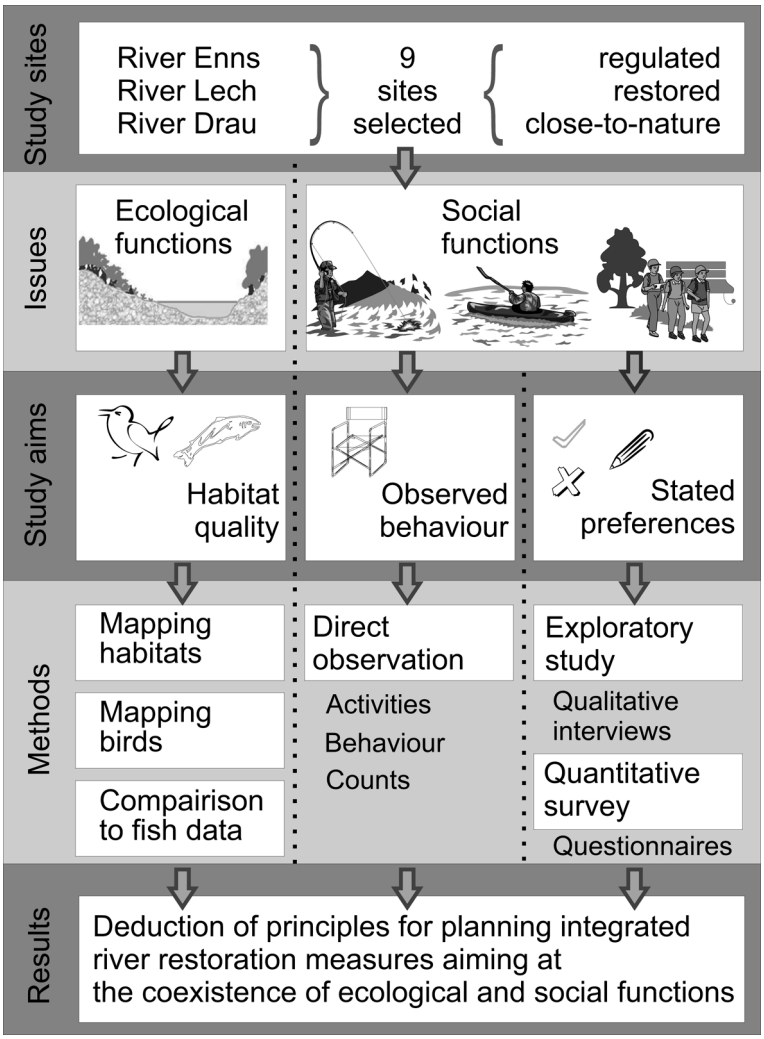


Fig. 1. Study design (S. Chiari 2008)

Fig. 2: Survey sites of the exploratory study at River Enns.
Left: restored site close to town Schladming. Right: Site situated in the National Park “Gesäuse”.

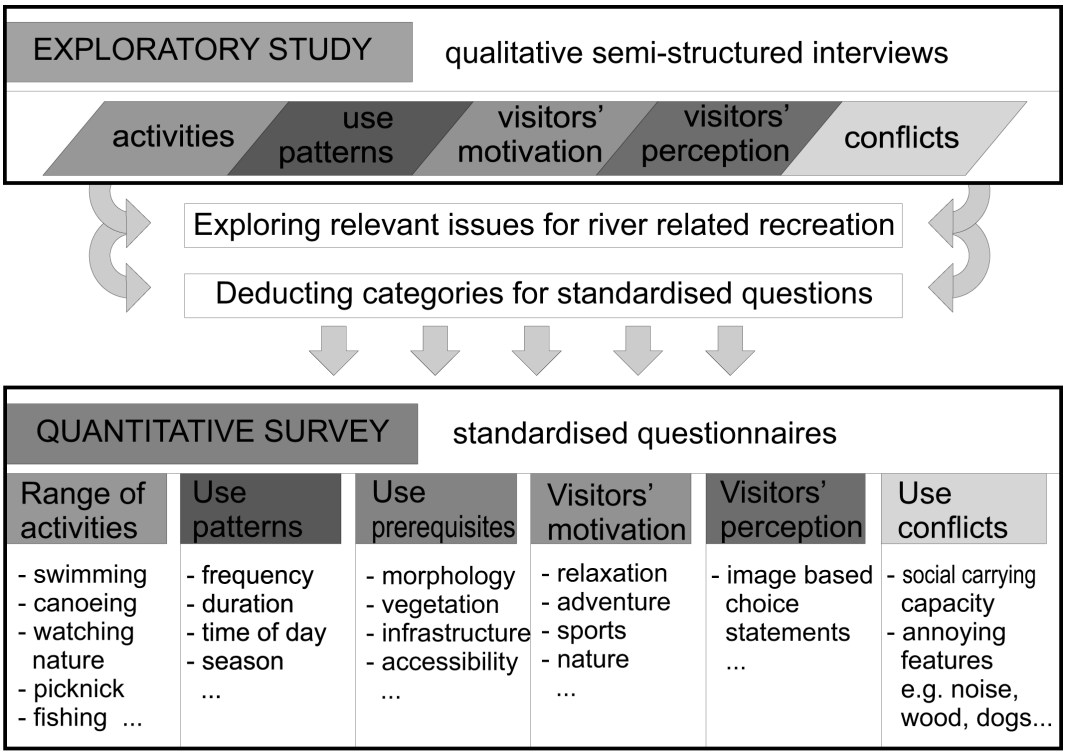


Fig. 3. Survey methods

recreation peak-day observations were carried out on the nine selected sites documenting recreational characteristics like number of visits, length of stay and activities. Additional to these local site-specific data, the recreational potentials and the actual uses were evaluated on a more regional scale. For this, the observer canoed down the investigated river sections (River Enns 15km, River Lech 22km, River Drau 35km) documenting all users, activities and their spatial references. This enables the identification of recreational hot spots and provides data for the ongoing spatial analysis of use distribution and use patterns.

5 Results and Discussion

Results presented here refer mostly to the exploratory study. Aiming to gain first insights into visitor's preferences and perception, the qualitative outcomes of this study cannot yet be generalized, as they reflect only a small part of the scope of interests. The intention was to detect relevant issues and first trends as a basis for the quantitative survey.

Concerning the motives for visiting a river section the results indicate that "contemplative motives" (M. Mönnecke et al. 2006) are dominating. About two thirds of the interviewed persons mention silence and / or relaxation to be motives for spending some time at a river. One third emphasizes that they appreciate the acoustic scenery of running waters and that this adds to the calming effect rivers have on them.

Concerning the usability, people state accessibility to the riverside but also to the water to be a vital prerequisite. Further water quality points out to be crucial for the quality of recreation, as comparable studies have already shown, e.g. Gobster et al. (1998) where water quality was proved to be "the chief concern".

When analysing comments people made on morphological issues, more than half of the persons stated that rivers should be able to flow freely. Almost half spoke out against river regulations and stated the demand for more natural river courses.

By way of contrast there were also persons - about one third - preferring riverscapes to be well maintained and looked after. This aspect is also reflected in the fact that many people appreciate facilities like benches a lot (see also P. H. Gobster and L. M.Westphal 1998). Whereas a small group of people is rather skeptic about too many facilities, as they could attract crowds of people or could spoil the naturalness of the site.

The same ambiguousness seems to exist in terms of how people perceive woody debris in rivers: the proportions of those who were bothered by wood and those who realize and appreciate the ecological value were almost balanced. The opponents called for the removal of wood for both aesthetic and / or security reasons. Similar aspects where found by Piegay et al. (2005), showing that photos with wood were perceived more natural but less aesthetically pleasing than photos with wood in 8 out of 10 case studies.

In terms of management, these preliminary results show, that accessibility, facilities and the perceived naturalness of river sections turn out be key factors attracting recreational use. Further details on these issues will be elaborated by merging the results from the exploratory study, the quantitative survey and the observation data within the next step of this project.

Acknowledgement

This research project has been conducted in the framework of the Doctoral School Sustainable Development (DOKNE) at BOKU University of Natural Resources and Applied Life Sciences, Vienna, Austria, funded by the Austrian Sustain-ability Research Program proVISION of the Federal Ministry of Science and Re-search as well as by the Federal Ministry of Agriculture, Forestry, Environment and Water Management and the Bundesländer Lower Austria, Styria, and Vienna.

References

[1] P. Atteslander, "*Methoden der empirischen Sozialforschung"*, Berlin, 2006.

[2] S. Chiari, S. Muhar, A. Muhar, "Linking ecological and social aspects of river restoration - first experiences from a case study on Austrian rivers", Proc. *4th Conference on River Restoration*. San Servolo Island, Italy, 2008.

[3] P. H. Gobster und L. M. Westphal, *People and the river. Perception and use of Chicago waterways for recreation*, Milwaukee,Wisconsin: National Park Service, Rivers, Trails, and Conservation Assistance Program, 1998.

[4] M. Jungwirth, G. Zauner, S. Muhar, J. Kleeberger and T. Kucher (1996) "*Die steirische Enns – Fischfauna und Gewässermorphologie",* Universität für Bodenkultur, Wien, 1996.

[5] S. Muhar, M. Jungwirth, G. Unfer, C. Wiesner, M. Poppe, S. Schmutz, S. Hohensinner and H. Habersack, "Restoring riverine landscapes at the Drau River: successes and deficits in the context of ecological integrity". Proc. *Gravel-Bed Rivers VI: From Process Understanding to River Restoration.* Amsterdam, 2008.

[6] H. Piegay, M. Mutz, K. J. Gregory, M. Rinaldi, V. Bondarev, A. Chin, B. Wyzga, N. Dahlstrom, J. Zawiejska, A. Elosegi, S. V. Gregory and V. Joshi, "*Public perception as a barrier to introducing wood in rivers for restoration purposes."* Environmental Management*,* vol. 36, no. 5, pp. 665-674, 2005.

[7] S. Preis, S. Muhar (in prep.): *"Evaluierung flussbaulich - ökologischer Maßnahmen an Lech und Vils im Rahmen des Life - Natur Projektes Wildflusslandschaft Tiroler Lech"*, Endbericht, Fachbereich: Aquatisch-terrestrische Lebensräume.

[8] F. Schmid (in prep.): "*Freizeit- und Erholungsnutzung an Fließgewässern: Kriterien aus Sicht der Nutzer an der steirischen Enns",* MS thesis, University of Natural Resources and Applied Life Sciences, Vienna.

[9] A. Zited and S. Schmutz (in prep): *"Evaluierung flussbaulich - ökologischer Maßnahmen an Lech und Vils im Rahmen des Life - Natur Projektes Wildflusslandschaft Tiroler Lech"*, Endbericht, Fachbereich: Fischökologie.

An importance-performance study of visitor opinions concerning access into the countryside of Ceredigion

Ian Keirle

Abstract ó It is important that countryside resource managers gain a full understanding of visitor needs and develop suitable facilities and infrastructure to respond to them. Importance-Performance Analysis (IPA) is a simple and effective technique that can be used to identify those attributes of a product or service that visitors consider to be important and to gain responses on how these attributes are performing. This study based in the county of Ceredigion in Wales, used IPA to find the relationship between importance and performance for a range of attributes relating to the management of access into the countryside, covering the areas of infrastructure, information and product acceptability. The results indicated that attributes relating to infrastructure such as signposting and stiles were not performing to visitor expectations and issues relating to dog mess caused visitors the greatest concern. When sub-divided by user type the results showed a clear segregation as to what different user types considered important and their perception of performance.

Index Terms ó Access, Importance-Performance Analysis, infrastructure, service quality.

1 Introduction

This study uses the Importance-Performance Analysis (IPA) technique to help understand aspects of the management of access into the countryside of Ceredigion in Wales as part of the process of developing a Rights of Way Improvement Plan for the county. The study sought to find out which aspects of the management of access into the countryside visitors thought important, and how these aspects were performing in practice. Gaps between importance and performance are 'service gaps' that need to be considered for future management.

Ian Keirle is with the Institute of Biological, Environmental and Rural Sciences, Aberystwyth University. E-mail:ike@aber.ac.uk.

2 Importance-Performance analysis

IPA is a research technique developed within the discipline of marketing that has since been applied to a wide range of subject areas [1], [2], [3], [4], [5], [6], [7]. IPA seeks to establish the relative importance of different service and product attributes and compares them with how they are performing. This is carried out using a three stage approach. First, a set of product or service attributes is developed. These will be in the form of statements such as 'It is important to me that paths are fully signposted and easy to follow'. Secondly consumers are asked to rate how important these attributes are and how they are performing using a Likert scale [8], [9]. In this survey a five point Likert scale of 'extremely important'; 'somewhat important'; 'neutral'; 'not very important'; 'not at all important' was used with an additional option of 'I have no opinion'. Finally importance and performance

values are calculated from the collected data. For this survey these were calculated by allocating a score of +2 for responses under the 'extremely important' category; +1 for 'important'; 0 for 'neutral'; -1 for 'not very important' and -2 for 'not at all important'. For each attribute a mean score for all respondents for importance and performance can be calculated (referred to as the IP value) such that the mean score of the importance and performance of each attribute can be compared.

3 METHODOLOGY

This survey was conducted using a one-to-one questionnaire research instrument by means of a representative sampling methodology [9], [10], [11], [12]. The questionnaire form and the sampling methodology was developed using a two phased approach. An initial draft questionnaire and sampling method was developed by the author, based upon a review of relevant literature. This draft was used as the basis for discussion with a range of experts from within Ceredigion, representing a range of organisations who have an interest in the management of countryside access. This included the academics from Aberystwyth University, staff from the International Centre for Protected landscapes, the Countryside Council for Wales, the Forestry Commission and Ceredigion County Council. A large amount of consideration went into the selection and wording of attributes that were to be explored. Following from their comments and constructive criticism, the survey form and sampling method was further developed before three days of pilot testing in the field. Further alterations were made based upon the pilot test prior to full implementation.

Sampling was carried out at nineteen countryside locations chosen to represent coastal access, managed sites, managed walks and open countryside. Visitors were sampled on site using the random sampling technique of choosing to interview the next person to come past the interviewer after two minutes. Individuals from groups were selected by asking who from the party had the next birthday. The survey was completed over the months of July, August and September 2005 with survey days running from 10am to 4pm. Each site was surveyed twice, once on a weekday and once on a weekend day. A total of 259 individuals were selected for interview of which 211 agreed to take part giving a refusal rate of 19%.

4 RESULTS

4.1 Analysis of all user groups

Fig. 1 shows that for the majority of attributes that performance was not matching importance. Some general patterns are present:

- There was concern about signposting with people feeling that there was a need for paths to be fully signposted and they should contain distance and destination information.
- There was a large gap between importance and performance with regard to the attribute 'I think it is important that paths are clear of dog mess'.
- There was no discernable gap between importance and performance with regard to attributes concerned with the availability of 'named managed sites', 'named managed routes', 'short circular walks' or 'challenging walks'.

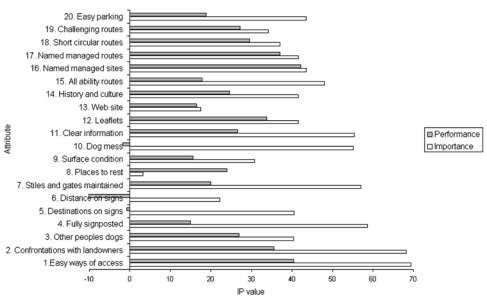


Fig. 1. Importance-performance values for all interviewees.

- The performance score for information for the attribute 'I think it is important that there is clear information about where to go in the countryside' does not match with the perceived importance for that attribute.

4.2 Analysis by user type

To find out if IP scores were influenced by the type of user a question was asked that allowed interviewees to be categorised. This followed the model used by the Wales Tourist Board to categorise visitors to Wales. Interviewees categorised themselves as belonging to the following classes:

Dedicated active – Almost all time away spent doing a specific outdoor activity (9.6% of interviewees)

Heavy active – Majority of time spent away doing a specific outdoor activity (22.5% of interviewees)

Light active – Like to do outdoor activity but interspersed with non-energetic pastimes (49.8% of interviewees)

Stroller – Do little energetic outdoor activity but want to spend time exploring the area (18.1% of interviewees)

When analysed using these categories some interesting patterns emerged with clear differences apparent between the different user types. Within the limitation of this paper the two categories of user will be used as illustration, namely dedicated actives and light actives.

Fig.2 shows the results for the group of interviewees who considered themselves to be dedicated actives. This group:

- Have concerns about dog mess and confrontations with landowners.
- Feel that the signposting needs to be improved and should contain distance and destination information.

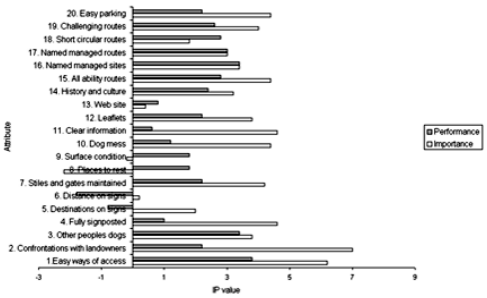


Fig. 2. Importance-performance values for interviewees who considered themselves to be dedicated actives.

- Would like stiles and gates to be better maintained.
- Feel that the surface condition of paths is OK and that having adequate places to rest is not very important.
- Would like clearer information including leaflets.
- Do not feel there is a need for more named managed sites or named managed walks.

Fig.3 shows the results for the group of interviewees who considered themselves to be light actives. This group:

- Appear to be very concerned about confrontation with landowners.
- Would like better signposting, including destination information to be added to signs but are less concerned with adding distance information

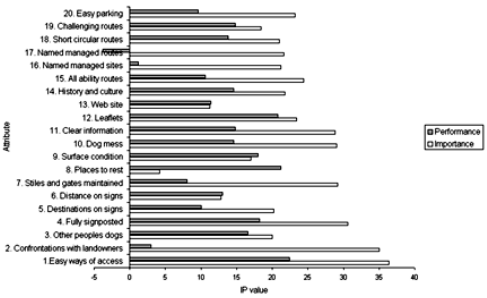


Fig. 3. Importance-p erformance values for interviewees who considered themselves to be light actives.

- Would like better maintenance of stiles and gates.
- Would like more provision in the way of all ability routes, named managed sites and named managed routes.

5 Conclusion

The results give a graphic demonstration of the issues that need to be addressed in the future management of access into the countryside of Ceredigion. Of particular interest are the differences in the responses of different user types. The two user groups illustrated in this paper show considerable variation in the importance they attached to the differing aspects of the provision of infrastructure such as signs and gates and of managed countryside. There are also clear differences in how the two user groups rated performance, probably reflecting different behavioral norms.

This research has clearly demonstrated the potential of the Importance-Performance Analysis technique to yield useful management information about the management of access into the countryside. The technique is simple to use, easy to analyse and produces data in a form that is easily understood by a range of managers, funding agencies and politicians. As such it is a useful tool in any countryside resource managers toolbox.

References

[1] C. Ellis and H. Vogelsong, "Measuring Bird-watcher Preferences Through Importance-Performance Analysis," *Proceedings of the 2003 Northeastern Recreation Research Symposium, Department of Agriculture, Forest Service*, pp. 203-210, 2003.

[2] C. Ennew, G. Reed and M. Binks, "Importance-Performance Analysis and the Measurement of Service Quality," *European Journal of Marketing*, 27 (2), pp. 59-70, 1993.

[3] F. Guadagnolo, "The importance-performance analysis: An evaluation and marketing tool," *Journal of Park and Recreation Administration*. 2, pp. 13-22, 1985.

[4] K. Hunt, D. Scott and S. Richardson, "Positioning Public Recreation and Park Offerings Using Importance-Performance Analysis,"*Journal of Park and Recreation Administration*. 21 (3), pp. 1-21, 2003.

[5] S. O'Leary and J. Deegan, "Ireland's Image as a Tourism Destination in France: Attribute Importance and Performance," *Journal of Travel Research*, 43, pp. 247-256, 2005.

[6] J. Martilla and J. James, "Importance-Performance Analysis," *Journal of Marketing*, January, pp. 77-79, 1977.

[7] J. Tonge and S. Moore, "Importance-satisfaction analysis for marine-park hinterlands: A Western Australian case study," *Tourism Management* 28, pp. 768-776, 2007.

[8] C. Ryan and R. Garland, "The use of a specific non-response option on Likert-type scales". *Tourism Management*, 20, 107-113, 1999.

[9] A. J. Veal, *Research Methods for Leisure and Tourism: a practical guide*. London: Pitman Publishing, 1997.

[10] P. Brunt, *Market Research in Travel and Tourism*. Oxford: Butterworth-Heinemann, 1997.

[11] M. Finn, M. Elliott-White and M, Walton, *Tourism and Leisure Research Methods*. Harlow: Longman, 2000.

[12] A. Oppenheim, *Questionnaire Design, Interviewing and Attitude Measurement*. London: Pinter, 1992.

Ian Keirle has an MSc. in Countryside Recreation Resource Management (Salford 1984) and a BSc in Geography (Swansea 1982). He currently works as a lecturer at Aberystwyth University and previously worked for the North Yorkshire Moors National Park, the Royal Society for the Protection of Birds and the Nature Conservancy Council. He is author of a text book (I. Keirle *Countryside Recreation Site Management: A marketing approach*. London: Taylor and Francis, 2002). His research interests lie in the areas of countryside access, recreational site management, observational studies of countryside usage and the use of automatic people counters.

Affinity to place and serious leisure: implications of amenity migration for nearby recreational and protected areas

Linda E. Kruger

Abstract — People have long been attracted to places with high amenity values. The first Baby Boomers have begun to collect Social Security checks and many more will follow. Increasing retirees who make up a growing numbers of migrants are moving into communities fortunate to have highly valued environmental and cultural resources and recreation opportunities. Tourists and retirees are drawn to natural amenities and opportunities for both tranquillity and adventure. Wilderness can be especially attractive and introduces people to rural and remote locations. Resort real estate, full and fractional ownership arrangements (time shares), residence clubs, and a variety of other options provide an array of investment possibilities. Rapid growth of retirees has implications for communities and public land managers. For land managers, growth is likely to increase population density in proximity to public lands, increase pressure on riparian and other environmentally sensitive areas and increase the demand for recreation opportunities and facilities. The changing values within the neighbouring community may change the issues and concerns residents have about recreational and protected area management. Healthy retirees are looking for a variety of recreation and volunteer opportunities. Communities need to consider infrastructure, especially in health and transportation sectors. As amenity migrants settle in their new community, the physical changes are readily apparent: new homes, new business, new roads, rising real estate values. Rising levels of disposable income among the middle and skilled working classes and the growth of a “leisure society” with time for recreation and travel have fueled demand for recreation. What are the implications for recreational and protected area management? This paper explores concepts of place and serious leisure as they are related to amenity migration and implications for management of recreational and protected areas near amenity communities. How can these concepts inform our understanding of the changing demands of amenity migration communities? In what ways are concepts of place attachment and sense of place useful in planning for change in high amenity communities and the surrounding recreational and protected areas?

Index Terms ó Recreational and protected areas, place’s affinity, leisure.

Linda E. Kruger is with the USDA Forest Service, 2770 Sherwood Lane, Ste. 2A, Juneau, AK 99801 USA.
Email: lkruger@fs.fed.us.

Slovenia:
a case-study in sustainable rural development for agriculture and tourism

Marko Koscak

Abstract — This paper deals with the concept of the heritage trail which main purpose is rural regeneration through sustainable tourism. A heritage trail is a regional network of natural and cultural heritage sites, activities and tourism facilities which is created with a well defined product identity in order to support an interesting and varied tourist visit up to one week. The heritage trail does not necessarily have a single theme, with the visitor following a pre-determined route. It can be designed as a coherent menu of natural, cultural and landscape attractions, out of which visitors can create their own itinerary. The aim of heritage trail marketing is to attract the visitor to the region in the first place, by offering a specific and attractive experience. Once in the region, other facilities and experiences can be offered which are not featured in the heritage trail promotion itself

Index Terms — Heritage Trails, Dolenjska, Bela krajina, Slovenia, planning, carrying capacity, marketing.

1 Introduction

It is a paradox that the decade of the 1960's - which saw the roots of modern sustainable tourism, in the world-wide movement for resource-conservation & limits of development, gave rise to a destructive counter- phenomenon! The counter-problem was the explosive rise in air-based international tourism. This transport and revolution was to become damaging to the environments and cultures of tourist destination-regions. It has taken 40 years to respond effectively to this demanding global process, and to start to achieve sustainable rural regional tourism products & realities.

The rural case-study which is presented, is one of a region in slovenia along the border with croatia, where we track the 10 year process, from preliminary idea - to the operational reality of sustainable international tourism in a strategically-located destination-region.

2 Origins and catalysts

The 30 year period from 1960-1990 saw distinct phases of evolution in tourism, planning, and conservation-thinking and actions in the western world. The indicative bibliography, at the end of this paper, shows how a sequence of publications in the french, german, and english-speaking worlds, developed this field, in parallel streams, over time. This led to concepts and processes of sustainable tourism-planning. By the end of the 1980's a uk national task force on 'tourism &the environment' was set up in order to provide sustainable tourism guidelines for three problem-categories:

1) the countryside 2) heritage sites and 3) historic cities and towns.

Several key actors and catalysts can be identified in this story : a national ministry of agriculture (in slovenia), the bavarian ministry for agriculture, a faculty of architecture in ljubljana, the european commission's tourism directorate, a regional chamber of com-

merce, and that of a commercial tourism operator, plus later - use of a market research consultant.

3 Integrated rural community development project

Crpov programme (integrated rural development and village renovation), which started in 1990, was associated both with the fao, and with the bavarian ministry for agriculture. Bavaria helped in the initial phase transferring experience and know-how. Crpov was based on a bottom-up approach, involving an initial 14 local project-areas, in1991. Two villages were located in trebnje municipality, and around 500 local residents were involved in the project. During this period around 250 local projects were developed in Slovenia, primarily aimed at development possibilities for rural economic diversification.

The community development role of crpov involved many local village meetings, linked to the economic need for diversification of the rural economy. Crpov worked together with an expert team on strategy and action. Critically, our case-study of a rural region sits strategically between ljubljana and Zagreb, on the international motorway from belgrade to ljubljana. This has a high location potential for selling locally-sourced food and wine products, as well as craft- and tourism products. Tourism is based on the appeal of a gentle landscape of hills, and river-valleys for walking, horse-back riding, cycling, angling, rafting, or the simple enjoyment of its unspoilt character!

Crpov as integrated rural community development, led the way to rural product development, and as a by product, community based sustainable tourism. Such tourism requires partnership and co-operation between the public, private and the ngo voluntary sectors. Co-operation of this sort was not common in the period 1992 -1995 in slovene tourism. It was clear, however, that sustainablity -in slovenia or anywhere else, requires community involvement, and the commitment of local actors and producers. The appeal of such action, is to add tourism products to the other rural products ,which they complement.

Community-based rural development is thus an ideal starting point for sustainability, whether in agriculture, and /or in tourism. This creates an 'environment' in which new opportunities for economic diversification, new job-creation, added value to agricultural products, local guiding, and new farm-services can occur. In this process, institutions like an agricultural extension service and others play a very important role, in terms of capacity-building, and of human resource development.

Crpov resulted in the creation of a tourism product, by offering a themed 'commercial package', by linking with Slovene railways, in developing a one-day tour. This theme was the main idea of a development strategy, one result of which was an 18kms. Long baraga walking-trail. Initially, this product was offered to school pupils. The response was limited, as there was no commercial partner to market and sell the product on the domestic market. However, there were improvements in infrastructure, and in housing, plus local training-schemes to create business opportunities. In 1996, the project was given an award in munich, as part of arge- 'landentwicklung und dorfeneurung' development competition. This was also a confidence-building phase for rural people locally, later enabling them to become part of a broader, regional project, with its tourism elements.

4 International team heritage trail consultancy

This background of crpov and the wine trails, prompted regional chamber of commerce of the region of dolenjska and bela krajina to accept an invitation by a consortium - who in 1996 secured european union funding to launch two pilot projects in slovenia and bulgaria, to create heritage trails. The consortium included ecotourism ltd., a British consultancy firm, prisma -a greek consultancy firm, and ecovast- the european council for the village and small town. All of these were supported by regional and national institutions in

the field of natural and cultural heritage.

The uk/slovene h.t. team conducted a tourist resource inventorying & selection, based upon natural-, built-, and living cultural heritage resources of the selected region. Some 150 sites were identified and proposed by the different partners involved in the participation process, for the heritage trail. From this large number,28 sites were selected, to be networked in a trail system for the area. The idea was to develop a tourist product which can offer opportunities for stays of up to seven days in the region. Two key access-forms were used for the clustering of attractions, one a "flower structure", and the other a "garland structure". Existing tourist assets and potentials were the basis of these groupings.

A major result of this work, was the creation of a regional partnership of 27 organisations, from the public, private and ngo sectors, which signed an agreement to co-operate in the h.t.'s implementation phases of marketing and product development. This partnership - working under the umbrella of regional chamber of commerce, is now 10 years old, and is still going strong. It supports, co-ordinates, and brings together the provider-partners. Work in general consists of marketing activities, product development, and training activities, where different combinations of partners, institutions, and individuals are involved.

For marketing purposes, a commercial partner - Kompas novo mesto, was brought into the partnership in 2001, as it was necessary to have a much "stronger attack" on foreign markets. Kompas was to act as the marketing agency, on behalf of ht partnership. Although the official launch of the product was in 1997, at the world travel market in London , followed in1998- by a presentation at itb/ tourist fair in Berlin, there was no significant response. Foreign markets at that time had limited awareness about any Slovene tourist products , other than the constantly-featured "traditional Slovene tourist Ikons", such as lake bled, Kranjska Gora ski resort, Postojna cave, and Portoroz seaside resort. The effective commercial launch of the h.t. internationally, with a foreign tourist industry adviser, and a much more professional co-ordinated national approach, was delayed until2002, in London. There, at the wtm, the launch had the active support of the Slovene tourism board, plus other relevant institutions

5 Stages of commercial product adaptation, and implementation

After the launch of the h.t. to the domestic market, the international launch of the trail was at the world travel market in 2002, but this did not give rise to responses by foreign tour-operators and travel agents. It became clear that external help was needed to find such foreign trade partners, and identify the niche markets selected and targeted. External consultant, prof. Travis became employed in this role.

From travis's market research on slovenia's key foreign markets, the special interest markets, with a focus on either cultural tourism or nature- tourism (eco-tourism) were selected. Independent and some major commercial operators were to be approached by phone, fax, or on-line. 200 firms were identified in 7 european countries. 60 firms were contacted by at least two contact modes, but only 6 showed some interest!

The problem revealed was that though there is much interest in slovenia as a high-growth.

Destination country, it is seen by the international industry as one with 3 major attractions or 'tourist ikons', already mentioned. For a long time Slovene overseas marketing

Focused only on these well-known destinations! by 2003, low-cost airlines made slovenia easily accessible to high spend markets. Air travel cannot be a basis for sustainability, but may have to be used to 'open -up a destination' to international markets-in the first place. Rail travel access must be the aim ! The h.t.product offered was being linked to an air-gateway at Ljubljana or klagenfurt, with access routing via Ljubljana. In-depth contact with key operators by phone showed that there were two viable special- interest packages, which could appeal commercially:

1) a heritage trail add-on package to offers at bled, or ljubljana ;
2) an integrated new 'highlights of slovenia' holidays, which started with 25% of their time at two existing ikons (bled & ljubljana), then the remaining 75% time allocation spent on the heritage trail.

Testing of this product with a group of 6 uk professionals was extremely successful. A second tour with tour-operators from germany & the uk -in 2004, was less successful. In 2005 a specialist walking- tour firm assembled its bespoke and individualised ht offer, and independent tour operator firms are preparing for launching on-line, two individualised alternative packages -already indicated.

6 Conclusions and findings

A) Because the heritage recycling for tourism phase, was preceded by the work on integrated rural community development, there was a community-based approach to development. In this context, tourism was a part of the economic mix. This created a real hope of sustainability via the local communities' support for a new mixed economy. Sustainable development can underpin successful tourism, if the right strategy is chosen.

B) Heritage-resource based tourism development, if it is to be sustainable, must:
   - show respect for the carrying capacity of resource- zones -be they robust or fragile,
   - have rural community involvement and commitment to tourism, because they have a stake in it, and have net gains from it.

C) Much tourism development arises because the destination creates potential tourism. Products, because they want economic gain from them. Rural tourism products have to be adjusted to fit niche market demands, that are highly competitive sectors internationally. Thus market awareness and understanding must be built-in early in the development process, or it becomes much longer and harder!

D) New tourist destinations are very difficult to launch internationally, even if they have high accessibility, unless they can be linked and tied in to existing tourist ikons or magnets. This new slovene offer had to be adjusted , to do just that.

E) The "gateway" identification is critical in new product formulation. Whether this be a selected airport, seaport, railway station or whatever. If the gateway is the airport of an attractive heritage city (like ljubljana), then both add-on package possibilities, as well as links to a popular 'short-city break' destination, add great value!

F) Continuity of personnel in a development process is of real importance: project manger's initiating, and continuity role- has been critical, and the continuing interactions with external partners- who were supportive & shared a belief in the integrity of the development, over a long period of time, also valuable.

G) This model ultimately is one of multiple stake-holders, community -based, and having the equal support of small rural operatives, and major agencies. The support from several levels: local, regional, national, and international have enabled this 13 year development -cycle to be achieved.

7 Adapting the Slovene h.t. model for neighbouring countries

There are good reasons why the slovene h.t. model is being successfully adopted in several neighboring countries as an initiative for rural regeneration through sustainable tourism, namely:

A) Economic regeneration. A heritage trail is created as a tool for rural economic regen-

eration. The heritage trail extends tourism from existing centres into new and undervisited areas, by increasing the number of visitors, extending their stay, and diversifying the attractions and services offered to them: expansion, extension and diversification.

B) Contributes to regional tourism development. The heritage trail is a tourism product which makes the natural and cultural heritage of a region the focal point of the offering. The development of such a product is, therefore, an integral component of the development of the whole region as a tourism destination. However, a heritage trail is only one product, and many regions have other tourism products on offer which may not be included in the trail. In creating heritage trails in slovenia, there was frequently a temptation to include all tourism attractions and services in the region. But to give into such a temptation would have been to lose the focus of a well defined tourism product.

C) Complements other tourism products. Although a heritage trail focuses on only some of the attractions of a region, it can be complementary to other tourism products on offer. For example, it can contribute to economies of scale in regional promotion - in slovenia, the heritage trail and spa tourism were promoted jointly, and costs of this shared. A heritage trail can also contribute to a wider choice of products for target markets. Taking the example of slovenia again, spa tourists may be interested in the heritage trail product, and heritage trail tourists may enjoy the spa facilities.

D) Transferable. The heritage trails concept is transferable to other regions and countries where there is sufficient natural and cultural heritage to attract tourists and where there is a local desire both to benefit from tourism and to safeguard that heritage. This is particularly the case in parts of central and eastern europe where established settlement patterns and rural economies have developed similarly to those in slovenia.

E) Sustainable tourism. A heritage trail focuses on the natural and cultural assets of a rural region. This runs the risk of exposing some of the most vulnerable sites in a region to excessive numbers of tourists. The preparation of a heritage trail, therefore, must include a tourism »carrying capacity study« at each proposed tourism site. If a sudden increase in tourists risked damaging the physical or natural attributes of a site, or if it were to exceed the tolerance of the local people, it should not be included in the heritage trail until preventive measures can be implemented.

Marko Koscak, heritage trail manager, Dolenjska and bela krajina heritage trails marketing association, p.p.11, 8001 novo mesto, Slovenia

Farm tourism experiences in rural Australia: a continent-wide study of geographical distribution and socio-economic characteristics of farm tourism operators

Claudia Ollenburg, Ralf Buckley

Abstract — Worldwide changes in agricultural commodity prices and production systems, coupled with increasing demand for rural tourism in urbanized developed nations, have lead many farm landholders to turn to tourism operations as an alternative or additional source of income. The proportions of farmers and rural landholders who have made this move, however, differ considerably from one country to another, and between different areas in the same country. There is a great demand side interest to visit farms, but only some farm landholders provide a tourism experience. For the purpose of this paper tourism experiences on farms include accommodation and activities. A revealed preference approach was applied, at a continent-wide scale examining the geographical distribution and socio-economic characteristic of Australian farm tourism operators. Using multiple data sources, we inventoried, mapped and characterized all known Australian farm tourism enterprises, and examined patterns using both size-based and multi-criterion classifications. Results from revealed-preference analyses are congruent with stated-preference studies but yield considerable additional information and insights. There are clusters of farm tourism enterprises close to cities and gateways, and isolated operations in more remote areas. We identified four groups of farm tourism providers: full-time, part-time, retirement and lifestyle operators. Characteristics of the farm property and business, the farming family, and the farm tourism business differ significantly between groups. Most (88%) of these farm tourism operators offer nature-based as well as farm-based activities; and in aggregate, they use only four fifths of their land for farming, with the remaining fifth, presumably, potentially available for other recreational activities or conservation.

Index Terms — Nature tourism, rural tourism and experiences in recreational and protected areas.

Claudia Ollenburg is with the International Centre for Ecotourism Research, Griffith University, Gold Coast campus, Queensland, Qld 4222, Australia, Email: c.ollenburg@griffith.edu.au

Ralf Buckley is a professor in International Centre for Ecotourism Research, Griffith University, Gold Coast campus, Queensland, Qld 4222, Australia, Email: r.buckley@griffith.edu.au.

Optimizing the quality of experience-oriented nature-based tourism offers: the new evaluation tool “Experience Compass”

Dominik Siegrist and Karin Wasem

Abstract — In the past few years in Switzerland nature-based tourism has been showing a positive and fresh dynamic. New providers and co-operations enter the market with their products. But very often the new initiatives state problems with the quality of their products and are alone not able to design the products in a way that attracts the attention of a broad audience. An authentic design of the offers can contribute significantly to make them more attractive and visible and therefore stimulate the demand on the tourist market. The article here presented deals with the in-depth analysis of potentials regarding the improvement of the quality of experience-oriented nature-based tourism offers. Based on the results of an expert survey the “Experience Compass”, an evaluation tool of experience quality in nature-based tourism, has been developed and verified by means of case studies. With the new tool providers and other actors are enabled to evaluate and improve experience quality of offers in nature-based tourism.

Index Terms — Nature-based tourism, experience quality, offer development, evaluation tool, expert survey.

1 Introduction

The quality of experience forms an important basis for the success of nature-based tourism [5]. However, despite of an existing wide range of original natural, cultural and landscape values (“first nature”) the derived tourist offers (“second nature”) are not sufficient in terms of experience quality. Many of the nature-based products are missing a specific experience quality. Reasons for this phenomenon are a lack of the necessary knowledge on the side of the providers on one hand and a lack of financial resources on the other. The tourist infrastructure, which is in many cases not appropriate anymore, together with the measures for visitor guidance and management pose a problem. For structural modernization beyond the necessary often the financial means are missing [21].

It has been pointed out on various occasions that experiences are an integral part of post-modern recreational activities [17], [18], as well as specifically for nature-based tourism [13]. Solely beautiful landscapes are not enough to generate experience-oriented tourist offers [9], [14], [20]. This also refers to nature-based tourism and its principle. It is characteristic for this kind of experience offers that they are set in natural or semi-natural cultural landscapes. Thus the natural and cultural values of the setting form the main basis and must not be derogated in their significance and integrity. Based on these primary values the experience offers shall convey a high degree of authenticity and enable the visitors to actively experience the natural and cultural attractions with all their senses. Offers shall promote the locomotion through ones own strength, improve regional value added and at the same time be considerate of sensitive areas, environment and climate.

The result of this survey is the “Experience Compass”, a tool which supports the evalua-

tion and optimization of experience quality in nature-based tourism. This tool has been developed based on an expert survey and tested by means of different case studies [22]. Core element of the survey has been a series of qualitative semi-structured interviews, which have been conducted with 22 providers of nature-based tourism offers in Switzerland that have been selected according to specific criteria. The survey served to identify specific assessment criteria for experience quality in nature-based tourism and to document good practice examples. The new tool shall enable the providers and other involved actors to evaluate the experience quality on their own by means of an easy to use Excel application.

2 Results

The Experience Compass is based upon experience sectors, experience dimensions and the assigned assessment criteria (see fig. 1). The 5 experience sectors are the cornerstones of the assessment system; promising offers should comprise several or all of these sectors. The 17 experience dimensions are understood as different specifications of the experience sectors, which are relevant regarding the evaluation of the offer. The 41 assessment criteria are assigned to the experience dimensions and represent the actual tool for the evaluation within the Experience Compass (see fig. 2).

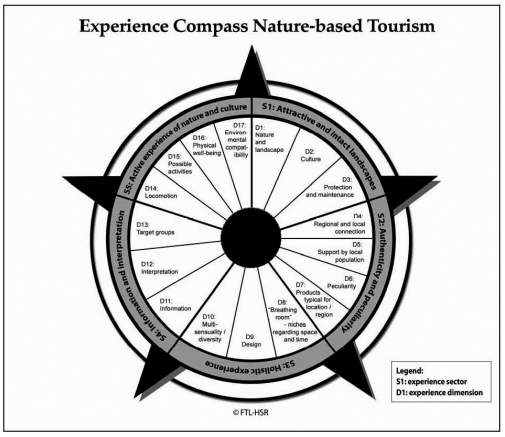


Fig. 1. Experience compass nature-based tourism

Experience sector "Attractive and intact landscape" (3 experience dimensions, 10 criteria)
The presence of attractive and intact landscapes forms the basis for offers in nature-based tourism. Attractive landscapes are characterized by variations of nature and culture; a rich diversity and contrast in terms of natural and cultural elements on a small scale is of great importance. A sustainable nature and landscape management (e.g., measures for protection, maintenance, and valorization of the landscape) shall assure the preservation of the inherent natural beauty [12], [15].

Experience sector "Authenticity and peculiarity" (4 experience dimensions, 13 criteria)
Authentic offers [20] are characterized by a strong reference to the natural, cultural and landscape values as well as to the current conditions of a location or a region. They emphasize the distinctiveness and peculiarity of a location or a region [10]. Authentic offers aim at a close contact with the local population and claim to permeate societal façades and coulisses and show the real social conditions of the visited places. The offer includes elements very peculiar for the location or the region. This also includes production of and marketing for regional products and services.

Experience sector "Holistic experience" (3 experience dimensions, 6 criteria)
In order to allow for intensive and holistic experiences offers should provide "breathing room" in terms of time and space. Slowness, disorganization and flexibility are among the central aspects of nature-based offer rich in experiences. When designing the offer natural, cultural and landscape elements have to be particularly considered. Architectural features should be designed in such a manner that shows an active examination of current conditions; they shall represent a symbiosis of local and foreign elements, of tradition and innovation. The offer enables the visitor

to experience with all the senses and allows for various forms of experiences (e.g., active, contemplative and cognitive experiences). The possibility to experience different elements of nature and culture within the same offer in an intensive and direct manner is one of the most significant aspects.

Experience sector "Information and interpretation" (3 experience dimensions, 4 criteria)
Nature-based tourism offers shall be designed according to the requirements and interests of the visitors. Information regarding particular natural or cultural attractions must be elaborated according to the respective target group and reveal the meanings which are hidden beyond the obvious and directly visible. The visitors shall be supported in interpreting the natural and cultural traces and phenomena in the landscape and put them into a wider context. Professionally designed interpretation does not only help the visitors to gain an understanding of the natural, cultural and landscape elements but also enables visitors to establish an emotional relationship [2], [11].

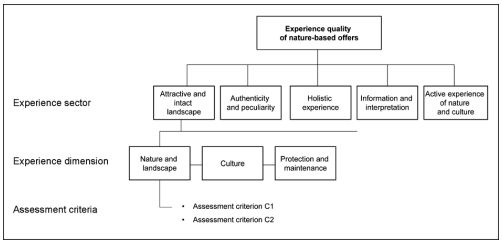


Fig. 2. Experience quality of nature-based offer

Experience sector "Active experience of nature and culture" (4 experience dimensions, 8 criteria)
The possibility for the visitors to actively appropriate nature and culture is one of the main prerequisites for a high experience quality. Central element is the locomotion through ones own strength (e.g., walking, hiking, rock climbing, snowshoeing). Also the possibility of a creative use of classic natural materials like stone, water, earth, snow and ice is of great importance as well as professionally guided activities like landscape design offers (building of dry-laid stone walls, thinning out of edges of the forest), sculpting courses or music events. The physical well-being while carrying out these activities plays a significant part regarding the quality of the experience. Thus, basic needs like catering and respites must be taken into account. Also requirements regarding safety and security as well as regarding sociability and privacy of the visitors should be considered. Especially in sensitive areas the activities should be carried out in a sustainable and environmentally compatible manner [7].

In order to verify and optimize the new Experience Compass, 31 offers chosen according to specific criteria have been evaluated.

Conclusion

The orientation towards experience is of significant importance in tourism. In today's experience-driven society also visitors in the sector of nature-based tourism are seeking for specific experience offers. However, the character of this kind of offers in nature-based tourism differs from the once in general tourism regarding several aspects:

- The experiences move emotionally, leave a strong impression and appeal to the visitors with regard to their specific needs and desires. They differ from other offers mainly in their authentic character. Moreover, they are mostly active or focused on certain activities respectively.
- Experience offers in nature-based tourism have a high degree of authenticity and are based on the landscape, cultural and historical peculiarities of the location visited. The exchange between local population and visitors is essential.
- Experience offers in nature-based tourism work without excessive emphasizing effects and do not need a consistent chain of experiences. Niches and flexibility in terms of time and space, the unforeseeable and

unpredictable are of great importance.
- Experience offers in nature-based tourism have got a more or less distinct ethic component. Therefore information and interpretation are important.

Recommendations

The following recommendations address the stakeholders of nature-based tourism, the providers of tourist services, the public authorities of state, regions and municipalities, planners and consultants as well as public and private institutions in the fields of nature, landscape and culture.

- The design and development of specific experience offers in nature-based tourism shall be promoted.
- Experience offers in nature-based tourism shall focus on the strength of nature, landscape and culture and shall be elaborated by involving the local population.
- Specific offers of basic and continuing education opportunities regarding experience management in nature-based tourism are needed.
- The establishment of regional enabler networks and local cooperation are of great importance for nature-based tourism.
- Quality management in nature-based tourism shall be assured according to specific criteria.
- Sustainable transport is to be promoted as an independent experience dimension.
- Together with the agricultural sector experience offers which incorporate local products shall be promoted.
- A professional marketing of experience opportunities in nature-based tourism shall be aspired.

References

[1] Bieger, T., Laesser, C. (Hrsg.) (2003). Attraktionspunkte. Multioptionale Erlebniswelten für wettbewerbsfähige Standorte. Haupt Verlag, Bern.

[2] Eder, R., Arnberger, A. (2007). Lehrpfade. Natur und Kultur auf dem Weg. Wien.

[3] Forster, S., Göpfert, R., Gredig, H., Jordi, N. (2007). Natur- und kulturnaher Tourismus in Graubünden. Fachstelle Tourismus und Nachhaltige Entwicklung der Zürcher Hochschule für Angewandte Wissenschaften, Center da Capricorns, Manuskript, Wergenstein.

[4] Gerdes, S., Siegrist, D. (2006). Erlebnisangebote im naturnahen Tourismus. In: Anthos, Zeitschrift für Landschaftsarchitektur Nr.4 / 2006, S. 10 - 15.

[5] Hammer, T., Siegrist, D. (2008). Protected Areas in the Alps – The Success Factors of Sustainable Tourism and the Challenge for Regional Policy. In: GAIA 17/S1 (2008): 152 – 160.

[6] Hunziker, M., Clivaz, C., Siegrist, D. (Eds). (2006). Monitoring and management of visitor flows in recreational and protected areas. For. Snow Landsc. Res. 81, 1/2. Haupt Verlag, Berne. 238p.

[7] INÖK (2004). Institut für Natursport und Öekologie. Neue Entwicklungen bei Natursportarten. Konfliktpotential und Lösungsmöglichkeiten. Schriftenreihe Natursport und Öekologie, Band 15, Köln.

[8] Kämpf, R. et al. (2005). Erfolgsfaktoren im alpinen Tourismus (= Studie der BAK Basel Economics im Auftrag des Staatssekretariats für Wirtschaft (SECO), Ressort Tourismus). Basel.

[9] Keller, P. (2006). Wettbewerb zwischen Destinationen: Werden natürliche und kulturelle Attraktionen auch in Zukunft eine Rolle spielen? In: Pechlaner, H., Bieger, T., Weiermeir, K. (Hrsg.). Attraktions-Management. Führung und Steuerung von Attraktionspunkten. (= Management und Unternehmenskultur. Schriftenreihe der Europäischen Akademie Bozen, Band 13). Wien.

[10] Kianicka, S., Gehring, K., Buchecker, M. & Hunziker, M. (2004): Wie authentisch ist die Schweizerische Alpenlandschaft für uns? In: Bündner Monatsblätter, S. 196-210.

[11] Kübloböck, S. (2001). Zwischen Erlebnisgesellschaft und Umweltbildung. Informationszentren in Nationalparken, Naturparken und Biosphärenreservaten. Eichstätter Tourismuswissenschaftliche Beiträge: Band 2. Wien.

[12] Mayer, M., Wasem, K., Gehring, K., Pütz, M., Roschewitz, A., Siegrist, D., Gehring, K. (2008). Wirtschaftliche Bedeutung des naturnahen Tourismus im Simmental und Diemtigtal – Regionalökonomische Effekte und Erfolgsfaktoren. Birmensdorf, Eidg. Forschungsanstalt für Wald, Schnee und Landschaft WSL, Hochschule für Technik Rapperswil HSR.

[13] McCool, S. (2006). Managing for visitor experience in protected areas: promising opportunities and fundamental challenges. In: Parks. Protected Areas Programme. The International Journal for Protected Areas Manager. Vol.16 (2006): No.2: pp 3-9.

[14] Müller, H.R. Scheurer, R. (2004). Tourismus-Destinationen als Erlebniswelt. Ein Leitfaden zur Angebots-Inszenierung. 64 Seiten, FIF Universität Bern, Bern.
[15] Nohl, W. (2001). Landschaftsplanung: ästhetische und rekreative Aspekte: Konzepte, Begründungen und Verfahrenshinweise auf der Ebene des Landschaftsplans. Patzer, Berlin.
[16] Pechlaner, H. et al. (2006). Attraktionsmanagement. Führung und Steuerung von Attraktionspunkten. Linde Verlag, Wien.
[17] Pine, J., Gilmore, J.H. (1999). The Experience Economy: Work Is a Theatre & Every Business a Stage. Harvard Business School Press, Boston.
[18] Pine, J., Gilmore, J.H. (2007). Authenticity. What Consumers Really Want. Harvard Business School Press, Boston.
[19] Romeiss-Stracke, F. (2006). Ist optimale Inszenierung möglich? In: Weiermair, K. & Brunner-Sperdin, A. (Hrsg.) (2006): Erlebnisinszenierung im Tourismus. Erich Schmidt Verlag, Berlin.
[20] Scheurer, R. (2003). Erlebnis-Setting. Touristische Angebotsgestaltung in der Erlebnisökonomie. Berner Studien zu Freizeit und Tourismus Nr. 43. Forschungsinstitut für Freizeit und Tourismus (FIF) der Universität Bern.
[21] Siegrist D., Stremlow, M., Wittwer, F. (2007). Natürlich naturnaher Tourismus. In der Nische erfolgreich. Grundlagenbericht. Staatsekretariat für Wirtschaft SECO, Bundesamt für Umwelt BAFU, Bundesamt für Landwirtschaft BLW. Gemeinsame Tagung am 6./7. September 2007 in Diesse (Bern, Schweiz). Download: www.sanu.ch/html/angebot08/archiv-de.cfm.
[22] Siegrist, D., Wasem, K. (2008). Erlebniskompass. Optimierung der Erlebnisqualität im naturnahen Tourismus. Studie im Auftrag des Staatssekretariats für Wirtschaft SECO. Rapperswil. Download: www.ilf.hsr.ch
[23] Siegrist, D., Clivaz, C., Hunziker, M., Iten, S. (eds.) (2008). Visitor Management in Nature-based Tourism. Strategies and Success Factors for Pars and and Recreational Areas. Series of the Institute for Landscape and Open Space, HSR University of Applied Sciences Rapperswil 2, Rapperswil. 129p.
[24] Wagenseil, U. et al. (2006). Enjoy Switzerland. Leitfaden. Qualitätsmanagement für Tourismusdestinationen. Institut für Tourismuswirtschaft ITW, Luzern und Schweiz Tourismus, Zürich.
[25] Weiermair, K., Brunner-Sperdin, A. (Hrsg.) (2006). Erlebnisinszenierung im Tourismus. Erich Schmidt Verlag, Berlin.

Dominik Siegrist is chair of FTL-HSR, Research Centre for Leisure, Tourism and Landscape (FTL-HSR), Institute for Landscape and Open Space, University of Applied Sciences Rapperswil (Switzerland) and a lecturer of Tourism in Landscape Planning. His main topics are nature-based tourism, regional development of mountain regions, visitor management and parks. He is president of the International Commission for the Protection of the Alps (CIPRA).

Karin Wasem is scientific collaborator of FTL-HSR, Research Centre for Leisure, Tourism and Landscape (FTL-HSR), Institute for Landscape and Open Space, University of Applied Sciences Rapperswil (Switzerland). Her main topics are evaluation methods, nature-based tourism and nature sports.

MMV4 PROCEEDINGS
MANAGEMENT

Stakeholder's monitoring and involvement: management option for Sumava National Park (Czech Republic)

Martin Cihar, Viktor Trebicky and Jindriska Stankova

Abstract — The paper presents the results of long-term monitoring and surveys of three major stakeholder's groups in Sumava National Park (SNP) – visitors, local people and public administration (mayors). SNP is the largest Czech national park situated in the southeast part of the country. In 1990s and 2000s the park became a popular nature tourism destination, mainly for domestic visitors. Views and attitudes of stakeholder groups to conservation and environmental management activities were analysed and compared. Primary data was statistically treated using the χ^2 test for evaluation of homogeneity of results from different years of monitoring and different stakeholder groups. The results show that management, development and nature tourism in SNP went through significant changes over the last ten years. Monitoring of stakeholder's opinions and attitudes and their involvement in a local decision making process is crucial for development of a new management plan of SNP.

Index Terms — Local people, management, monitoring, nature tourism, public administration, visitors.

1 Introduction

Over the last two decades, Sumava National Park (SNP) in the southwest corner of the Czech Republic has become one the primary destinations of nature tourism in Central Europe. It was closed to tourists and any other form of development in the second half of the 20th century due to military use and the "Iron Curtain" stretching across the region. Paradoxically, Sumava's nature flourished, with vast areas of land exposed to minimum human pressure.

Everything changed after the collapse of the communist regime in 1989. The Iron Curtain was torn down in a similar way to the Berlin wall. Sumava was discovered and literally conquered by tourists. Nowadays, the number of visitor nights is estimated to be around 1.1 – 1.3 million per year, which ranks SNP as the second most visited national park in the Czech Republic.

Considering its position in the middle of Europe ("Green Roof of Europe"), natural beauty of its landscape and presence of unique ecosystems – such as glacial lakes, peat bog sources and the remains of primeval mountain forests – the area was declared the Sumava National Park by the Czech government in 1991. National park, along with its buffer zone – Protected Landscape Area Sumava – takes up an area of 167,000 ha, with elevations between 600 – 1378 m above the sea level. Sumava is also part of UNECSO's Man and Biosphere reserves network and its peat bogs are protected under Ramsar Convention.

M. Cihar is with the Institute for Environmental Studies, Charles University, Prague, Czech Republic, E-mail: mcihar@natur.cuni.cz.
V. Trebicky is with EnviConsult, Ltd., Prague, Czech Republic, E-mail: viktor.trebicky@enviconsult.cz.
J. Stankova is with the Institute for Environmental Studies, Charles University, Prague, Czech Republic, E-mail: mcihar@natur.cuni.cz.

Park administration and management, however, has been struggling with three main problems, more or less continually since the beginning of national park's existence. Equally important is the deteriorating quality of its main ecosystem – forests ("beetle calamity"), increasing pressure from tourism development and flawed relationships with local people and municipalities. The research presented in this paper aims to address the later two. The main research question is: have behaviour patterns, attitudes and views of visitors, local people and mayors of local municipalities evolved in a similar way? What are their relations to the nature protection and management of the national park?

2 METHODS

The paper presents results of a long-term monitoring and surveys of three major stakeholder's groups in Sumava National Park (SNP) – visitors, local people and public administration (mayors). These groups and their interactions were identified as crucial for a successful and proactive management of the national park.

The Institute for Environmental Studies, Charles University, has been monitoring tourism use of SNP annually since 1997 as part of a broader research program. Visitor surveys are carried out in the high summer season during a nine-day period at four monitoring points in the central part of the national park. The survey's methods include interviewing a random sample of visitors by using an extensive questionnaire and counting of tourists. Results from 1997 – 2006 period are presented in this paper.

Surveys of local people and representatives of local public administration were carried out in 1998 and 2003. Their views and attitudes to conservation and environmental management activities were analysed and compared. Primary data were statistically treated using the χ^2 test for evaluation of homogeneity of results from different years of monitoring and different stakeholder's groups. For comparison of local inhabitants' and mayors' views, a method of testing of expected frequency attributes was used.

The following number of questionnaires was collected from visitors:
N_{1997} = 1,274, N_{1998} = 1,020, N_{1999} = 1,126, N_{2000} = 665, N_{2001} = 959, N_{2002} = 648, N_{2003} = 900, N_{2004} = 911, N_{2005} = 648, N_{2006} = 877.

For local people the number of questionnaires amounted to:
N_{1998} = 181, N_{2003} = 200.

Return rate of questionnaires was high in both groups and all monitoring years, within the range 70 % - 90 %.

Finally, 7 mayors from local Sumava's communities were interviewed in 1998 and 2003.

3. RESULTS AND DISCUSSION

3.1 Visitors numbers

How many tourists visit core areas of Sumava National Park in a high summer season? Fig. 1 summarizes development of number of hiking visitors and cyclists over 10 years of monitoring (1997 – 2006).

The number of hiking visitors peaked in 1997 with an average 2,930 recorded persons per day. That match approximately to

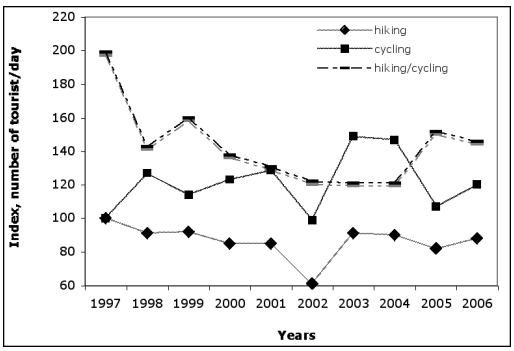


Fig. 1. Index: number of hikers and cyclist and their ratio. Indicator is based on an average number of tourists (hikers and cyclist) per monitoring day. It sums records from four monitoring points – crossing of hiking trails in central parts of the park. Beginning of monitoring, year 1997, corresponds to 100. Hiking/cycling ratio is expressed as 1 hiker/100 cyclists.

181,000 people passing through four monitored crossings in summer season (62 days) and roughly 270,000 people per year (conservative estimate of off-season tourist traffic being 10 % of a busy summer period value). Since 1997, the number of visits slightly dropped, with a much deeper fall (by 39 %) in 2002. Year 2002 was abnormal, however, affected by extreme floods in the whole country during the monitoring period.

The number of cyclists reveals a different picture. Cycling, even on hiking trails, is increasingly popular and exceeded every other year (bar 2002) the initial value of 1,475 recorded cyclists per day in 1997. Even the exceptional year 2002, when the floods occurred, counts for 99 % of 1997 value. So far, cycling peaked in 2003, with 49 % surge.

Hiking/cycling Index continually decreased in favour of cycling from 1997 to 2004 – from 199 hikes/100 cyclists in 1997 to 121 in 2004. In 2005, this trend was disrupted and index jumped back to 152 value. If the year 2006 stands for a renewed advent of cycling in SNP will remain to be seen.

3.2 Visitors description and attitudes

What kinds of people visit SNP? Did their main characteristics remain homogenous over the 10-years monitoring, or did they vary? For nature tourism analyses, *tourist type* is crucial [1]. It is related to the type of recreational activity and level of tourist development in the given area [2].

Some important characteristics of visitors remain identical over the monitoring period. Tourists are mostly Czech (foreigners, predominantly Germans, constitute on average only 7 % of visitors), more often male then female, in middle and upper middle age group, better educated and with a higher social status than the nation's average. Czech tourists come to SNP mainly from the capital – Prague - and from Sumava's neighbouring districts.

The rate of first time visit to return visit remained the same over the 10 years – 1:4 and it is similar to e.g. North York Moors NP [3]. Family with children prevails in terms of group composition – almost every second visitor comes with a family. Share of foreign visitors in "first-class" world national parks is higher (e.g. 41 % in Kruger NP – [4], 93 % in Komodo NP [5], 57 % in Sagarmatha NP [5]. The Situation in "country" national parks is similar to SNP (2 % in Lake District NP and 5 % in Dartmoor of Great Britain [6]).

TABLE 1

VISITORS/VISITS ATTRIBUTES IN THE SNP

Increasing	Decreasing	Neutral
1-week stay	2-weeks or longer stay	Socio-demographical composition
Stay in hotel	Stay in campsite	Rate of first time/ return visit
Stay in guest-house	Use of bus/ train to/from NP	Geographical and national composition
Use of car - to/from SNP	Hiking/cycling entirely	Travel distance to/from the NP
Use of car - in SNP	Direct contact with nature (berries and mushrooms picking)	Dominance of family with children group
Sport as the main reason for visit	Stay only in destination centres and around	Size of hiking groups
Cycling in SNP, ratio cycling/hiking	Impose fees for visit	Recreational costs (in constant prices)
Positive assessment of state of environment in NP	Not enough tourists (social capacity)	
Knowledge of "ecological problem" in the NP		
Positive feeling about new tourism development projects in SNP		
Tourists not permitted the most sensitive parts of the SNP		
Using border crossing in SNP		

Changes or trends in visits and visitors attributes have been identified as well. Concerning the length of stay, number of 7-day visit is the most popular (50 % of visitors stay for a week). Foreigners increasingly come for a 1-day visit (21 % in 2006), which corresponds with other aspects of their visits (e.g. use of car). Car is the predominant mean of transport to/from the national park (it increased from 78 % in 1997 to 85 % in 2006) for both native and foreigner tourists.

The main trends in visitors/visits characteristics are summarized in table 1. Some of them illustrate the previously published [7] fact of increasing preference of more consumption forms of tourism. It is manifested by car dependency, need for more "adrenalin" while in the park there are more relaxed views on conservation measures and acceptance of the new buildings and tourism development projects in the park.

3.3 Visitors, local people and mayors – comparison

Visitors, local people and representatives of local administration (mayors of local communities) have been identified as three major stakeholder's groups in SNP. Interaction among these groups has been studied in many natural areas of the world [8] and host – visitor relation is often double-edged: economic dependence on one side and distrust or even open hostility on the other side [9].

Within two years of monitoring, 1998 and 2003, sample of all three groups was asked identical questions. Results of surveys are summarized in Table 2. Important and statistically significant differences between groups have been identified in social and educational status: local people, comparing to visitors and mayors, have more frequently elementary education. Correspondingly, visitors and mayors have more often professional occupation. Both groups have strong ties with their region – most of them "would not move out of Sumava even if he/she could". Such a supportive relationship is important for local community development [10].

Mayors tend to be stricter when evaluating conservation measures in NP and the influence of the park on their everyday life. Mayors and visitor, contrary to local people, thought that the state of environment in the park has improved in recent years. Both local groups – local inhabitants and mayors expressed negative assessment of national park influence on the local price levels and offer of jobs. Local people, contrary to mayors, in both years of monitoring fretted about lack of benefits from tourism. It seems that representatives of local authorities are directly or indirectly involved in the tourism business in SNP, therefore more positive in this issue than "ordinary"local people.

Questions concerning economic and social value of tourism were not put to visitors. Its negative assessment from both local groups is consistent with similar findings in Komodo NP [11] and Arrowtown in New Zealand [12]. The problem was also discussed by [Elcom and Baines [13], who pointed out the lack of stakeholder's involvement since the beginning of new development planning in protected areas, which can lead to future tensions and conflicts.

Both local groups approve of the opening of a new border crossing to neighbouring Germany. From 1998 to 2003, favourable evaluation of national park and its management have exceeded negative assessment.

TABLE 2

COMPARISON OF STAKEHOLDER'S GROUPS

Attitude/ Characteristics	Visitors	Local people	Mayors
Education - basic		XX	
Occupation - professional	X		X
State of environment in SNP improved	X		X
Conservation measures in SNP too strict			X
Influence to everyday life from SNP existence	-		X
Not enough local jobs	-	00	X
Permit tourists access to the most sensitive parts of SNP			X
Tourism increases local prices	-	00	X
Not moving to other region, even if I could	-	00	00
Positive views on NP	-	00	0
Knowledge of "ecological problem" in NP	00	00	00
New border crossings - no harm to nature		00	00
Positive evaluation of NP's management		0	0
No benefits from tourism	-	00	

XX – statistical difference in both years (1998 and 2003)
X – statistical difference in one year
00 – statistical homogeneity in both years (1998 and 2003)
0 - statis

4. CONCLUSION

Long term monitoring of visitors numbers, their attitudes and attributes and relations to other stakeholder's groups is crucial for a successful management of national parks. Several concrete recommendations, based on the research outcomes, have been proposed to relevant authorities (Ministry of Environment, Administration of SNP). They exceed the scope of this paper, a few more general conclusions can be mentioned nevertheless.

The Number of tourists visiting SNP in the summer season has been stagnant in recent years, yet other indicators show that social carrying capacity of core areas of the park was reached. All efforts aiming at tourism growth in the area should therefore address its sustainability – i.e. qualitative, not quantitative development.

Stakeholder's surveys and interviews reveal sceptical attitudes of local people and mayors towards benefits that stem from inhabiting a unique area of NP. Both groups like the place where they live, but they have to be involved more strongly in the design of a new management plan. So far, lack of stakeholder's involvement encouraged unnecessary hassles.

REFERENCES

[1] D. A. Duffus and P. Dearden, „Non-Consumptive Wildlife-Oriented Recreation: A Conceptual Framework," *Biological Conservation*, vol. 53, no. 3, pp. 213-231, 1990.

[2] D. Roe, N. Leader-Williams and B. Dalal-Clayton. „Take Only Photographs, Leave Only Footprints: The Environmental Impacts of Wildlife Tourism," Wildlife and Development Series No.10, International Institute for Environment and Development, London, 1997.

[3] P.C.L. White and J.C. Lovett, „Public preference and willingness-to-pay for nature conservation in the North Moors National Park, UK," *Journal of Environmental Management*, vol. 55, no. 1, pp. 1 – 13, 1999.

[4] J. Turpie and A. Joubert, „Estimating potential impacts of a change in river quality on the tourism value of Kruger National Park: An application of travel cost, contingent and conjoint valuation methods", *Water SA*, vol. 27, no. 3, pp. 387 – 398, 2001.

[5] M. J. Walpole, H.J. Goodwin and K.G.R. Ward, „Pricing Policy for tourism in protected areas: Lessons from Komodo National Park, Indonesia," *Conservation Biology*, vol. 15, no. 1, pp. 218 – 228, 2001.

[6] S. Cullinane, and K. Cullinane, „Attitudes towards traffic problems and public transport in the Dartmoor and Lake District National Parks," *Journal of Transport Geography*, vol. 7, no. 1, pp. 79 – 87, 1999.

[7] M. Cihar, M and V. Trebicky, „Analysis of the sustainability of nature-based tourism in the Sumava National Park, Czech Republic: 1997-2004," *Series of the Institute for Landscape and Open Space*, HSR, University of Applied Sciences

Rapperswil, pp. 25-32, 2008.
[8] J.D. Johnson, D.J. Snepenger and S. Akis, „Residents' perceptions of tourism development," *Annals of Tourism Research*, vol. 21, no. 3, pp. 629 – 642, 1994.
[9] H. Ceballos-Lascuráin, „*Tourism, ecotourism and protected areas: The state of nature-based tourism around the world and guidelines for its development*," Gland, Switzerland and Cambridge, UK: IUCN, pp. 51 – 54, 1996.
[10] D. Gursoy and D.G. Rutherford, „*Host attitudes toward tourism*," Annals of Tourism Research, vol. 31, no. 3, pp. 495-516, 2004.
[11] See [5]
[12] M. Švehla, „Arrowtown: The perceived impacts of tourism by residents", PhD dissertation, University of Otago, New Zealand, 1996.
[13] D. Elcome and J. Baines, „Steps to Success - Working with residents & neighbours to develop and implement plans for protected areas," Switzerland: IUCN, Commission on Education and Communication, European Committee for EE, 1999.

Martin Cihar - Education: MSc (1983), Charles University in Prague, Faculty of Science, PhD (1989), Charles University in Prague, Faculty of Science, PhD thesis - Monitoring and management of selected Czech water reservoirs. Employment: since 1989 at the Institute for Environmental Studies, Faculty of Science, Charles University, Prague (lecturer). Main research and lecture topics: protection of nature, mountain ecology, management of protected areas, sustainable tourism, water ecology. Head of research and monitoring projects on sustainable tourism and recreational activities in national parks and protected landscape areas in the Czech Republic (cooperation with the Ministry of the Environment) since 1993. Head of the educational project *Sustainable Management of Nature Areas* (ESF grant). Member of IUCN Commission on National Parks and Protected Areas since 1995.

Viktor Trebicky - Education: MSc (1997), Charles University in Prague, Faculty of Science, PhD (2005), Charles University in Prague, Faculty of Science, PhD thesis – "Analysis of nature tourism in Sumava national Park, 1997 – 2004". Employment: EnviConsult, Ltd. – environmental consultancy - since 2005, TIMUR – NGO (sustainability indicators) – since 2004.

Jindriska Stankova Education: MSc (1998), Charles University in Prague, Faculty of Science, PhD (2007), Charles University in Prague, Faculty of Science, PhD thesis "Selected aspects of tourism and sustainable development in NP Sumava and Podyji from the point of three groups of respondents", Employment: Agency for Nature Conservation and Landscape protection of the Czech Republic – since 1996 to 2007. Currently on maternity leave.

The Sea-to-Sky playground: individual outdoor recreation and commercial recreation on public land in winter

Wolfgang Haider, Jenifer Riley, Nina Mostegl

Abstract — The so-called “Sea-to-Sky Corridor” in British Columbia, Canada, spreads from Vancouver via Squamish beyond Whistler. Its superb scenery nestled between ocean and glaciers attracts residents of Vancouver and international visitors alike. Most of the area is public land, and a major regional landuse plan is just about to be completed. While forestry has been the main traditional use, now summer and winter recreation feature very prominently in these plans. The plans separate much of the motorized and non-motorized activities, but other potential conflicts such as between commercial recreation and independent outdoor recreationists have been addressed to a lesser extent. In order to obtain some insights into the number of visitors and describe some of their characteristics, we undertook an intensive user count at the main staging areas, combined with a short intercept survey about the types of activities pursued, distances travelled, specific locations and expenditures. In the presentation I will elaborate on the method used for estimating site specific and regional user numbers, associated expenditures, and perceived and actual conflict. The presentation will compare motorized and non-motorized users, as well as clients of commercial operations and independent travelers, and link these findings to the already existing zoning for the region. The presentation will conclude with identifying remaining shortcomings of information for future landuse decisions in light of expected future use increases, as both the demand from the metropolitan Vancouver as well as from the resort community of Whistler will continue to grow

Index Terms – Outdoor recreation, winter recreation, landuse.

Wolfgang Haider is with the School of Resource and Environmental Management, Simon Fraser University Burnaby, Canada. Email: whaider@sfu.ca

Jenifer Riley is with the School of Resource and Environmental Management, Simon Fraser University Burnaby, Canada

Nina Mostegl is with the School of Resource and Environmental Management, Simon Fraser University Burnaby, Canada.

Sustainable camping at Ningaloo Reef, Western Australia: overcoming methodological challenges

Anna R. Lewis

Abstract — This paper outlines issues relating to campsite assesment along the Ningaloo coastline, Western Australia. A solution to methodological challenges, through the utilisation of both qualitative and quantitative data collection techniques are suggested. The Ningaloo coastline is gaining popularity as a remote camping destination in Western Australia. Camping activities in this semi-arid environment are largely unrestricted, and gradual environmental degradation is observable in many locations. The following factors make the Ningaloo camping experience unique within Australia: A remote, semi-arid environment; multiple management/ownership of land; off-road vehicle accessibility to campsites; elaborate camp set-ups (often with a campervan and four-wheel drive); and the long average length of stay (47 days). Existing literature largely focuses on camping impacts within a wilderness environment, with short visitor stays, pedestrian-only access and a single management regime. This research will undertake an initial environmental assessment of sample campsites within different locations along the Ningaloo coast. Campers' daily activities, resource (water, energy) use and waste production will also be determined. This research is highly significant from a local and regional perspective, given government plans to develop multiple camping 'nodes' along the Ningaloo coast by 2015. The data will therefore contribute to a stronger understanding of campsite sustainability, with regard to campsite placement and facilities. This research will also address information gaps within the field of recreation ecology

Index Terms — Australia, environmental impacts, methods, Ningaloo, recreation

1 Introduction

Ningaloo Reef, 1, 200km north of Perth, Western Australia is the only fringing coral reef in Australia, and is gaining an international reputation for nature-based tourism. Housing a diverse range of marine species, the Ningaloo Marine Park (Fig. 1) extends 260km along the northwest coast of Western Australia. The majority of the 200, 000 annual tourists to the Gascoyne region are international/interstate tourists who use official accommodation and campgrounds [1]. However, informal camping developments have increased rapidly in recent years. Increasing numbers of remote campers select undesignated coastal campsites along 200 kilometres of coastline within the Marine Park. Campsite numbers increased from 131 in 1995 to 318 in 2002 [2] in two stations, Waroora and Ningaloo. Land utilised by the campers is either leased by remote pastoral stations, or owned by the Commonwealth Department of Defence (CDD). There is growing government and community concern regarding the environmental impacts of unstructured camping, particularly during the peak months of June and July. Concerns include the impacts of off-road vehicles for access to campsites and activities, trampling of dunes, removal of firewood, lack of effective waste and sewerage disposal, and unmanaged boating, fishing and snorkelling activi-

A.R. Lewis is with Curtin University and the Australian Commonwealth Scientific and Research Organisation (CSIRO). E-mail: annarlewis@hotmail.com

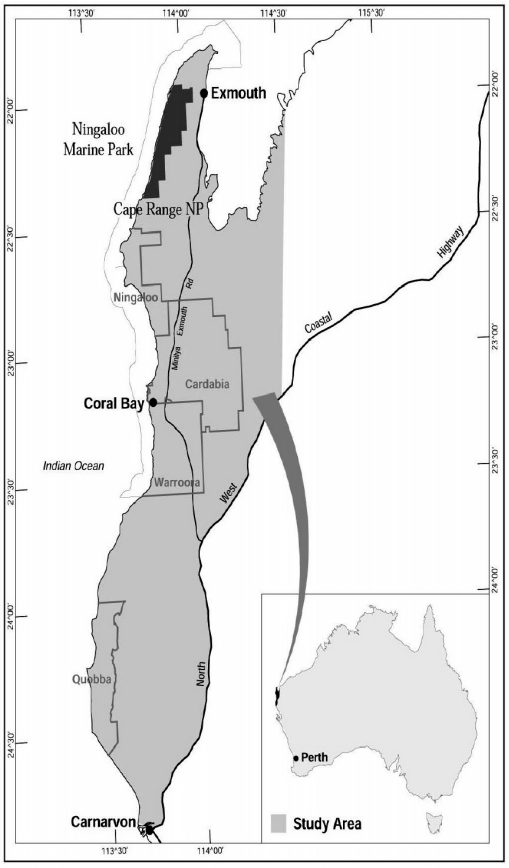


Fig. 1. Ningaloo Coast, incorporating Waroora, Cardabia and Ningaloo stations, and Cape Range National Park [8].

ties [3]. In response to increased visitors to Ningaloo, the West Australian Government has established the Ningaloo Sustainable Development Office. Additionally, the Department of Planning and Infrastructure has released a Regional Strategy [4] to become effective in 2015, proposing multiple official camping 'nodes' along the coast in response to an anticipated increase in visitation and camping demand.

However, except for two surveys [5] there have been no known studies undertaken to gain specific, quantitative information concerning the impacts of unregulated camping, to aid planning and management in the Ningaloo Marine Park.

Outcomes from this research include the development of campsite monitoring indicators to assist management authorities. Additionally, a layered map synthesising research data will provide a snapshot of the suitability of designated camping 'nodes'.

2 Camping impacts within the recreation ecology literature

2.2 Literature review

The environmental impacts of camping have been well researched within the recreation ecology literature. Reviews synthesising the research literature and management applications of recreation ecology have been published (See [6],[7]). It is asserted that most campsite research has have focused on soil and vegetation impacts within the United States, in designated wilderness and forested or alpine environments.

Camping impact research within Australia has also focused on forested environments [9]. As Ningaloo is a semi-arid environment, many of the impacts and methodologies within this literature do not apply. This project will thus draw on the limited literature relating to camping impacts in coastal and semi-arid environments (See [10],[11]).

3 Challenges unique to Ningaloo

In addition to being located in a semi-arid environment, unregulated camping at Ningaloo has unique characteristics. These can create challenges when drawing methodologies from the recreation ecology literature.

3.1 Mixture of management/ ownership

Cardabia Station, Waroora Station and Ningaloo Station are managed by pastoral lessees. The CDD owns/controls a stretch of coast between Ningaloo station and the Cape Range National Park. Additionally, the Department of Environment and Conservation (DEC)

operates structured camping areas within the Cape Range National Park north from Yardie Creek. The pastoral leases expire in 2015, at which time DEC will take management control of a 2km coastal strip from the aforementioned stations. Until this time, each station provides different facilities and practices different levels of control over campers, which has the potential to create inconsistency when assessing a variety of campsites. However, this also presents an opportunity to explore how impacts vary with different facilities and controls. Therefore, information on facilities and management regime will be factored into the assessment parameters.

3.2 Off-road accessibility of campsites

The majority of environmental impact studies in protected areas are focused on recreation in a wilderness environment. 'Wilderness' can be considered a remote area essentially unaffected and unaltered by modern society, including the presence of roads. Ningaloo is therefore a non-wilderness setting due to its pastoral use and vehicle accessibility. These additional disturbances must be taken into account when relating impact outcomes at Ningaloo, to those at wilderness areas within the literature.

3.3 Large camp set-ups/long average length of stay

Campers characteristically require camping, boating and 4-wheel drive equipment for this remote camping experience [Fig.2]. Many travel north for the winter from the temperate south, the average length of stay being 47 days [5]. The usual length of stay in most backcountry wilderness settings has been described by the literature as 1-3 nights. It is therefore likely that popular sites are only available at certain times in the year (October through April) for assessment purposes. The data collection period is limited, as fieldwork should be avoided during December and January due to high temperatures.
Campsites are located both on the beach, as well as behind dunes in some locations.

Fig. 2 A typical undesignated beach campsite. This camp contained a caravan, annex, chemical toilet, generator, chest freezer and 4wd vehicle.

Campsites located on the beach may be hard to identify due to lack of vegetation clearing and mobile sand. It may be necessary in this instance assess impacts to access points in addition to those at campsites.

4 Methods

4.1 Campsite selection

Campsites will be selected to gain a representative sample of: heavily used (Over 6 months/yr) and lightly used (less than 2 months/yr) sites, in different management locations (CDD, DEC, Pastoral lessees). Additionally, campsites both on the beach and behind the dunes will be assessed.

4.2 Estimate individual environmental load and activities

A questionnaire will be used to determine environmental load and activities of campers. Questionnaires are commonly used by managers in leisure and tourism. The questionnaires will provide both qualitative and quantitative data. Questionnaires are a thorough and cost-effective method [12] to effectively gain information concerning both environmental load and activities of campers for this

research. Questionnaires will provide data on:

1. Demographic information and camping preferences.
2. Resources brought from home, bought from local shops, and sourced from the land/water surrounding the campsite.
3. The amount of energy and water used, and composition of waste produced.
4. Access and distance to daily activities.

Data will be analysed statistically using the computer program SPSS.

4.3 Undertake an initial assessment of impacts and facilities at campsites

Campsite assessment protocols were developed and applied by both the National Park Service [13] and the USDA Forest Service [14] for forested areas. These were later modified by Monz [11] for the semi—arid environment of coastal Baja, Mexico, which is more applicable to the Ningaloo environment. Inventory parameters and impact parameters used within Monzs' [11] study will be modified to suit the Ningaloo Environment. Parameters will potentially be selected as indicators for future campsite monitoring by DEC. Data will be analysed statistically using the computer program SPSS. Data from the questionnaires and campsite assessments will be overlaied on an aerial photograph to further understand movements and environmental load of visitors in different locations. This data may assist in future campsite 'node' selection.

4.4 Research hypothesis

Hypothesis to be tested in this research include:

1. Campsites with higher use will have greater environmental degradation.
2. Campsites located on the beach will have less impact than those located behind the dunes.
3. Campsites with more facilities will have less environmental degradation through both activity access and environmental load.
4. Campsites are located within one kilometre of activity sites.

This research is highly significant from a local and regional perspective, given government plans to develop multiple camping 'nodes' along the Ningaloo coast by 2015. A number of studies exist which document both an increase in visitation to Ningaloo and a lack of tourism planning in the region. However, there is little understanding of the current impacts of camping along the Ningaloo coast. The data will therefore contribute to a stronger understanding of campsite sustainability, with regard to campsite placement and facilities.

This research will also aim to address the following research gaps within the international recreation ecology literature:

1. Impact comparison of one research area operating under different management regimes.
2. Impacts of camping over extended periods.
3. Impacts of camping in remote areas incorporating off road vehicle access.
4. Impacts of camping with a large, caravan-sized camp area.

REFERENCES

[1] R. Jones, C. Ingram, and A. Kingham, "Waltzing the Heritage Icons: 'Swagmen', 'Squatters' and 'Troopers' at North West Cape and Ningaloo Reef". *Geographies of Australian Heritages: Loving a Sunburnt country?*, R. Jones and B.J Shaw, eds., Ashgate: Aldershot, 2003.

[2] G. Armstrong, "End of "Grass Castle" King", *The Sunday Times,* 3 August, 2003, Western Australia, pp.17

[3] D. Wood, "Tourism on the Carnarvon-Ningaloo Coast between Quobba Station and Exmouth and its Implications for Sustainability of the Coast" , Western Australia Planning Commission, 2003

[4] Western Australian Planning Commission (WAPC), "Ningaloo Coast Regional Strategy Carnarvon to Exmouth". WAPC, Perth, Western Australia, 2004

[5] Remote Research, "Summary Report on the Findings of Surveys of Unmanaged Camping in

the North West Cape Region of Western Australia" , Perth: Remote Research

[6] Y. Leung, and J. Marion, "Recreation impacts and management in wilderness: a state-of-knowledge review", Wilderness Science in a Time of Change Conference, Volume 5: Wilderness Ecosystems, Threats, and Management, Ogden, Utah: U.S Department of Agriculture-Forest Service, Rocky Mountain Research Station, 2000

[7] D. N. Cole, "Research on soil and vegetation in wilderness: A state-of-knowledge review". National Wilderness Research Conference: Issues, State-of-Knowledge, Future Directions. General Technical Report INT-220, Fort Collins, CO, USDA Forest Service, Intermountain Research Station, 1987

[8] D.Wood and M. Hughes, "Tourism accommodation and economic contribution on the Ningaloo Coast of Western Australia", *Tourism and Hospitality Planning & Development*. vol. 3, no. 2, pp. 77-88, 2006.

[9] D. Sun and D. Walsh "Review of studies on environmental impacts of recreation and tourism in Australia." *Journal of Environmental Management* vol. 53, pp. 323-338, 1998

[10] C. Ingle, Y. Leung, C. Monz and H Bauman, "Monitoring visitor impacts in Coastal National Parks: A review of techniques", Protecting our Diverse Heritage: The Role of Parks, Protected Areas, and Cultural Sites Hancock, Michigan, The George Wright Society, 2003

[11] C. Monz, "Monitoring recreation resource impacts in two coastal areas of western North America: An initial assessment", Personal, Societal and Ecological Values of Wilderness: Sixth World Wilderness Congress Proceedings on Research, Management and Allocation. Vol 1, Ogden, Utah: U.S, Department of Agriculture–Forest Service, Rocky Mountain Research Station, 1998

[12] W.L. Neuman, Social Research Methods: Qualitative and Quantitative Approaches (5th Ed), Allyn & Bacon, Boston, 2000.

[13] J. Marion, "Developing a natural resource inventory and monitoring program for visitor impacts on recreational sites: A procedural manual", *Natural resources report PS/NRVT/NRR-91/06,* N. P. S. Department of Interior**:** 59, 1991.

[14] D.N Cole, "Monitoring the condition of wilderness campsites", Ogden, UT: U.S. Department of Agriculture Forest Service, Intermountain Forest and Range Experiment Station Research Paper INT-302, 1983 INT-302, 1983

Anna R. Lewis B.Sc. Marine Science/Tourism (Mi) (Hons1) (Murdoch University, 2002); Master of Environmental Management (Griffith University, 2007); PhD Candidate (Curtin University, due for completion 2011). Employment: Alaska Department of Fish and Game; Costa Rica Rainforest Outward Bound School; Pacific Whale Foundation; Cruisewest; Curtin University and CSIRO. Academic Achievements: Griffith University Academic Award for Masters by coursework in Environmental Management, 2007. PhD Scholarships; CSIRO Wealth from Oceans Scholarship (Ningaloo Cluster); CSIRO Wealth from Oceans (Flagship Scholarship); Australian Postgraduate Award; Curtin University Postgraduate Scholarship. Published Papers: Two Journal articles (2003/2004) in the International Journal of Tourism Research. Research Interests include impacts of tourism, recreation and development on coastlines and marine areas. Member, International Association for Impact Assessment.

Eco-volunteering programs as good practices for nature conservation and sustainable tourism development in protected areas

Micaela Solinas, Simona Clò, Manuela Nicosia

Abstract — The CTS, an Italian association involved in youth tourism and environment protection, acknowledged by the Ministry of the Environment, has a long experience in the planning and managing of programs in which environmental protection, local development and educational activities are linked. Since the early 90s, CTS started to issue volunteer tourism programs in which conservation and monitoring activities on endangered species were conceived as original features of summer camps for students and young people. This approach provided a new opportunity to support environmental initiatives chronically under-funded and was favourably considered by the European Commission, the Italian Ministry of the Environment and other institutions that granted the funds necessary to allow the projects increase and go on. Two more important results were also achieved: first, the development of tourist offers with a strong educational purpose and a low impact on the local environment; second, the creation of synergies between tourist and conservation programmes which, in turn, allowed to improve the local communities attitude towards research and conservation activities, thanks to the economic advantages generated by just such tourism. The success of the programs lies in the fact that tourist projects were created in harmony with scientific projects and were conceived to support and "serve" the research.

Index Terms — Eco-volunteering, volunteer tourism, sustainable tourism, environment conservation, protected areas.

1 An overlook of volunteer tourism

In the last few years a steadily growing body of works have examined volunteer tourism from different perspectives. Some studies, such as "[7]", recognise in volunteer tourism an "expression of the so called "other" postmodern tourism, which emphasize the growing appeal of concepts such as "alternative", "real", "ecological" and "responsible" form of tourism; some others have explored impacts and implications in the relation between the volunteering "guest" and the host community "[5], [6]"; or the volunteer's personal experience "[8], [10], [11], [12], [13] [14], [15]".

Volunteer tourism has been defined in "[4]" as "utilizing discretionary time and income to travel out of the sphere of regular activity to assist others in need". Broader definitions include environment conservation or research among the purposes of volunteer tourists described as those who "volunteer in an organized way to undertake holidays that may involve aiding or alleviating the material poverty of some groups in society, the restoration of certain environments, or research into aspects of society or environment" "[12]". Definitions and boundaries of volunteer tourism are still in flux, but even so it is considered as one of the fastest-growing forms of

M.S. is head of Sustainable Tourism and Protected Areas Department of CTS, Rome. E-mail: msolinas@cts.it.
S.C. is the head of the Nature Conservation Department of CTS, Rome. E-mail: sclo@cts.it
M.N. is researcher junior and project assistant in Sustainable Tourism and Protected Areas Department of CTS, Rome. E-mail: turismoricerche@cts.it

alternative tourism, increasingly viewed and marketed by governments, non-government agencies and private commercial operators globally, as a creative and non consumptive solution to a wide range of social and environmental issues "[3]".

When it focuses on environmental issues, volunteer tourism (or eco-volunteering) shows some distinctive features:

- active participation of volunteers in scientific activities carried out in a particular area to study and/or preserve endangered species or habitat;
- participation of volunteers is focused on personal responsibility and commitment in the environment protection;
- educational and scientific aspects take a prime role in the volunteering experience;
- researchers and the "ordinary" people (the volunteers) have the possibility to interact and develop a mutual understanding.

Volunteer tourism often includes the involvement of a NGO, deep-rooted in the territory and the local community or able, in any case, to act as a trait d'union between the scientists, the local administration and population, the broader civil society. NGOs, in fact, have taken thus far a prime role in the planning and organizing of volunteer tourism programs, pursuing the intention of achieving a socially appropriate and environmentally sound tourism, capable to really benefit local communities and to foster positive attitudes, values and actions in the tourists and the host communities themselves "[9]".

When it provides financial contribution from participants, some other features bring volunteer tourism back in the track of "real" tourism, even though "alternative" or sustainable as it:

- directly benefits the local economy through the purchase of services and products necessary to host the volunteer-tourists (board and lodging, transports, etc.);
- provides economic support to nature conservation and to chronically under-funded environmental initiatives and projects;
- helps by enhancing the value of the natural (and cultural) resources of the area in the local population opinion (administrators, stakeholders, people) and increasing consensus towards the institution of protected areas, if activities and programs are appropriately planned and managed.

In many countries ecovolunteers are playing an increasing role in nature conservation "[2]" but the development of programs where tourist volunteer make a financial contribution is less widespread and studied "[1]".

This paper focuses around the idea that eco-volunteer programs can be tools of development strategies leading to sustainable development, since they centre the convergence of natural resource qualities, locals and the visitors that all benefit from tourism activity "[14]".

Moreover, volunteer tourism programs, if appropriately planned and managed, can trigger positive processes in the areas where they take place, stimulating both public and private players locally to undertake further and new initiatives following in the wake, thus creating further opportunities for sustainable development. Some concrete results in terms of nature conservation and development of sustainable tourism activities, achieved by CTS (Centre for Student and Youth Tourism) in Italy, are given in the following paragraphs.

2 CTS projects for the conservation of marine turtles and cetaceans

The CTS is an Italian non-profit association founded in 1974 with the aim of promoting cultural exchanges and the mobility of young people and students. In time, CTS has broadened its activities, including nature conservation, environmental education and responsible tourism development among its purposes. In 1992, CTS was acknowledged by the Ministry of Environment as a national association for environment protection; and since 2002 it has also been acknowledged by the Ministry of Labour and Social Matters as one of the primary associations for social promotion and culture. In 2002 CTS founded a

Study Centre to provide an increased understanding of tourism and supporting sustainability in the sector. CTS is also a founding member of AITR (Italian Association for Responsible Tourism) a network of 92 organizations, all working at different levels to promote and increase sustainability in all its dimensions (environmental, economic and social) and to promote awareness and responsibility in the tourism industry. In the past 15 years CTS, pursuant to its activity both as a tourist and environment protection association, has focused on promoting a new "way" in tourism, inspired by the principles of sustainability and respect towards nature, the local communities and cultures of destination areas. The idea was to involve tourists, scientists, travel industry professionals and local authorities in destination areas in the development of conservation and tourism programs in Italy.

Since the early 90s, CTS started resorting volunteer tourism programs as a tool for nature conservation and local development in some small Italian islands: the Pelagian Archipelago MPA (Marine Protected Area) (Sicily), the Archipelago of La Maddalena NP and the Asinara island NP (National Park) (Sardinia). More recent initiatives have been set up in the coastal areas adjoining Brancaleone (Calabria) and Cattolica Eraclea (Sicily) and on the island of Capraia (Toscana) in the Arcipelago Toscano NP.

These are places with high environmental value (presence of Nature 2000 sites, protected areas, endangered species) and tourist value. Going programs focuses on the protection and study of marine turtles and cetaceans (such as the Bottlenose dolphin) which suffer from negative impacts due to fishing and tourist activities.

Initially, funds provided by participant's grants allowed the establishment of basic monitoring and conservation activities only.

Nevertheless, the presence of volunteers had an immediate, positive result on the local population attitude - particularly that of stakeholders such as fishermen - towards turtles and dolphins, thanks to the small-scale economy generated and the enthusiasm and commitment of participants to the programme. These pilot schemes then drew the interest and attention of both public bodies and private sponsors, who understood that new opportunities for local development, on a sustainable basis could raise from those experiences. Starting from the year 2000, six notable, long-term projects conceived and planned by CTS with the support of local authorities and Parks Agencies gained loans from the EU Commission (through the Life Nature program), from the Ministry of the Environment, from the Calabria Region, from the Province of Agrigento and from private sponsors (such as Bassetti). This has given conservation programs and research activity more solidity and continuity.

Along the years, starting from pioneering initiatives carried out on a seasonal basis, considerable results were achieved from a scientific, educational and economical point of view, which in order allowed starting new programs and experiences, even in different places. Altogether, the mentioned areas and projects had benefit from 6.864.289 euros since the year 2000, allowing the establishment of two Research Centres on dolphins and cetaceans, four turtle Rescue Centres and one wild fauna Rescue Centre that now act as hubs for either scientific, educational, awareness raising and tourist activities (such as dolphin watching). The Centres give employment to 19 local operators on a regular basis. All Centres have permanent exhibition about the species, regularly visited from tourists. As a matter of fact, along eight years these structures were included in the local tourist offer and counted 143.500 visitors. The projects also drew the interest of mass media; a lot of space was given to the activities of the Centres in papers and television programmes in Italy, thus contributing to the positive image of territories, as places with high value both from an environmental and tourist point of view. In 2007 only, television passages about projects, the Centres and the conservation activities have been 71 and 520 the articles on magazines and newspapers.

On the conservation side, projects results were notable as well. Research activities allowed the definition of Action Plans for the conservation of Loggerhead Turtle and Bottlenose dolphin in the Pelagian Islands; the drawing up of national guidelines to reduce impacts of fishing activities on marine turtles and guidelines for the conservation of Bottlenose dolphin in the Archipelago of La Maddalena NP. Starting from the year 2000, in the Pelagian Islands MPA and La Maddalena NP, 167 resident dolphins have been identified through photo-identification and almost 600 turtles rescued. In the Pelagian Islands, the raising of consensus towards conservation activities and the establishment of the Marine Protected Area, which initially had to face hard opposition from local stakeholders and people, is strongly tied to the process which led to value the presence of turtles as a resource for the community, instead of being considered just an annoying by-catch of fishing activities. In such a process, the presence on the islands of volunteer tourism programs, carried out by CTS and other organizations as well, played a considerable role, leading to the expression "Lampedusa, the island of turtles" adopted by local administration and operators from the tourist sector to promote the island's image. A similar process took place in Brancaleone, where thanks to the species conservation efforts carried out by different groups and the establishment of a turtle Rescue Centre by CTS, the coast once known as "Jasmin Coast" is now named after the turtles.

Conclusions

Until today, local conservation projects on sea turtles and dolphins, launched as pioneering initiatives and carried out on a seasonal basis by CTS thanks to volunteer tourism programs, have acquired national importance and are accomplished with continuity. The projects, involving professionals from different sectors (public administrations, environmental and trade associations, universities) led to the creation of stable, multifunctional facilities (Dolphin Research and Turtle Rescue Centres) offering research and conservation programs and providing at the same time information, didactic and tourist activities. The most innovative feature of the above-mentioned experiences lies in the fact that tourist projects were created in harmony with scientific projects and were conceived to support and "serve" research. Thanks to this alternative form of tourism, results obtained in research and conservation efforts are coupled with the improvement in terms of environmental education and awareness. A demonstration of this may be found (for instance) in the tourist flows that every summer visit Linosa and Lampedusa Centres (over 20,000 against a population of nearly 5000) and the hundreds of people that every year take part in eco-volunteering camps. Volunteer tourism has also increased awareness of local population about the value of the natural resources of their living environment. Let us also mention the improvements in winning collaboration of local stakeholders such as the fishermen, engaged in minimizing accidental captures of turtles and dolphins, and local schools participation in specially tailored programs (nearly 500 from all over Sicily only during the years 2004 and 2005).

Efforts made by CTS to give birth to positive synergies between conservation projects and tourism, highlight a process characterized by different phases: after an initial "pioneering" stage in which scientific activities were only possible thanks to the financial and practical support from eco-volunteering camps, the programs entered a critical stage. In order to overcome the crisis and allow the activities to progress, it was necessary to prove the private and public sector the potentials and value of the going programs. This fact must not be taken for granted, since similar initiatives undertaken by CTS failed. Reason for this can be found in the lower tourist "appeal" of the species and the areas involved (e.g. wolves and bears in mountainous districts) and different conservation techniques, which made it more difficult to reach a "criti-

cal" mass of participants necessary to reach significant results. However, once the critical stage was overcame, thanks to the effectiveness of strategies undertaken, the programs witnessed significant progresses in terms of quality, strengthening previous initiatives and triggering a development phase which resulted in a general improvement: establishment of new centres, partnerships, projects, research locations and operating modalities.

REFERENCES

[1] C. Ellis, "Participatory Environmental Research in Tourism: A Global View", *Tourism Recreation Research* 28(3), 2003

[2] E.A. Halpenny, L.T. Caissie, "Volunteering on Nature Conservation Projects: Volunteer Experience, Attitudes and Values", *Tourism Recreation Research* 28(3), 2003

[3] K. Lyons, S. Wearing, *Journeys of discovery in volunteer tourism: International case study perspectives, CABI, Wallingford, UK,* 2008

[4] N.G. McGehee, C. A. Santos, "Social change, discourse and volunteer tourism", *Annals of Tourism Research*, Volume 32, Issue 3, July, Pages 760-779, 2005

[5] N.G. McGehee, "Volunteer Tourism and Social Movement Participation". *Annals of Tourism Research* 29, 124-143, 2002

[6] H. Stoddart, C. Rogerson, "Volunteer Tourism: The Case of Habitat for Humanity South Africa". *GeoJournal*. 60, 311-318, 2004

[7] N. Uriely, A. Reichel, A. Ron, "Volunteering in tourism: Additional thinking", *Tourism Recreation Research,* 28 (3), 57–62, 2003

[8] S. Wearing, A. Deville, K. Lyons, "The volunteer's journey through leisure to the self", *in K.D. Lyons and S. Wearing (Eds.) Journeys of discovery in volunteer tourism: International case study perspectives*, pp. 63 - 71, CABI, Wallingford, UK, 2008

[9] S. Wearing, M. McDonald, J. Ponting, "Decommodifying tourism: the contribution of non-governmental organisations", *Journal of Sustainable Tourism*, 13, 5, pp. 422 - 424, 0966-9582, Channel View, Clevedon, UK, 2005

[10] S. Wearing, B. Deane, "Seeking Self: Leisure and Tourism on Common Ground". *World Leisure Journal* 45, 4-12, 2003

[11] S. Wearing, "Re-centering the Self in Volunteer Tourism", in G. Dann (ed.) *The Tourist as a Metaphor of the Social World*. CABI Publishing, Wallingford, pp. 237-262, 2002

[12] S. Wearing, "The Development of Community-based Tourism: Re-thinking the relationship between Tour Operators and Development Agents as Intermediaries in Rural and Isolated Area Communities", *Journal of Sustainable Tourism*, 10, 3, pp. 191 - 206, Channel View Publications, Clevedon, UK, 2002

[13] S. Wearing, *Volunteer Tourism: Challenging Consumerism in Tourism, Environmental Awareness*, 24, 3, pp. 99 – 106, 2001

[14] S. Wearing, *Volunteer Tourism: Experiences That Make a Difference*. CABI Publishing, Wallingford, 2001

[15] S. Wearing, "Refiguring Self and Identity through Volunteer Tourism". *Loisir et Societe* 23, 389-419, 2000

Micaela Solinas is head of Sustainable Tourism and Protected Areas Dept. of CTS, Rome. She is specialized in the planning and managing of projects and researches to promote a sustainable and responsible development of tourism.

Simona Clò, PhD in Biology, is head of the Nature Conservation Dept. of CTS, Rome, and Mediterranean representative for the IUCN Sharks Specialist Group. Since 1994 she dedicated all her scientific career to sharks and marine protected species.

Manuela Nicosia is consulting sociologist and PhD candidate in Methodology of social research. Work experienced in sustainable tourism programmes and social surveys on environmental and tourism issues.

Recreational demand of the Euganean Hills Regional Park (Veneto – Italy)

Tiziano Tempesta, Samer Arkilo

Abstract — The Euganean Hills Regional Park is a hilly area of about 180 square kilometres that rises isolated in the central Veneto plain. It was established in 1989 but there is no data available on the number of visitors, and economic benefits for the local economy and for the visitors. With the aim of estimating visitor flow, a telephone survey was conducted. A sample of 309 families living on the Veneto and Emilia Romagna plain was interviewed. In order to estimate the visitors' expenditure, a subsequent in-person survey was made on site. The research highlighted that the Park, with 168 visits per hectare per year, is probably the most frequently visited of the Veneto Region. Also the expenditure of the daily visitors (4.025 euros per hectare per year) and the recreational benefits (837 euros per hectare per year) are much greater than in the other Regional Parks of a similar size.

Index Terms — Benefits Estimation, Recreational demand, Regional Park

1 Introduction

The Euganean Hills regional park was the first one established in the Veneto region in 1989. It is a hilly area of about 180 square kilometres that rises isolated in the central Veneto plain, near the city of Padova. The hills are mostly of volcanic origin and have a peculiar morphology that makes the Euganean landscape unique. Due to its geographical position and morphology, there is a marked differentiation of micro-climate and ecosystems that are unique in the regional area. Despite this, the areas of strictly natural interest cover no more than 16% of the territory, while most of the land is cultivated (meadows, vineyards and olive groves on the hills and arable crops in the valleys)[1]. There are also many monuments of great historic and cultural importance in the park (one of these being the house of the 14th century poet Petrarch at Arquà) and the National Archaeological Museum at Este. Near the park and partly within its borders is one of the most popular thermal spa areas in Europe, which is visited by about half a million people every year.

About 50,000 people live in the park (270 inhabitants per square kilometre) and many roads pass through the territory, so it is almost impossible to calculate the number of visitors by using direct or indirect approaches [2].

There is no data available on the number of visitors and economic benefits for the local economy. The main aim of the study is to define a viable approach for collecting data and monitoring the visitor flow in such a complex scenario and to estimate the recreational benefits and the impact of day trippers' expenditure on the park economy.

Tempesta Tiziano, Dipartimento Territorio e Sistemi Agroforestali – Università di Padova,tel 049 8272762, emali tiziano.tempesta@unpd.it
Arkilo Samer, Dipartimento Territorio e Sistemi Agroforestali – Università di Padova, tel. 049.8272744 email samer.arkilo@unipd.it.

2 Methods

With the aim of estimating visitor flow, we conducted a telephone survey from January

TABLE 1
SAMPLING PROCEDURES

Strata	Municipality	Distance from the Euganean Hills	Distance from other hilly areas	Number of interviews
1	Teolo, Torreglia	Euganean Hills		6
2	Padova, Rovigo	< 25 km	> 25 km	73
3	Torri di Quartesolo, Vicenza	< 25 km	< 25 km	24
4	Trecenta, San Martino Buon Albergo, Venezia, Cavarzere, Copparo	25 – 50 km	> 25 km	56
5	Treviso, Vazzola	25 - 50 km	< 25 km	67
6	Marcon, Mozzecane, Ferrara, San Donà di Piave, Mantova	50 - 100 km		83

to April 2007. A sample of 309 families living on the Veneto and Emilia Romagna plain was interviewed. A stratified sample was obtained by dividing the territory near the park into 6 strata, considering the distance from the park and from other hilly areas in the regions (table 1). We excluded mountain and hill municipalities from the survey, but this was not a potential bias because in a subsequent onsite survey we verified that the park is not frequented by people from those areas. The number of families selected from each stratum was proportional to the population living there. The choice of municipality was not random. We tried to select both rural and urban areas in order to better represent the different recreational attitudes of the residents.

During the interview, people were asked to state how many times each member of the family had visited the Euganean Hills Regional Park during the past year, the period and motivation for the trip, in addition to this,. some socioeconomic information was also collected. To estimate the total number of visits from each sampled municipality we calculated the ratio between the number of trips and the number of family members (g_i). We then estimated the function $g_i = f(km_i; R_i)$, where km_i is the distance of the municipality from the park and R_i is a dummy variable relating to the type of municipality (urban = 0; rural = 1). Through the function we estimated the total number of trips by multiplying "g_i" for the number of inhabitants of each municipality of the Regions.

3 VISITORS' CHARACTERISTICS AND RECREATIONAL ACTIVITIES

Through the 309 interviews it was possible to analyse the behavior of 883 people. The average sample age is 45 and the average family size is 2.7 persons, figures that are quite similar to the whole population[1]. On the contrary, with respect to qualifications, there is a higher presence of graduates in the sample.

In 41% of the families, at least one member had visited the park during the past year and the average number of trips was 5.68. The average number of trips and the percentage of interviewees that visited the park decrease with distance from the park (table 2).

The park is visited most often in spring (69%) and in summer (61%), usually during the weekend (70%) or public holidays (28%). The recreational activities are strongly concentrated in a few days throughout the year and traffic is often congested, especially along the main access roads.

The main motivations for the trips are a generic need to spend time outdoors (63%) and to have lunch or dinner in a restaurant or agritourism (58%). There is less interest in visiting the museums, villas and historic villages (24%), or in walking and hiking in closer contact with the natural settings (29%). On the whole, people seem to be less interested in

[1] The average age of the Veneto population is 43 and the average family size is 2.5 persons.

TABLE 2
INTERVIEWEES AND TRIPS BY DISTANCE FROM THE PARK

Distance from the park	Families interviewed			% of families that visited the park	Total visits	Average visits
	no visits	yes visits	total			
Less than 25 km	27	65	92	70.7	1296	14.09
from 26 to 50 km	29	24	53	45.3	230	4.34
from 51 to75 km	74	30	104	28.8	184	1.77
More than 75 km	52	8	60	13.3	45	0.75
Total	182	127	309	41.1	1755	5.68

the natural and historic aspects of the territory that were the basis for establishing the park.

However, it can be seen that people living more than 50 kilometres from the park are more interested in these elements and activities. It can therefore be presumed that there are at least two different groups of visitors. The first is made up of people living inside or near the park. They use the Euganean Hills as a generic green area for spending spare time in order to relax. The second group consists of people coming from further away, who are attracted by the natural and historic elements of the territory that are characteristic of the park.

As mentioned above, in order to estimate the number of visits, a statistical function between the average number of trips, distance from the Euganean Hills and type of the municipality was estimated:

$$g_i = e^{[3.1067 - 0.6108 \ln(km_i) - 0.6422 R_i]} - 1 \qquad (1)$$

adjusted $r^2 = 0.91$

By means of (1), we calculated that the number of visits equals 3.29 million per year.

94% of visits are paid by people living on the plain near the park. The function also highlights that the recreational activities of the park are mainly an urban phenomenon. About 87% of visits have been paid by inhabitants of the urban and metropolitan areas.

The catchment area [2] of the park extends to about 160 kilometres with reference to the urban areas, and 56 kilometres with reference to the rural areas. These figures have been confirmed by a subsequent onsite survey in which 274 visitors were interviewed.

4 RECREATIONAL BENEFITS

The recreational benefits have been estimated by using a partly modified zonal travel cost approach [3]. We considered as dependent variable, not the visiting rates per inhabitant in each zone, but the ratio between the number of trips and the number of the family members (g_i) that we interviewed in each municipality. A function similar to (1) was estimated by using the travel cost (C_i) instead of the distance:

$$g_i = e^{[2.0529 - 0.6108 \ln(C_i) - 0.6422 R_i]} - 1 \qquad (2)$$

adjusted $r^2 = 0.91$

By the trip generating function (2) we simulated the number of visitors (G) coming from each municipality on the Veneto and Emilia Romagna plain under the hypothesis of increasing travel costs (added travel costs – CA) and we estimated the demand function:

[2] The catchment area is defined as 'the distance covered by the 95th percentile', could be a significant indicator for the attraction potential of a defined area, and for the value visitors attach to it.

TABLE 3
NUMBER OF VISITORS TO THE EUGANEAN HILLS REGIONAL PARK AND AVERAGE EXPE NDITURE PER CAPITA (EXCLUDING TRAVEL COS TS).

distance	visits		expenditure (euros)		
	n.	%	average	total	%
Less than 25 km	1,326,034	43.7	17,20	22,805,479	31.5
from 26 to 50 km	631,182	20.8	28,23	17,816,823	24.6
from 51 to 75 km	655,025	21.6	28,61	18,739,174	25.9
More than 75 km	419,040	13.8	42,62	17,857,551	24.6
Total	3,031,281	100.0	23,91	72,463,570	100.0

$$CA = 27.61 \cdot e_i^{(-1.82E-06 \cdot G)} \qquad (3)$$

adjusted $r^2 = 0.82$

The consumer surplus is 4.97 euros per trip, and the whole benefits flow is 15 million euros per year.

Through the onsite survey, visitor expenditures has also been estimated. It can be observed that expenditure increases significantly with the distance travelled in order to reach the park (table 3). While the visitors who travelled less than 25 kilometres during the outward journey spent on average 17 euros per capita (excluding travel costs), people travelling more than 75 kilometres spent 45 euros per capita. The total yearly expenditure is equal to about 72.4 million euros.

5 CONCLUSIONS

The research highlighted that the Euganean Hills Regional Park, with 168 visits per hectare per year, is probably the most frequented of the Veneto Region. For example, in the Dolomites of Ampezzo Regional Park, which is the most frequented protected area of the entire Alps, there are 48 visits per hectare per year [4], [5]. Also the expenditure of the daily visitors (4.025 euros per hectare per year) and the recreational benefits (837 euros per hectare per year) are much greater than in the other Regional Parks of a similar size [6].

This is probably partly due to the park's location, which is close to urban areas, but it is also due to the presence of an important historic-cultural and natural heritage.

It's also important to underline the fact that the recreational activities, especially during certain periods, currently cause congestion problems. It would therefore seem important that there should not be an increase in the number of visitors in the future and that the park authorities should try to improve the control of the recreational flow and encourage, if possible, some new cultural and recreational activities in autumn or in winter.

REFERENCES

[1] A. Finco, Franceschetti G., "I caratteri ambientali e paesaggistici dei colli Euganei", *Sistemi produttivi, redditi agricoli e politica ambientale. Risultati di una ricerca nel parco regionale dei Colli Euganei (Veneto)*, M. Prestamburgo, Tempesta T., eds.,Franco Angeli Milano, pp. 49-66, 1994

[2] A. Muhar, Arnenberger A., Brandenburg C., "Methods for Monitoring in Recreational Protected Areas: An Overview", *Proc. Monitoring and Management of Visitor Flows in Recreational and Protected Areas*, A. Muhar, Arnenberger A., Brandenburg C. eds., Vienna, pp. 1-6, 2002.

[3] T. Tempesta, *Appunti di estimo rurale e ambientale*, CLEUP, Padova, 2005.

[4] M. Da Pozzo, Tempesta T., Thiene M., *Turismo e attività ricreative a Cortina d'Ampezzo*, FORUM, Udine, 2003.

[5] M. Chodziesner, Wiederwald D., *Tourism in the alpine protected areas* , Alparc - Dossier n. 2, 2001.

[6] Tempesta T., Visintin F., Marangon F., Ecotourism Demand in North-East Italy, *Proc. Monitoring and Management of Visitor Flows in Recreational and Protected Areas*, A. Muhar, Arnenberger A., Brandenburg C. eds., Vienna, pp. 373-379, 2002.

Tiziano Tempesta is full professor at the Dipartimento Territorio e Sistemi Agroforestali of the Padova University. He is a member of national and international scientific associations. He worked on rural land management and explored the connection between agriculture and environment, focusing particularly on rural landscape and tourism and outdoor recreation in rural and mountain areas. He published more than one hundred and fifty papers and books both in Italy and abroad. Web: http://www.tesaf.unipd.it/people/Tempesta/HomeTT.htm

Samer Arkilo takes the PhD in 2008 and is an expert consultant of the Dipartimento Territorio e Sistemi Agroforestali of the Padova University.

Meeting needs equals enhancing satisfaction? Case study of cableway and lift riding in World Heritage Site Wulingyuan, China

Zhang, C.Z., Xu, H.G. and Su, B.T.

Abstract – Meeting the needs of tourists to satisfy tourists is the policy basis for many mangers of world heritage sites in China. The paper, based on the case study of lift riding in world heritage site Wulingyuan China, challenge the policy. With tourist survey and online interview methods, the authors argue that lift do meet part of tourists' needs, but it do not enhance the satisfaction level as the managers supposed, the assertion "meet the needs of tourists, thus enhancing their satisfaction" is not built on solid ground, and catering to the needs of tourists is at least not a valid reason for tourism developments in heritage sites. The results of this study coincide with the Motivation-Hygiene Theory. Some factors may not give positive satisfaction, but dissatisfaction results from their absence, such as good service quality and management skills. The improvement of services and management skills may eliminate dissatisfaction, but cannot enhance tourist satisfaction. They are called hygiene factors. Those factors that can provide positive satisfaction are called motivators. Cableway and lift act as motivators that can induce more satisfaction if properly operated.

Keywords – Meeting needs, tourist satisfaction, motivation-hygiene theory

1 Introduction

There are many issues in the management of heritage tourism that are deemed to be straightforward in western countries but become very complicated and controversial in the Chinese context. Construction of cableways within heritage sites is one of them. In Mainland China, the construction of cableways and other modern means of transport into World Heritage sites is a highly controversial issue.

Most supporters are stakeholders and interest groups of tourism development, who tend to view the issue from a market perspective and think that cableways have many advantages over roads or trails. Cableways are more adaptive to the topographic conditions and less affected by weather; they require less space to build, therefore they have less negative impact on local topography and natural environment. With greater grade ability, they shorten distance between two ends and save time for the tourists. They do not

Zhang Chaozhi, Ph.d & Associate professor of Center for Tourism Planning & Research, Sun Yat-sen University. Current research interests: heritage tourism management and tourism planning. E-mail:zhchzhi@mail.sysu.edu.cn.
Xu Honggang , Ph.d & professor of Center for Tourism Planning & Research, Sun Yat-sen University. Current research interests: system dynamic and tourism planning. Center for Tourism Planning & Research, Sun Yat-sen University. E-mail:xuhonggang@yahoo.com.cn
Su Botao, Ph.d candidate of Centre of Urban Planning and Environmental Management, the University of Hong Kong, Hong Kong, China

discharge emission of "Three Wastes" (waste water, waste gas and solid wastes) and do not cause noise pollution; thereafter they meet the need for protecting the environment and ecology of the place. They are safe and reliable; easy to maintain with automated operation. They need less fund for infrastructure construction and less expensive to run, so better financial returns are generated. They consume less energy and therefore achieve greater energy conservation. Besides, they hold the idea that cableways, as a manifestation of human achievement and scenery upgrade, can be fully developed under proper arrangement and in accordance with principles of landscape ecology in order to boost tourism development (Jiang, 2000) Fang and Dong, 2001).

Meanwhile, tourist cableways can effectively meet tourists' needs and enhance their satisfaction by increasing carrying ability and thus saving their time on the way. They may become a tourist attraction themselves; with enlarged environment capacity and improved construction on the site, more tourists will be attracted and thus more revenue will be generated which in turn accumulates funds for developing new tourist resorts and new cableways. Consequently, a virtuous cycle of tourist development will be achieved. Besides, cableways can serve to transport people and goods swiftly in case of an emergency. Therefore, cableways should be recognized for their merits in promoting the development of mountainous scenic spots and be employed as an effective means in the sustainable development of such spots. (Xie, 2000)

However, the opponents of building tourist cableways are mostly heritage experts and heritage management departments. For example, Renzhi HOU (2000) and other consultants for the State Cultural Relics Bureau, who commented on the cableways in Tai Mountain, consider a cableway built in 1980, during the construction of which a small but integral part of the mountain was blasted away, to be the most serious damage to the authenticity and integrity of the topography of the mountain whose natural beauty was destroyed significantly, thus caused visual pollution to tourists. Besides, a high concentration of tourists on top of the mountain has led to such consequences as over-commercialization, over-urbanization and environment degradation of that area. Cableways also deprive the tourists of the pleasure of climbing and conquering the mountain. With shorter average time each tourist spent in Tai'an where Tai Mountain is located, tourist revenue thus becomes less. The beneficiaries are the cableway operators only. During the construction process, they failed to follow proper procedures by acting first and reporting afterwards, thus violated relevant rules and regulations.

Ninggao Xie (2000), another expert for the Ministry of Construction (the authority in charge of scenic areas and World Heritage Sites), maintains that sightseeing cableways cause irreversible damage to the topography, vegetation, ecology and natural beauty of scenic spots. World Heritage Sites in particular are among serious victims. Besides, visitors who choose to use cableways to get to the top may forget the intrinsic value of mountain climbing, thus undermining the reputation of this renowned mountain. He also insists that cableways and other tourist facilities cause irretrievable damage to World Heritage Sites and that they should be built somewhere outside the resorts. He firmly believes that tourists' needs should not be blindly met at the expense of heritage itself. (Xie, 2000)

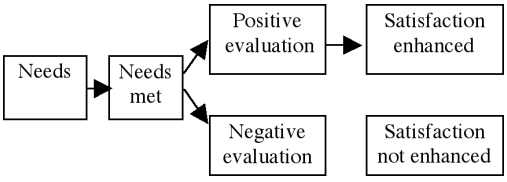
Though heritage experts and the mass media strongly protest against the building of tourist cableways, in many cases, out of their conscience and morality, yet they can hardly provide any empirical studies or concrete evidence to prove the negative effects of these projects. Due to the lack of practical research and related legislation over this particular issue, such projects have been and are still being launched one after another in the country's leading World Natural and Cultural Heritage sites, such as Taishan, Huangshan Emei Shan and Wudang Shan and so forth, among which the World Natural Heritage Wul-

ingyuan is one of the most typical cases. Since 1992, when Wulingyuan was listed as a World Natural Heritage, the local government has successively built two cableways, one railway and one elevator for sightseeing. Despite the controversy and criticism caused by the construction of these facilities, the local government persists to initiate another cableway construction on the ground of "meeting tourists' needs, enhancing their satisfaction".

In view of the above, this study attempts to research into the satisfaction level and motivations of those cableway passengers, verify the legitimacy of local government's claim of "meeting tourists' needs, enhancing their satisfaction", discuss whether meeting the needs of tourist is equivalent to increasing their satisfaction level, examine tourists' satisfaction based on the Motivation-Hygiene Theory and provide some insights for the management of heritage sites.

2 METHODS

Taking into consideration the complexity of the research questions and the inapplicability of Western satisfaction measurement scale, this study conducts in-depth interviews with tourists instead of questionnaire survey,The framework of the outlines is illustrated by the



following diagram:

Diagram 1 Logical framework of researching tourist satisfaction

At present, the average waiting time per tourist in the site for cableways, elevators and other modern means of transport is about three hours, which becomes a favorable condition for this interview-based study. The interviews were carried out when the tourists were waiting in line for their cableway/lift ride (both uplink and downlink). The following questions were asked:

(1) Measurement of motives (in order to check whether the demand has been met). Question: Why do you take the cableway/lift?
(2) Satisfaction level and perception of service quality. Question 1: What are you content with during your visit in Wulingyuan? Question 2: What are you discontented with during your visit in Wulingyuan?
The interviewees are 45 tourists (old, mid-aged and young) from over 10 different provinces and municipalities of China such as Human, Hubei, Guangdong, Yunnan, Zhejiang, Shangdong, Shanghai and many more. They are package tourists, provisional groups of tourists and individual tourists.

In addition, during August 24-27, 2006, in order to take full account of tourists' perception of Wulingyuan, the authors also searched and collected the comments from tourists on Wulingyuan in several major online tourism forums (such as www.ctrip.com), where people share and exchange information about tourist destinations, as a supplement to the interviews.

3 CONCLUSION AND DISCUSSION

3.1 Conclusion

The study shows that the cableway/lift can meet the needs of tourists on three levels. The first is their spontaneous need to save time and energy and experience something new. The second refers to the need of conforming to others under peer pressure. The third level is the need forced upon the tourists by tour guides/travel agents, which sometimes is inevitable because of the asymmetry of information.

But on the other hand, scenic quality is recognized as a major factor that can increase their satisfaction level. Other factors

compromise their satisfaction, such as unethical conduct of small business operators, poor service quality, unfriendly local people and long hours waiting in line to get on the cableway/lift. While the cableway and lift can facilitate tourists' movement, they do not necessarily contribute to their overall satisfaction. Instead, their inadequacies dissatisfy tourists directly. This proves that meeting some needs of the tourists does not always enhance their overall satisfaction and that service quality is the key.

Therefore, the assertion "meet the needs of tourists, thus enhancing their satisfaction" is not built on solid ground. There is no theoretical support for it. In many scenic spots and heritage sites throughout Mainland China, all kinds of facilities are being built to meet the needs of tourists. But they fail to enhance tourist satisfaction, as shown by this study. In conclusion, catering to the needs of tourists is at least not a valid reason for tourism developments in heritage sites.

3.2 Discussion

As indicated by this study, cableway and other modern means of transport do not directly contribute to the overall satisfaction of heritage tourists. Of course, it can be argued that they can increase tourist satisfaction to some extent, but the overall satisfaction is severely compromised by the poor service quality and management skills. This indicates from another perspective that the absence of good service is more likely to dissatisfy tourists than a lack of facilities.

The results of this study coincide with the Motivation-Hygiene Theory. Some factors may not give positive satisfaction, but dissatisfaction results from their absence, such as good service quality and management skills. The improvement of services and management skills may eliminate dissatisfaction, but cannot enhance tourist satisfaction. They are called hygiene factors. Those factors that can provide positive satisfaction are called motivators. Cableway and lift act as motivators that can induce more satisfaction if properly operated. But in this study, there is no satisfaction arising from them because the service and management accompanying them are so poor. Further research is required to support this assumption.

The competition among and within heritage sites in China to build facilities to attract more tourists has led to the "tragedy of the commons" (Zhang, 2006). Neither the legitimate operators, local residents and other stakeholders nor the tourists are the ultimate beneficiaries of this practice. In further reflection of this phenomenon, the question arises as how such highly scarce heritage resources should be managed and developed. Should more facilities be provided to cater to various needs of tourists, or should the demand of tourists be channeled to ensure a win-win situation?

Acknowledgement

The authors would like to express their gratitude to the National Science Foundation of China for supporting the research (project serial number: 70503007). And also the authors would like to thank students and officials who had facilitated the research.

References

[1] Cronin, J. and Taylor, S. (1994). SERVPERF versus SERVQUAL: reconciling performance -based and perceptions-minus-expectations measurement of service quality. Journal of Marketing, 58:125-131.

[2] Eitzinger, C. and Wiedemann, P. (2006). Risk perceptions in the alpine tourist destination Tyrol—an exploratory analysis of residents' views. Tourism Management, (4):1-6.

[3] Fishbein, Martilla, and James, J. (1977). Importance-performance analysis. Journal of Marketing, 41:77-79.

[4] Haber, S. and Lerner, M. (1999). Correlates of tourism satisfaction. Annals of Tourism Research, (26):197–200.

[5] Hou, R.Z., Wu, L.Y., Xie, N.G.(2000). Protect Mount Tai, detach the cableway. Chinese Garden, (5):9-11(in Chinese).

[6] Jiang, N. (2000). The legitimacy of cableways in tourist resorts. Tourism Tribune, (6): 61-63.

[7] Laws, E. (1998). Conceptualizing visitor satisfac-

tion management in heritage settings: an exploratory blueprinting analysis of Leeds Castle, Kent. Tourism Management, 19 (6):545-554.

[8] Li, X.L. (2004). A study on the passengers of modern means of transport in tourist resorts: case study of cableway and lift in Wulingyuan. Urban Planning Forum, (2):72-76 (in Chinese).

[9] Macintosh, G. (2002). Building trust and satisfaction in travel counselor/client relationships. Journal of Travel & Tourism Marketing, (12): 59–73.

[10] Parasuraman, A., Zeithaml, V., and Berry, L. (1988). SERVQUAL: a multiple-item scale for measuring consumer perceptions of service quality. Journal of Retailing, 64:12-40.

[11] Pizam A,Neumann Y, and Reichel A(1978).Dimensions of tourist satisfaction with a destination area.Annals of Tourism Research,(5):314-322.

[12] Tribe, J. and Snaith, T. (1998). From SEERVQUAL to HOLSAT: Holiday Satisfaction in Varadero, Cuba. Tourism Management, (1):25-34.

[13] Woodside AG, Frey LL, Daly RT(1989). Linking service quality, customer satisfaction and behavioral intention. Health Care Marketing, 9(4): 5-17.

[14] Xie, C.F(2000). Thinking about cableways in the scenic spots of China. Journal of South Anhui industry institute. (1):21-15(in Chinese).

[15] Xie, N.G. (2000). The threats of cableways to World Heritage sites. Tourism Tribune, (6):57-60 (in Chinese).

[16] Zhang, C.Z. (2006). Tourism and heritage protection: an empirical study from the perspective of the government management. Beijing: China tourism press, 212 (in Chinese).

[17] Zhang, C.Z., Xu, H.G., and Bao, J.G. (2005). Characteristics, satisfaction level, and the impact of cableway passengers in World Heritage sites: the case of Wulingyuan. Tourism Tribune, (3): 33-37 (in Chinese).

MMV4 PROCEEDINGS
NEEDS AND TOOLS

A new recreation visitor inventory that parallels other resource inventories

Kenneth Chilman, Les Wadzinski, Andy West

Abstract — A Rapid Assessment Visitor Inventory (RAVI) has been developed for inexpensively obtaining representative samples of place-specific visitor numbers and perceptions of attributes of their visit experience. It has been tested in 13 studies on 7 federal and state parks and conservation areas in 4 states. The inventory data are used by field-level managers in decision meetings with other persons in the management organization and with individuals and groups external to the organization. Examples of the application and use of a RAVI study, and a repeat measurement for monitoring purposes are discussed.

Index Terms — Decision-making, management, public participation, visitor inventory.

1 Introduction

Monitoring and management of visitor flows in recreational and protected areas involves learning how many and what types of visitors are moving through outdoor recreation areas. Then management decisions can be made about desired conditions to be managed and maintained on the areas.

Often the parks and protected areas are large and diverse, and visitors are scattered and engaged in various activities. Visitor inventories have usually involved long and expensive studies of several months duration. A shorter-time-frame, less expensive inventory method is needed to provide specific data for management decision-making discussions.

K.C. Chilman is with the Department of Forestry, Southern Illinois University Carbondale, IL 62901. E-mail: plc1@siu.edu (attn Chilman).
L. Wadzinski is with the Hoosier National Forest, Bedford, IN 47421. Email: lwadzinski@fs.fed.us
K.A. West is with the Missouri Department of Conservation, P.O. Box 218, Puxico, MO 63960. E-mail: Andy.West@mdc.mo.gov.

2 Methods

Natural resource systems, such as forestry and wildlife management, have used field inventory methods to obtain place specific data for decision-making for many years (Avery 1975, Dasmann 1964). Wildland recreation, when viewed as renewable resources for visitors to repeat enjoyable experiences, has not had similar inventory procedures.

A place-specific, inexpensive Rapid Assessment Visitor Inventory (RAVI) has been developed to conduct visitor counts and surveys in a short (2 week) time frame. As in other resource management, management subunits with specific conditions are identified. Then sampling is done at a travel pattern concentration, junction, or a similar location - where most visitors to a land management subunit can be contacted. Counts of visitors, and one-page surveys (emphasizing questions thought important by managers) are conducted.

Because seasonal differences occur in recreational use of most areas, the RAVI system utilizes a 4-day sampling period (Thursday through Sunday) as a representative

sample of the weekends in a season (spring, summer, fall, winter). The two weekdays are used as a comparison to the weekend days. A short report of findings, emphasizing ease of management communications, is then written.

The RAVI system has been tested at various federal and state parks and forests in four states. A case study example is presented of how the RAVI system was administered and how the data was utilized by a federal land manager of horse riding trails on a national forest in 2005, and then remeasured for monitoring purposes in 2007.

3 Results

A case example of the application and use of the RAVI system will be discussed using steps identified in the RAVI model (Chilman, et.al. 1006). Applications have been done at forest, park, river, and lake areas with similar results.

Following telephone conversations and two visits to the Hoosier National Forest in southern Indiana, an agreement was reached to do a test of the RAVI system at Hickory Grove Church in the Hickory Ridge area of the national forest. The church area was at the confluence of some heavily used horse riding trails. It was an attraction point with a log church built in 1871. There were recently built hitch rails for the horses and a toilet facility, so many of the riders dismounted and rested in the area. The first RAVI study was done in September 2005, and the second study for monitoring purposes was in September 2007.

Step I. Design the Study

1. Identify concerns/questions. The basic questions addressed in this study were: What types of users (and how many) visit a central destination point in the Hickory Ridge trails area during a typical weekend in the fall use season? What are their perceptions and preferences for trail and use conditions? What changes (including increased use) had been observed by the riders?
2. Examine study area. Prior to the 2005 four-day RAVI study, the researcher traveled to the trails area and Hickory Grove Church area with the Hoosier National Forest recreation program manager. In addition, they visited four nearby horse rider campgrounds (3 private, 1 public) and talked with staff there.
3. Develop sampling plan. Sampling was done Thursday through Sunday, October 15 - 18, 2005. Counts and surveys were done at the Hickory Grove site from 9:00 a.m. to 4:00 p.m. The second study was done September 13 - 16, 2007.
4. Develop count forms and questionnaires. Count forms and one-page questionnaires from previous recreation visitor field studies were adapted for use.

Step II. Data Collection

1. Train data collectors. No training was necessary as the research was done by the researcher who has done field-level visitor studies for several years. One assistant was added to do counts while the researcher was surveying visitors.
2. Do counts and interviews. All trail users stopping or passing by were counted during the 7 hours each day. One person per group was surveyed when groups stopped for awhile in the hitchrail area.
3. Data coding and entry. Optional. In this case, the descriptive count and survey data were easily tabulated.

Step III. Data Analysis and Reporting

1. Tabulation of counts and interviews. Data from the trail user counts and interviews were displayed in descriptive enumerative paragraphs.
2. Prepare maps of user distribution. Although not done for purposes of the Hoosier report, map displays of distribution of visitor types and numbers are often a useful communication tool.
3. Prepare preliminary report. A very basic format was used in the draft report: Introduc-

tion, Methods, Results, Discussion. Sixty groups totaling 251 riders were counted in 2005: 51 groups totaling 181 riders were counted in 2007. Twenty-seven interviews were conducted during the four days in 2005: 38 in 2007. Visitor satisfaction ratings in 2005 were quite high, with sixteen respondents giving the highest rating of 10, nine respondents giving a rating of 9, and two respondents rating their visits an 8. In 2007, 28 respondents gave a rating of 10, 6 rated it 9, and 2 ratings of 8.

Step IV. Discussion of Data with Managers

1. Are data, methods clearly understood. Because travel distance was approximately 250 miles between the researcher's office and the manager's office, no face-to-face discussions took place after the reports were written. However, several telephone conversations were used to discuss the methods and data.
2. Implications for management issues.

The Hoosier manager in his 2005 presentation indicated that they found out that most riders there were horse riders, use is fairly high, satisfaction ratings were high, most riders started form a particular campground, and riders were unsure about fees. He indicated that they used the information to determine that is was appropriate to spend money to enhance the site, and confirmed that trail maintenance techniques were working and acceptable to the users.

3. Develop a plan for monitoring remeasurements. A follow-up study to examine changes in use conditions was conducted in 2007.
4. Prepare the final report. In the case of the 2005 and 2007 Hoosier RAVI studies, no corrections or revisions were requested in the final reports.

4 Discussion

High quality recreation experiences occur on many outdoor areas, but managers usually do not have place-specific data to describe the visitors and their experiences. The RAVI method enables managers to obtain visitor data rapidly and inexpensively to describe and discuss specific visitor experiences on key management areas.

Managers of the 13 areas where RAVI's have been done expressed an interest to know more about visitors to their areas, so that high quality recreation experiences could be maintained or improved. Because of management budget limitations, they wanted to be able to obtain the information for a low cost.

As well as learning about visitors and their visits, managers used the RAVI study data in various ways: as information for capacity planning (Niobrara National Scenic River, Nebraska), to evaluate visitors' responses to trail improvements (Hoosier National Forest, Indiana), for information about visitors to a new visitor center (Cache River State Natural Area, Illinois), as input on controversial duck hunter management proposals (Duck Creek Conservation Area, Missouri), and in other similar ways. Four of the managers found the RAVI method useful enough to have the researchers return for studies on other parts of their areas. One study currently underway is evaluating visitors' experience on four major use areas on Mingo National Wildlife Refuge in Missouri. The Corps of Engineers lake manager at Table Rock Lake has discussed the new trail visitor data at various meetings in Branson, Missouri, a highly developed entertainment travel destination.

5 Conclusion

The three innovations of RAVI as a place-specific inventory method appear to be 1. the identification of travel pattern concentrations (TPC's) for sampling, 2. the sampling strategy of doing one weekend (plus 2 weekdays) in a season (spring, summer, fall, winter) as a known population, and 3. short, straightforward easy-to-read study reports as recognition of the importance of communications

(both internal and external to the management organization) for effective management decision-making.

RAVI appears to be a useful tool to provide managers with specific information for meetings with individuals and groups. During RAVI at two areas, management interns at the areas were trained to do data collection and write study reports. A training session for Missouri Department of Conservation employees in southeast Missouri was conducted in April 2008 to demonstrate the procedures involved.

Managers who have used the visitor inventories report increased credibility in their local communities and with area visitors. And this is the basic purpose of the RAVI: to help managers, and visitors, maintain high quality recreation visit opportunities.

References

[1] T.E. Avery. 1975. *Natural Resource Measurements.* New York: McGraw-Hill.

[2] K.C. Chilman. 1983. *Developing an Information - Gathering System for Large Land Areas, Recreation Planning and Management*, pp. 203 - 215, S. Lieber and D Fesenmaier, eds. St. College, PA: Venture Publishing.

[3] K.C. Chilman, S. Schneider and L. Wadzinski. 2006. " A Recreation Quality Rapid Assessment Method for Visitor Capacity Managment," In *Proceedings Northeast Recreation Research Symposium, General Technical Report*, Burlington, VT, pp. 290 -294. Northeastern Research Station, USDA Forest Service.

[4] R.F. Dasmann, 1964. *Wildlife Biology*. pp. 125 - 152. New York: John Wiley and Sons, Inc.

K. C. Chilman, Degrees: BS Forestry, Purdue University, 1956, MF University of Michigan, 1959, Ph.D. University of Michigan, 1972. Employment: U.S. Forest Service, California, 1956 - 1965; Teaching Assistant, Instructor, University of Michigan, 1965 - 1968; Assistant Professor, University of Missouri, 1968 - 1972, Associate Professor, Southern Illinois University Carbondale, 1973 - 1995; Adjunct Professor / Researcher, Southern Illinois University Carbondale, 1996 - present.

L. Wadzinski, Degrees: BS Recreation, Indiana University, 1973; MS Recreation Resource Management, 1983, Slippery Rock University. Employment: Recreation Program Manager, Hoosier National Forest, 1991-present; Adjunct Faculty, Indiana University School of Public and Environmental Affairs, 2002-present; Park Manager, US Army Corps of Engineers, 1980-1991.

K. A. West, Degrees: B.A. 1971 and M.A. 1975 Botany, PhD 2002 Zoology (Interdisciplinary Studies) Southern Illinois University Carbondale. Employment: 30 years as biologist and land manager for Illinois Dept of Natural Resources (1975-2005), botanist/ecologist with Shawnee National Forest (Illinois); currently Wildlife Management Biologist for the Missouri Dept. of Conservation, Puxico MO.

Developing a national approach to visitor data collection, management and use for protected areas: thoughts from Australian research and practice

Tony Griffin, Susan A. Moore, Simon Darcy and Gary Crilley

Abstract — Information on visitor numbers, activities, expectations and satisfaction is vital for protected areas managers on two counts: to assist in the provision of the services and facilities that visitors need and want; and to determine if managers have been efficient and effective in meeting these demands. This paper builds on a recently completed national study in Australia of visitor data collection and usage, and the future visitor data needs, of protected area management agencies. Australia is a federation of states and provides a challenging backdrop for developing a national approach as most responsibilities for protected areas rest with the states rather than the national government. Thus, the success of such an approach rests on cooperation rather than an overarching national regulatory responsibility. The study found that all protected area agencies collected visitor data, however, their approaches were highly variable in what was measured, how the measurements were applied and how data were managed and used. This variability was problematic because it becomes very difficult to determine issues of general importance for protected area management or to benchmark performance across areas. Based on these findings and knowledge of the institutional settings for protected area management in Australia, this paper poses some ideas for progressing a national approach for standardising the measures and measurement of key variables so that comparisons and benchmarking become possible and reliable. Core and supplementary visitor data variables can be identified, with the former being of national interest and hence requiring collection and storage under national coordination and guidance. Implementing such an approach will require working creatively and collaboratively within the current institutional settings.

Index Terms — Benchmarking, national approach, performance indicators, protected area management, visitor data.

1 Introduction

Protected areas in Australia cover 10% of the continental land mass [1]. Visitation to these areas is both substantial and perceived to be growing [1], [2], with a recent estimate putting annual visits at 100 million [3]. The accuracy of that estimate, however, is open to serious question [4]. It is based on an aggregation of estimates of the number of annual visits provided by the ten separate agencies responsible for the management of protected areas in Australia. Each of those agencies, six of which are under the auspices of state governments, two under territory governments and two under the Federal government, has developed its own method of generating this estimate. The methods are

Tony Griffin is with the University of Technology, Sydney, Australia. E-mail: tony.griffin@uts.edu.au. Susan A. Moore is with Murdoch University, Perth, Western Australia. E-mail: S.Moore@murdoch.edu.au.
Simon Darcy is with the University of Technology, Sydney, Australia. E-mail: simon.darcy@uts.edu.au.
Gary Crilley is with University of South Australia, Adelaide, SA. Email: Gary.Crilley@unisa.edu.au

highly variable, ranging from survey-based approaches to aggregations of guesstimates based on the opinions of individual park managers. In one agency an estimate was generated some years ago and then an arbitrary standard growth rate applied for all subsequent years [4]. Overall, there can be little confidence that the estimates reflect reality, nor that agencies are fully aware of the growth in visitation that is occurring and management implications arising from this.

The situation described above reflects a broader problem within Australian protected area agencies: collection and use of visitor data has been rather inconsistently and haphazardly done. Management decisions have consequently often been based on poor quality or no information about such matters as the scale and variety of visitor activities and their associated impacts, as well as visitor needs, behaviour and levels of satisfaction with regard to existing services and facilities. This paper presents some key results from a major study that sought to address this problem. It involved all Australian protected area agencies and aimed to develop a nationally consistent system for visitor data collection that would address current knowledge gaps and improve the overall quality of visitor data available to managers at various levels within the agencies.

2 Background to the problem

The absence of a strategic, standardized and systematic approach to visitor monitoring has been long-recognized in Australia, dating back to at least the early 1980s [5]. In response, there have been a number of reviews of visitor monitoring practices over the last decade or so. One of the first was carried out by the Victorian National Parks Service in 1996 for theAustralia and New Zealand Environment and Conservation Council (ANZECC) Working Group on Benchmarking and Best Practice for National Parks [6]. The resulting guidelines provided a range of standardized measurement and visitor data collection protocols. A few years later Archer, Griffin and Hayes [7] undertook a review of visitor data collection practices, with the intention of describing how the agencies were collecting, storing, analyzing, reporting and using visitor data. This study revealed that practices varied widely between agencies and the ANZECC guidelines had been only very partially adopted, a finding reinforced in 2002 by the Open Mind Research Group [8]. The OMRG study also found that while the guidelines were well regarded, a range of constraints had limited to their application, including a shortage of resources, the complexity of the standards and the difficulty of operationalizing them. In response, agencies had developed their own standards or adopted others that were perceived to better suit their particular systems.

A common finding of these reviews was the variability and inconsistency across the agencies in terms of measurement methods, frequency and means of collection, and integration of visitor data into management and planning decision-making. The reviews also highlighted how most visitor monitoring had primarily focused on measuring visitor numbers and satisfaction as performance indicators, with limited focus on other types of data such as visitor activities, movements and distribution, motivations, expectations and attitudes. The principal objective of a visitor data collection system is to produce reliable, current data which can be analyzed and presented in a format that can guide decision making at all levels in an agency [6], [8], yet there were clearly some significant gaps. The Commonwealth Grants Commission [3] has reinforced this need to develop reliable and valid methods of collecting visitor data at a national level for the purposes of resource allocation.

The agencies themselves acknowledge these problems and some have made significant recent advances in developing systematic approaches to visitor data collection and use [2]. However the variability and inconsistency in visitor data collection and use across, and sometimes within, the various agencies

has persisted, making it very difficult to determine, at the national level, the precise magnitude of visitation, identify visitation trends, or understand visitor market needs in relation to protected areas. It is with this background in mind that the research was designed to assist in developing a nationally consistent system for collecting, benchmarking and managing visitor data for protected area management.

3 STUDY METHOD

This study adopted a *participative action research* (PAR) methodology. PAR aims to produce knowledge directly useful to those being researched though collaboration in the research process. In PAR research, therefore, the emphasis is on working with groups as co-researchers [10]. Adopting this methodology permits the use of diverse methods, and the preferred way to communicate the practice of PAR is through describing actual cases. Within this framework, the study engaged all organizational levels within all Australian protected area agencies and recognized that the structures and purposes for which data are collected may vary between agencies. There needed to be a shared ownership of the knowledge created, and efforts had to be taken to ensure that this knowledge could be effectively used within each agency.

The first stage of the project was to comprehensively review current practices of visitor data collection, management and use, and to identify significant data needs that were not being met. The review considered data that were collected for operational and strategic decision-making as well as performance reporting. Approximately 120 agency staff were interviewed, with the selection of these staff being based on a protocol. Essentially, the team sought to interview those staff involved in the collection, management or use of visitor data, or were responsible for performing functions which relied on visitor data. The selection of staff was driven by a snowballing approach that began with recommendations from key agency contacts within the various head offices. The review focused on the following questions:

- Types of data and how collected
- Organizational level(s) at which data are collected
- Use, storage and dissemination of data
- Factors influencing or constraining data collection and use
- Adequacy and reliability of available data
- Perceived gaps in existing data collections

A crucial step in this process was the establishment of an Industry Reference Group (IRG). The role of the IRG was central to the research design and integral to developing cooperative knowledge management within and between agencies. In this sense, the IRG was central to the notion of PAR to encourage the agencies to work together. At the end of the review, the outcomes were presented to the IRG, which then reached a consensus on the common visitor data needs that required a nationally consistent approach. The IRG also identified a range of supplementary data needs which did not require consistent approaches but where existing practices required some improvement.

4 KEY FINDINGS

The review revealed wide variations in the types of data collected, the means of collection and measurement, and the subsequent management and application of the data. However there were a number of strong common themes and recognized data needs that emerged. Consultation with the IRG led to these needs being organized into two sets: core and supplementary. Each of these is discussed below.

4.1 Core data needs

Core visitor data was defined as information that should be collected on an annual or other regular basis using a nationally consistent and standardized methodology across all agencies. Some of these data would need to be collected on a national basis and disaggregat-

ed down to an agency level. Other data may be collected at various levels within an agency, regional or even an individual park. In this latter case, the data could, where appropriate, be aggregated up to an agency or national level, but the general rationale for collecting such data in a nationally consistent way is that there is some advantage to this consistency. It may, for example, allow inter-agency comparability or national benchmarking in relation to certain variables. The system, overall, would consequently not only improve the level and quality of knowledge across all agencies but also produce efficiencies.

The following sets were agreed to represent core data needs:

- Aggregate number of visitors, or visits, state or territory wide
- Frequency or regularity of use, as a contributory requirement for estimating visitor/visit counts
- Demographic visitor profiles
- Visitor satisfaction and perceptions of service quality, overall and with regard to specific attributes
- Determinants of satisfaction or quality of experience
- Community attitudes, values and perceptions with respect to protected areas
- Economic value of protected areas
- Trends affecting protected areas
- Visitor safety (accidents, incidents)

These data sets were further categorized as first or second tier needs, based on the relative priority and frequency of collection (e.g. annual). Aggregate visitor/visit counts were regarded as first tier. All agencies expressed a need for a more accurate method of estimating total visitation within their jurisdiction, with a number of agencies describing current estimates as “embarrassing”. The perceived value of such data was that they provided a key performance indicator for the agency and were vital to support funding submissions to the respective state or territory Treasuries. In addition, all agencies were required to report their annual visitation estimates to the Commonwealth Grants Commission, which makes recommendations to the Federal Treasury on subsequent funding allocations. The fact that different agencies had varying methods for arriving at these estimates, most of which were subject to a high margin for error, was a major concern. Agencies that tended to be conservative in their estimates felt that they could be disadvantaged in the distribution of funds. There were also concerns over whether the number of visits, which could be varyingly defined, was an adequate basis for determining the load that visitors placed on protected areas. For example, in making a case for additional funding from the Federal Government to support management activities, visits could vary in duration and this could have a great influence on the load placed on a park. For this reason alone, there was a strong case for standardizing the method for estimating aggregate visitor numbers, or an alternative visitor load indicator, across all agencies.

In relation to visitor data other than counts, there was a general issue relating to the variability in the way certain indicators were measured, across agencies and even in different management units within the same agency. This makes it unnecessarily difficult to draw inferences about general issues such as the importance of certain park facilities, and to benchmark performance against other parks and agencies in relation to indicators such as visitor satisfaction. More consistent and regular measurement would also enable improved monitoring of trends in relation to important management issues.

4.2 Supplementary data needs

Supplementary visitor data was defined as that which provides some value for specific management and/or performance reporting tasks in specific contexts, but where there is no advantage in collecting on a consistent basis either nationally or within an agency. There was a wide range of such data needs recognized in the course of the review, some of which were being met by methods that were in need of improvement. Supplemen-

tary data needs focused predominantly on information needed at park level for routine management and forward planning. Data of interest included visitor numbers at park level; spatial patterns of use; visitor information requirements; commercial tour activities program evaluation; complaints about service; and facility preferences and expectations.

CONCLUSION

Work on this project is ongoing, with the current focus being on developing and testing measurement methods for the core data. Success in advancing a national approach to visitor data collection and use for protected area management rests on continuing to work collaboratively with the associated management agencies. Such a collaborative approach is essential in federated countries like Australia where no one agency has the mandate to direct the activities of managers in protected areas across the country. Collaboration is the only way to achieve national outcomes. The focus on core data needs in this project acknowledges the current institutional circumstances worldwide where protected area agencies have limited resources. Thus, only those data that are deemed essential for management and required for national aggregation or comparison are included in the core set.

REFERENCES

[1] J. Tonge, S. Moore, M. Hockings, G. Worboys and K. Bridle "Developing Indicators for the Sustainable Management of Visitor Use of Protected Areas in Australia – A Scoping Project". Technical report for CRC for Sustainable Tourism, Qld, Australia, 2005.

[2] T. Griffin and M. Vacaflores "A Natural Partnership: Making National Parks a Tourism Priority". Technical report for CRC for Sustainable Tourism, Qld, Australia, 2004.

[3] Commonwealth Grants Commission, "Visitor Numbers (National Parks and Wildlife Services)", http://www.cgc.gov.au/, 2006.

[4] S. Darcy, T. Griffin, M. Craig, S. Moore and G. Crilley, "Protected Area Visitor Data Collection and Management: Emerging Issues and Gaps in Current Australian Practices". *CAUTHE: Proceedings of 17th Annual Conference: Past Achievements, Future Challenges,* CD-ROM, 2007.

[5] D. Sheppard, *Collection and Collation of Visitor Use Data*. Queanbeyan: NSW National Parks and Wildlife Service, 1982.

[6] Australia and New Zealand Environment and Conservation Council, *Benchmarking and Best Practice Program, National Data Standards on Protected Areas Visitation*. Brisbane: National Parks Service, Victoria in conjunction Centre for Leisure Research, Griffith University, 1996.

[7] D. Archer, T. Griffin, and A. Hayes, "Managing People by Understanding People: a Review of Current Visitor Monitoring Practice by Australian Parks Agencies". *Capitalising on Research: Proceedings of the Eleventh Australian Tourism and Hospitality Research Conference*, CD-ROM, 2001.

[8] Open Mind Research Group, *Application of the ANZECC National Visitor Data Standards*. Prepared for Parks Victoria, St Kilda, Victoria, 2002

[9] M. Wardell, and S. Moore, *Collection, Storage and Application of Visitor Use Data in Protected Areas: Guiding Principles and Case Studies*. Technical report for CRC for Sustainable Tourism, Qld, Australia, 2004.

[10] P. Reason, "Three Approaches to Participative Inquiry", *Handbook of Qualitative Research*, N. Denzin. & Y. Lincoln, eds., Thousand Oaks: Sage Publications, pp. 324-339, 1994.

Tony Griffin BA Macq 1975, Grad Dip Urb Studs Macq 1977, Grad Dip Trsm Mgt KCAE 1989. Postgraduate Courses Director and Senior Lecturer, School of Leisure, Sport and Tourism, University of Technology, Sydney. Research interests and extensive publication record in tourism planning, national parks and urban tourism.

Susan A. Moore B Nat Res (Hons 1) UNE 1981, PhD U Wash 1995. A/Prof in Environmental Policy, Murdoch University Australia. Expertise in natural area tourism and biodiversity conservation policy. More than 100 publications in journals, books and as reports.

Simon Darcy BA KCAE 1990, MEnvPl Macq 1993, PhD UTS 2004. A/Prof in Leisure, Sport and Tourism, University of Technology, Sydney, Australia. Extensive research and publication record in tourism, sport and diversity management.

Gary Crilley BA, Dip Ed, Dip Rec, MBA, PhD. Director, Centre for Tourism & Leisure Management, University of South Australia. Co-Director of the CERM PI® research program which benchmarks performance indicators in Australian sport and leisure centres.

Plus ça change, plus c'est la même chose: visit types across Canada's National Parks

Frank P. Grigel

Abstract — Parks Canada is continuing to use latent class analysis to identify behaviour-based 'visit type' segments (created through the analysis of reported activities and the places visited) in different national parks. The current paper reviews three studies conducted in different national parks. We will discuss improvements in the efficiency of data collection and highlight the consistency in visit type segments across different national parks. The appearance of consistent visit type segments across national parks serves to reinforce Parks Canada's move to behaviour-based segmentation. These visit type segments contrast with the different visitor profiles of each national park (as measured by origin and motivations for visiting). Identifying consistent visit type segments across different national parks allows Parks Canada to develop regional-level programs and products for each of these groups, rather than continuing to develop products for each park in isolation.

Index Terms — Behaviour patterns, national parks, latent class modelling, trip diaries, activities.

1 Introduction

Parks Canada has a long history of conducting research with visitors to Canada's national parks and for the past eight years has been working to develop a systematic approach to segment its visitors. Previous papers by McVetty [1], [2] review Parks Canada's initial attempts to analyze trip diary data collected in a survey of visitors to Banff, Jasper, Kootenay, and Yoho National Parks. After comparing classification systems based on respondent origin, motive segmentation, and visit type segmentation, McVetty [2] concludes that the 'visit type' approach (segments based on activities reported and locations visited) is the most effective method to reducing complex recreational behaviour into meaningful typologies. He also emphasizes that latent class analysis is the most efficient method for developing visit type classifications from trip diaries.

Developments in the trip diary format will be discussed. The trip diary has evolved from a labour-intensive format requiring visitors to report on each activity, its location, and its duration to a more streamlined version that asks visitors to identify the specific activities they participate in across different areas of the park.

This paper will present the visit type segments that have been identified in three different research projects: the 2007 Summer Survey of Visitors to Prince Albert National Park, the 2005/06 Survey of Visitors to Elk Island National Park, and the 2003 Survey of Visitors to Banff, Jasper, Kootenay, and Yoho National Parks. The review of these behaviour-based segments will emphasize the consistency in visit type segments between national parks. The similarity of the behaviour-based visit type segments stands in stark contrast to the different profiles (as measured by origin and motivations for visiting) of visitors to each park.

F.P. Grigel is with the Parks Canada Agency, Calgary, AB T2P 3M3. E-mail: frank.grigel@pc.gc.ca.

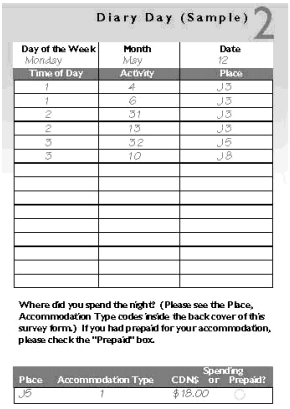
We will discuss how the identification of consistent visit type segments across national parks holds implications for how Parks Canada can research and plan for new programs and products on a regional basis.

2 METHOD

Parks Canada consistently conducts two-stage surveys of visit-party arrivals to its national parks. The unit of analysis is the visit-party (1 itinerary per visit party). Independent visit-parties (those arriving by personal vehicle or public transportation) are systematically intercepted at all entry points to the park. An intercept interview determines each potential party's eligibility (excluding park residents and employees, commuting workers, commercial vehicles, and parties re-entering on an existing visit) and gathers baseline population information. Willing respondents receive a questionnaire to be returned in a postage-paid envelope after their visit. Intercept interview information is used to weight data by relevant categories (intercept location, season, respondent gender, or origin) to represent all independent visitors. Tour groups may be intercepted, but their information is not included in these visit type analyses.

3 THE TRIP DIARY

The 2003 Survey of Visitors to Banff, Jasper, Kootenay, and Yoho National Parks used a very detailed form of the trip diary. Visitors were asked to report every activity they engaged in, its location, and its duration. This information was collected in a diary format so that a visitor's movements through the park could be tracked from point of entry to their final departure. Visitors were asked to refer to tables of activities, locations, and time periods and input the codes for each of these categories into daily records.



Diary Day (Sample) 2

Day of the Week	Month	Date
Monday	May	12
Time of Day	Activity	Place
1	4	J3
1	6	J3
2	31	J3
2	13	J3
3	32	J5
3	10	J8

Where did you spend the night? (Please see the Place, Accommodation Type codes inside the back cover of this survey form.) If you had prepaid for your accommodation, please check the "Prepaid" box.

Place	Accommodation Type	Spending CDN$	or Prepaid?
J5	1	$18.00	☐

Fig. 1. Detailed trip diary format.

AREA 2: While in the Crean/Kingsmere Lake area,

1. ○ **Did not visit the Crean/Kingsmere area**
2. ○ **Took a scenic drive**
3. **Activities at a picnic/day use area**
   ○ Point View ○ Waskesiu River ○ Birch Bay ○ Kingsmere River day use area
4. **Activities at the Hanging Hearts Marina**
   ○ Sightsee ○ Rent equipment ○ Launch my boat ○ Set up a guided tour
5. **Activites at the Hanging Hearts Lakes**
   ○ Fish ○ Canoe ○ Motorboat ○ Kayak ○ Sail
6. **Activites at Crean Lake**
   ○ Fish ○ Canoe ○ Motorboat ○ Kayak ○ Sail ○ Camp
7. **Activites at Kingsmere Lake**
   ○ Fish ○ Sail ○ Canoe the Bagwa/Lily route
   ○ Canoe ○ Camp ○ Visit Grey Owl's cabin
   ○ Motorboat ○ Use the marine portage
   ○ Kayak ○ Canoe the Bladebone Wilderness route
8. **Trails used in the Kingsmere area**
   ○ Narrows Peninsula ○ Kingsmere River ○ Southend ○ Grey Owl's cabin
9. **Other activity while in the Crean/Kingsmere Lake area**

Fig. 2. Simplified trip diary format.

We were never able to fully utilize the information about the duration, frequency, and the order of different activities in a meaningful analysis. Our most successful attempts at segmentation are based solely on data measuring to the activities reported and the locations visited.

Due to the large time commitment we were asking of visitors to provide us with information at this level of precision, the decision was made in 2006 to move to a more simple form of the trip diary. In the newer version of the trip diary, a park is divided into key areas and the main activities that can be performed in each area are listed. Visitors are asked to identify which activities they have participated in at each of the areas of the park.

The revised trip diary format allows us to perform the same behaviour-based visit type segmentation we conduct with the more detailed trip diary format. The reduced amount of effort required from the visitor makes this format the more attractive option.

The limitation of the revised trip diary format is that we are now unable to use the information that is collected in more sophisticated analyses. On of the original intents of the detailed trip diary format was to collect data to be used in developing simulation models of visitor behaviour. Moving away from this format, we are no longer able to pursue these models and analyses.

4 Results

Visit type segments are identified using LatentGOLD® to estimate the latent class models. The variables entered from the 2003 Mountain Parks study are the list of activities reported in each of the five areas of the parks. For the other two parks, the activities and the areas of the park visited are entered as separate variables into the initial estimates.

This process generally identifies distinct visit type clusters that differ from one another in the type of activities reported, the areas of the park visited, or some combination of both of these dimensions.

As displayed in Table 1, there are two primary categories of recreational activities that emerge in these analyses. Activities labelled vigorous and those labelled passive. Almost all the visit type segments in each park report some degree of participation in passive activities. What distinguish the different segments are either additional reports of vigorous activities, or the specific locations in the park where activities are reported.

The 2003 Survey of Visitors to Banff, Jasper, Kootenay, and Yoho National Parks takes place in four contiguous Rocky Mountain parks situated on the border between Alberta and British Columbia and located

TABLE 1
Primary Activities By Type

Vigorous	Passive
Hike/walk on trails/backcountry	Hike/walk in town site
Cycle	Drive/sightsee
Canoe/kayak	View wildlife
Fish	Bird watch
Swim	Photography
Golf	Picnic
Cross-country ski	Eat in a restaurant
Snowshoe	Shop

Fig. 4. Map of Banff, Jasper, Kootenay, and Yoho National Parks.

one hour away from a metropolitan area (Calgary, 1 million people) that report annual visitation in excess of 3 million people from all around the globe.

McVetty [2] identifies three key summer visit types in his analysis of the trip diary data, these include:

1. **Getaway (Townsite) Visits** (56%) represent parties who engage in both passive and vigorous activities, primarily in the area around the Banff townsite.
2. **Touring (Sightseeing) Visits** (23%) represent parties who engage in passive recreational activities along specific through-corridors within the four parks.
3. **Park Experience Visits** (21%) represent visit parties who report engaging in vigorous activities across all five areas in the parks.

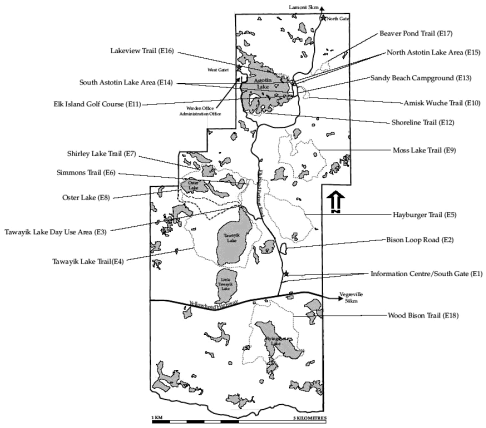


Fig. 5. Map of Elk Island National Park

Elk Island is a small, fenced park situated in central Alberta and located 45 minutes away from a metropolitan area (Edmonton, 1 million people) that reports annual visitation of approximately 100,000 people, largely from the regional area around the park.

Three visit types emerge among visitors to Elk Island:

1. **Sightseeing visits** (50%) represent parties who engage in passive recreational activities in multiple areas of the park.
2. **Park Experience Visits** (40%) represent parties who engage in active recreational activities throughout the park.
3. **Golfing Visits** (10%) represent parties who enter the park solely to use the Elk Island Golf Course.

Prince Albert is a park containing a townsite situated in the boreal forest of Saskatchewan and reporting visitation of approximately 200,000 people per year, largely from the regional area around the park.

Four visit types emerge among visitors to Prince Albert:

1. **Townsite Visits** (42%) represent parties who report both passive and vigorous activities, all within the townsite area of Waskesiu.
2. **Sightseeing Visits** (26%) represent parties who engage in passive recreational activities in multiple areas of the park.
3. **Park Experience Visits** (21%) represent parties who engage in passive and vigorous activities in multiple areas of the park.
4. **Single-Area Sightseeing Visits** (11%) represent parties who engage in passive recreational activities in one geographic area of the park.

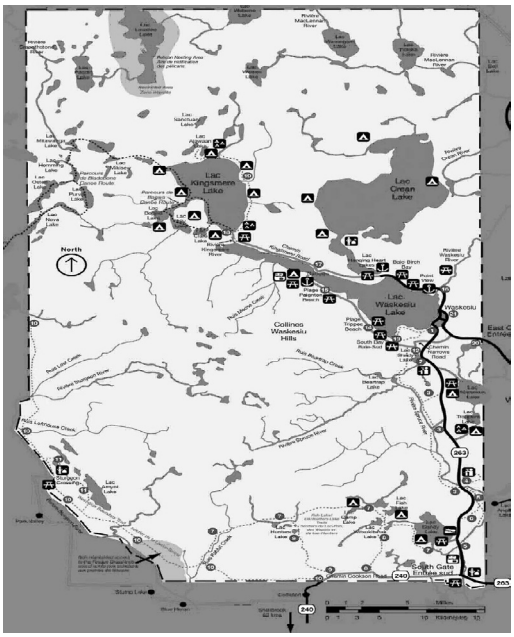


Fig. 6. Map of Prince Albert National Park

These three studies are conducted in parks with large variations in the level of service and in the type and the number of vigorous recreational activities available. They draw their visitors from different geographic areas and the visitors to each park identify slightly different key motivating factors for coming to the park. Despite the differences in the visitors themselves, the ways in which they use the parks shows a remarkable consistency. The appearance of the same behaviour-based visit type segments begs the question as to why we would attempt to segment our visitors on any other dimension.

In all parks, the sightseeing visits are slightly more likely to be reported by first-time visitors and by visitors from origins farther away from the park. This is to be expected, with the emphasis of this visit type being to look around and view the highlights of the park.

The people on sightseeing visits, just like other visit types, rate the importance of 'experiencing the natural outdoors' as a primary motivator for their visit. This should serve as a reminder to park management that 'experiencing nature' is not a single construct for the range of visitors that we receive.

Despite variety in the scenery and the recreational opportunities available in the greater park ecosystem, townsites remain an important draw for visitors to Canada's national parks. For the two parks in this study with townsites, the visit type that concentrates their visits around townsites are not limited to engaging in passive recreational activities, as has largely been assumed. These visit types report that they engage in a variety of vigorous activities (similar to the park experience visit type). They tend, however, to simply concentrate their activities to those opportunities that are located in the areas immediately adjacent to the townsites.

5 Conclusion

The identification of consistent behaviour-based visit type segments across parks provides Parks Canada with the opportunity for the planning of new products and services at a multi-park level. Given that most management actions relate to visitor behaviour, the visit type segments presented in this paper can be effectively targeted for exploring new programs that may be of interest to these groups of visitors.

The sheer size of the sightseeing visit type in all national parks included in the current study serves as a good starting point for this process. The appearance of this visit type in each park allows us to plan further research at a scale larger than for visitors to a single park. The consistent presence of this visit type requires that Parks Canada review its services that have largely ignored this group of visitors.

For those parks with townsites, the large proportion of visits that are focused around these areas also serves as a point of exploration for Parks Canada. Understanding the reasons across national parks for the lack of geographic dispersion by people engaged in this visit type can assist Parks Canada in determining how to develop additional product offers for this group of visitors. Contrary to previous assumptions, this group of visitors is not inactive; they simply limit their activities to those areas around the townsites.

The park experience visit type is the stereotype of what Parks Canada has long considered its visitors to be. Assessing whether the current program is consistently meeting the needs of this group is critical for us to meet our corporate goals.

References

[1] D. McVetty, "Understanding Visitor Flows in Canada's National Parks: The Patterns of Visitor Use Study in Banff, Kootenay, and Yoho National Parks," *Monitoring and Management of Visitor Flows in Recreational and Protected Areas,* pp. 46-52, 2002. (Conference Proceedings).

[2] D. McVetty, "The Road to a Strategic Typology of Visit Itineraries," *Exploring the Nature of Management: Proceedings of the Third International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas,* pp. 338-339, 2006. (Conference proceedings).

Frank P. Grigel (B.A. 1987, M.A. 1989) has worked for Parks Canada since 1981 and as a Social Science Specialist since 2002. He is a member of and active participant in the Marketing Research and Intelligence Association (Canada). His current research interests include systems for monitoring human use in protected areas, the development of meaningful segments of visitors, and simulation models of recreational behaviour

Database system development of nature-based tourism in protected areas, Chiang Mai province

Mayuree Nasa, Dachanee Emphandhu, Sura Pattanakiat, and Sukumal Kitisin

Abstract — The objectives of this study were to assess the status of nature-based tourism resources, design and develop the database system and web application for tourism resources management in protected areas, Chiang Mai province. The data contained in the database system included tourism resource potential, recreation opportunity spectrum, and physical carrying capacity of the tourism sites in Chiang Mai's protected areas. The tourism resource potential at 124 sites were assessed and classified into 72 conventional nature tourism (NT), 37 adventure tourism (AT), 5 ecotourism (ET), and 10 being qualified as both adventure and conventional nature tourism sites (NT/AT). The highest potential of the NT sites was identified as Keaw Mae Pan scoring 2.84 out of 3. While Mae Tang and Mae Cham - Tha Phra Sadej water rafting routes were the highest potentials for the AT (score 2.69), Doi Luang Chiang Dao for ET (2.46), and bicycling route Yod Doi Pui - Botanical Garden for the NT/AT (2.13). The recreation opportunity spectrum (ROS) offered nature closely related experiences in primitive (P), semi-primitive non motorized (SPNM), and semi-primitive motorized (SPM) totalling of 77 sites while 47 sited in semi-developed and developed areas offered less nature experience. The system was designed as relational database by System Development Life Cycle (SDLC) for the target group identified as tourism resources planners and managers. The database and web application was developed by MySQL and the available program in php script language, in that order. For the User Interface design, the web browser through internet connection was employed for database management. The database system testing regarding techniques and design earned the score 64%. While the evaluation score of user interface capability and the usefulness of the information contained in the database given by the expert in database development and the PA managers was 81% and 84%, respectively.

Index Terms — Database System Development, Nature-based Tourism, Protected Areas, Chiang Mai Province

1 Introduction

Protected areas (PAs) in Chiang Mai province Thailand have been popular for diverse outdoor recreation uses such as forest trek, bird watching, bicycling, waterfall, cave, and hot spring visits,. About 124 sites in protected areas were identified as tourism sites and as many as 2.85 million people visited them annually [1]. To help protected area managers manage recreation resources to meet visitor satisfaction and desires, there is a need for recreation resources inventory and development of a database system for management purposes related to recreational potential and experiences.

M.N. Department of Conservation, Faculty of Forestry, Kasetsart University, Jatujak Bangkok 10900,Thailand E-mail: pixx65@hotmail.com
D.E. Department of Conservation, Faculty of Forestry, Kasetsart University, Jatujak Bangkok 10900,Thailand E-mail: ffordne@ku.ac.th
S.P. Faculty of Environment and Resource Studies, Mahidol University 999, Phuttamothon, Salaya, Nakhon Phathom 73170, Thailand, E-mail: enspt@mahidol.ac.th
S.K. Department of Computer Science, Faculty of Science, Kasetsart University, Jatujak Bangkok 10900,Thailand E-mail: fscismi@ku.ac.th

2 Objectives

1. To assess the recreation opportunity spectrum and recreational potentials for nature-

based tourism in protected areas, Chiang Mai Province,
2. To design and develop the database system and web application for tourism resources management in protected areas, Chiang Mai province.

3 METHOD

Inventory of recreational resources potentials for 3 types of nature-based tourism: conventional nature tourism (NT), adventure tourism (AT) and ecotourism (ET) was carried out in 124 sites of 22 protected areas located in Chiang Mai province. Indicators and criteria for assessment of the resource potential were developed primarily based on related literatures from [2], [3] and empirical study from within the country [4], validated by academics and practitioners as well as ground check. There are 15 indicators for NT and AT and 18 indicators for ET evaluation of potentials (Table 1). The score from the evaluation was ranked 1 to 3 as 1 is the lowest potential and 3 the highest. Weighting score method was employed for potential calculation.

In addition, the recreation opportunity spectrum (ROS) was also classified by employing the concept from [2]. The recreation opportunities of 124 tourism sites in protected areas are classified into 5 classes: Primitive (P), Semi primitive non-motorized (SPNM), Semi primitive motorized (SPM), Semi developed (SD) and Developed areas (D).

The database system was designed as relational database by system development life cycle (SDLC) for the target group identified as tourism resources planners and protected area managers. The database and web application was developed by MySQL and the available program in php script language, in that order. For the user interface design, the web browser through internet connection was employed for database management. The system testing and evaluation were done by the experts in database development, experts in content and data quality, and direct users including park superintendents, recrea-

TABLE 1

INDICATORS FOR TOURISM SITE EVALUATION

Indicators	Weighting score		
	NT	AT	ET
Tourism Resources			
1. Attractive and uniqueness elements	3	2	3
2. Richness of vegetation and naturalness of ecosystem	-	-	3
3. Opportunity for wildlife sighting	-	-	3
4. Landscape quality and aesthetics	3	1	3
5. Appropriateness of tourism activity related to the site characteristics and resources	2	2	2
6. Diversity of tourism activity	2	-	2
7. Micro-climate condition	3	1	2
8. Accessibility	3	-	-
9. Self reliance	-	3	-
10. Opportunity for challenge and exciting experiences	-	3	-
total	16	12	18
Facility and service			
11. Harmony of facility	3	2	3
12. Facility sufficiency	3	3	-
13. Quality of facility	3	3	3
14. Management of visitor safety	3	3	3
15. Quality of service	3	3	3
16. Interpretation: appearance, content, and interpretation method	-	-	3
total	15	14	15
Environmental and social impact management			
17. Tourism zoning	3	3	3
18. Carrying capacity determination	3	3	3
19. Measures for environmental Impact mitigation	3	3	3
20. Waste and garbage management	3	3	3
total	12	12	12
Local participation			
21. Opportunity for local people to participate in tourism management	-	-	3
22. Opportunity of local people to gain tourism benefit	-	-	3
total	-	-	6
Net total	43	38	51

Note: NT = Conventional Nature Tourism
AT = Adventure Tourism
ET = Ecotourism
(-) = Not use in equation

tion management officials of the PA, and a regional national park director.

4 RESULTS AND DISCUSSION

The results from the recreation resource inventory found that there were 72 NT sites (58.06%), 37 AT sites (29.84%) and 5 ET (4.04%) while there are 10 sites (8.06%) being assessed as either NT or AT. From total of 124 sites found 24 sites in high potential, 91 and 9 in medium and low potentials, respectively.

The highest potential of the NT sites was identified as Keaw Mae Pan scoring 2.84 out of 3. While Mae Tang and Mae Cham - Tha Phra Sadej water rafting routes were the highest potentials for the AT (score 2.69), Doi Luang Chiang Dao for ET (2.46), and bicycling route Yod Doi Pui - Botanical Garden for the NT/AT (2.13). Recreation resources found in PA were mainly waterfall, forest hiking trails, bicycling routes, streams and hot springs, respectively.

As a result, tourism sites in PAs are now mainly appropriate for mainstream nature lover tourists seeking relaxing nature experiences. However, PA manager should consider increase ecotourism sites within PAs in order to accommodate more ecotourists in the future.

The ROS classification found most sites in the opportunity settings of SPM (25%) and SD (25%) equally. Secondly was in SPNM (24.2%) and the least found recreation opportunity settings was the developed area (D) (12.9%) and the primitive area (P) (12.9%). It is worth to take note that recreation opportunity classes in the PAs were diverse and mainly fell within range of SPNM to SD classes.

For database development, the PAs managers identified that all 4 tourism elements: tourism resources, facilities and services, visitor information, and administration information should be included in the database. However, the most urgent needed data for management was the information about the recreation or tourism resources such as potential for recreation uses, ROS, and carrying capacity of the sites.

The database was designed as relational database for the following target groups: tourism resources planners and protected area managers. The database users were then divided into 2 groups: administrative users and general users. The administrative users must have a user name and password in order to modify or update the information in the database while general users have limited access, only read and print the data report. The database contained search engine for tourism site(s) by either PA names or key words. The database contained general information, map, photos, resource potential, ROS evaluation, facilities and physical carrying capacity of each tourism site. Figure 1 and Figure 2 showed the samples of web pages.

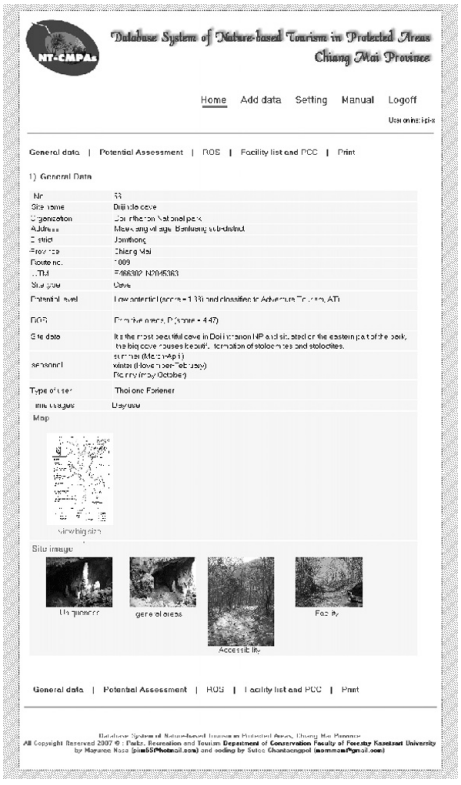


Fig. 1 The sample web page containing menus for accessing information on site potential, ROS, facilities and physical carrying capacity of tourism sites in PAs

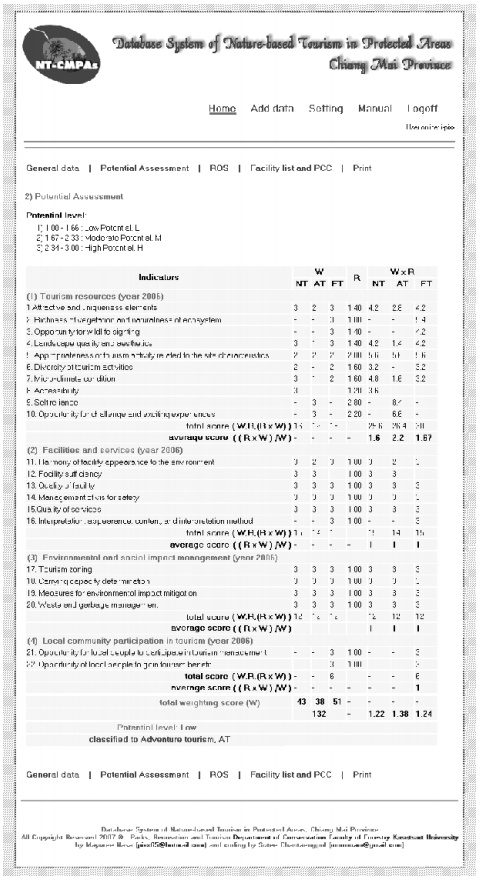


Fig. 2 Sample web page containing detail information on tourism site potential evaluation.

The experts in database development carried out the database system testing and the testing grade for the design and techniques was given as “rather good” with the score 64%. While the evaluation score of user interface capability given by the expert in database development and the PA managers was 81%. Finally, the evaluation score on the usefulness of the information contained in the database was the highest at 84%.

The weakness of this database appeared mainly on the design of the web pages that primarily for working purpose but not very attractive for general users. Further, the contents of database should include information on both user and resource components to give comprehensive information for tourism management. Information useful for tourism management is visitor numbers, visitor characteristics, visitor expectation and satisfaction at each site.

Nonetheless, the development of the tourism resource database appeared to be a useful management tool for PA managers. Application of computer technology can help park management in terms of convenience in systematic data organization such as data updates, comparisons among sites and giving insight information for site management concerning site potentials, recreation opportunity setting, and carrying capacity.

5. CONCLUSION

The relational database system on nature based tourism in PAs contained useful information obtained from systematic recreation inventory on resource potentials, ROS, facilities and physical carrying capacity. The database system was developed as web application and primarily for PA tourism management purpose. The integration of Geographical Information System (GIS) into this relational database system as well as taking in information on visitor element is suggested to enhance usefulness of the database.

REFERENCES

[1] Department of National Park, Wildlife and Plant Conservation, “Visitor Statistics year 2005-2007, Unpublished.

[2] R.N. Clark & G.H. Stankey, “The Recreation Opportunity Spectrum: A Framework for Planning, Management, and Research,” General Technical Report PNW-98. USDA Forest Service, Dec. 1979.

[3] Resources Inventory Committee – The Province of British Columbia, “Recreation Opportunity Spectrum Inventory: Procedures and Standards Manual”, http://wsww.for.gov.bc.ca/ric

[4] D. Emphandhu, “Assessment of Nature-based Tourism Site Potential at Chiang Mai Province,” *Proc. 45th Kasetsart University Annual Conference*, pp 739-746, 2007.

Mayuree Nasa (M.S.) graduated from Parks and Recreation Program, Faculty of Forestry Kasetsart Univer-

sity Thailand in 2008. Currently work as a researcher in Recreation Carrying Capacity Studies at Doi Inthanon and Tarutao National Parks with Kasetsart University. Area of interest: park and recreation management.

Dachanee Emphandhu (Ph.D) graduated from College of Forest Resources, University of Washington in 1992. Currently work as Assist. Prof. in Parks, Recreation and Tourism Program with Department of Conservation, Faculty of Forestry, Kasetsart University. Area of interest: tourism management in protected area, ecotourism.

Sura Pattanakiat, Ph.D (Forestry) graduated from Faculty of Forestry Kasetsart University. Currently work with Faculty of Environment and Resources studies Mahidol University. Area of interest: GIS application in resource management.

Sukumal Kitisin, Ph.D (Computer Sciences) graduated from University of Southern California in 2002. Currently work as Assist. Prof in Department of Computer Sciences Faculty of Sciences, kasetsart University. Area of interest: computer sciences.

Criteria for scientific tools for recreation planning in nature areas

Rogier Pouwels, René Jochem, and René J.H.G. Henkens

Abstract — Recreation is increasing the last decades in Northwest-Europe. Although these visitors might have a negative impact on biodiversity values, they are important for the support of biodiversity actions. Therefore a major objective for planning and managing of visitor landscapes is to avoid the negative effects of recreational use and to ensure that expectations of visitors can be afforded. Scientific knowledge and scientific tools always have and always will be important in managing recreation in visitor landscapes. However it is an illusion scientists will deliver ready-to-go answers. In this paper we will define criteria that scientific tools should meet. We will follow the arguments of Haider [1] and McCool et al. [2] that the use of knowledge and tools should be implemented in decision strategies like adaptive management and use experiences from a case study of recreation planning in the New Forest (UK). We will show that scientific tools should be flexible to adapt to local data to gain credibility and legitimacy and should be able to show which management alternative is most likely to meet recreation objectives and conservation objectives. Therefore the recreation tool has to be linked to the biodiversity tool. The scientific tools also should be useful in communication between stakeholders so they learn each other's key processes and values and better understand the "other side of the table". Especially because stakeholders have different views about what should or should not be considered a problem.

Index Terms — Adaptive management, integrating scientific tools, recreation planning, biodiversity.

1 Introduction

Many nature areas in Northwestern Europe are open for recreational use. Visitors enjoy restorative health benefits of contact with nature and they experience many other valued aspects of visiting the countryside such as tranquility, open space, fresh air, unpolluted waters and scenery. Health programs are stimulating people to go out in nature areas. Also different types of recreation are evolving. Although these visitors might have a negative impact on biodiversity values, they are important for the support of biodiversity actions. In order to accommodate the increasing number of visitors managers and decision makers need to make changes in visitor landscapes that includes parks, protected areas, and urban forests. Therefore a major objective for planning and managing of visitor landscapes is to avoid the negative effects of recreational use and to ensure that expectations of visitors can be afforded [3].

In this field of meeting human developments while protecting biodiversity confronts policy makers, scientists and local communities [4]. Since the mid 1970's recreation frameworks have been developed to help managers and decision makers to make plans for recreation in nature areas. Within recreation frameworks scientific tools always have and always will be important [5]. In this abstract we will define criteria that scientific tools should meet in order to be helpful in recreation frameworks. We will follow the arguments of Haider [1] and McCool et al. [2] that recreation frameworks should be imple-

R. Pouwels is with the team Ecological Modelling and Monitoring at Alterra, Wageningen UR, the Netherlands. E-mail: rogier.pouwelsr@ wur.nl.
R. Jochem is with the team Ecological Modelling and Monitoring at Alterra, Wageningen UR, the Netherlands. E-mail: rene.jochem@wur.nl
R.J.H.G. Henkens is with the team The Human Factor at Alterra, Wageningen UR, the Netherlands. E-mail: rene.henkens@wur.nl

mented in decision strategies like adaptive management [6] and research is conducted in a transdisciplinary setting [7].

2 ADAPTIVE MANAGEMENT AND TRANSDISCIPLINARY RESEARCH

Adaptive management promotes flexible decision making. Careful monitoring of the outcomes both advances scientific understanding and helps to adjust policies or operations as part of an iterative learning process. It is not a 'trail and error' process, but rather emphasizes learning while doing. Its true measure is in how well it helps meet environmental, social, and economic goals, increase scientific knowledge, and reduces tensions among stakeholders [6].

Adaptive management is appropriate if management can strongly influence the system and if uncertainty about management impacts is high [8]. Because recreation can be managed in many different ways and there is still a high uncertainty about which management actions are effective [9], adaptive management seems to be the most appropriate strategy for recreation management. In adaptive management research is always conducted in a transdisciplinary setting were scientists in different fields of expertise work together with local stakeholders and (local) managers [7].

The main difference with the current recreation frameworks [2] is that in adaptive management uncertainties have to be embraced by scientists, managers and stakeholders alike. An adaptive approach provides a framework for making decisions in the face of critical uncertainties, and a formal process for reducing uncertainties so that management can be improved over time [6]. The old frameworks are focusing on one future plan [2]. Also the learning process in adaptive management includes managers and decision makers, scientists and stakeholders and is based on long term monitoring plans [6]. Nowadays sufficient long term monitoring plans are a major omission in both recreation management [9] and biodiversity management [10].

3 BIODIVERSITY AND RECREATION IN THE NEW FOREST

The New Forest lies to the west of Southampton in the United Kingdom and covers over 57 thousands of hectares. Current figures show that there are 24 million people days spent in the Forest each year with 18 million of those comprising local residents. More then 80% of the visitors come by car. The last decade a lot of restorations for improving the quality of valley mires and wet heaths have been taken place in the New Forest. This restoration has been important for wader species like Lapwing (*Vanellus vanellus*), Snipe (*Gallinago gallinago*), Curlew (*Numenius arquata*) and Redshank (*Tringa totanus*). However, these species are still declining in South England [11] and are one the Red List or Amber List for the UK. One of the expected causes of declining heathland species is the increasing number of visitors enjoying the heathlands and woodlands [12], [13], [14]. In order to set a hold to the decline, the Forestry Commission, responsible for managing the New Forest, wants to create tranquil areas for the wader species by redirecting recreational use. Therefore changes to the accessibility of the heathlands should be made.

4 ADAPTIVE RECREATION MANAGEMENT IN THE NEW FOREST

4.1 Setting objectives

Adaptive management requires stated management objectives to guide decisions about what to try [6]. In this study the recreation objectives and biodiversity objectives were set by stakeholders together with the managers of the New Forest. The stakeholders agreed on compensating measures if management actions would

lead to reduced accessibility of the area. The objective for wader species was to create tranquil areas of 750 ha of good habitat. These areas should hold so called key populations [15].

4.2 Monitoring data

No detailed monitoring data for recreation were available. Because this information is needed to indentify problems and opportunities a large monitoring program was set up that covered almost one third of all parking lots and on third of the area. Visitor counts were held at parking lots, questionnaires were filled in and visitors were monitored using GPS.

Monitoring programs for wader species were more scattered, but covered large areas of the New Forest. Also data on vegetation structure, slopes and soil type is available. These data are somewhat outdated [16], but most of the area still has the same vegetation structure and is useful for mapping potential breeding habitat of most species.

4.3 Scientific tools

Scientific tools can be used to show which management alternative is most likely to meet conservation objectives. If these scientific tools are used in recreation frameworks the recreation tool has to be linked to the biodiversity tool. Therefore the recreation tool has to simulate the relevant recreation processes and deliver results for an ecological footprint; type of recreation and the intensity in space and time. Fig. 1 gives an example how two separate tools can be linked into one management tool. In the New Forest we used the model LARCH [15] for evaluating the wader species and the model MASOOR for evaluating recreation [17].

The monitoring data was used to validate the result of the models. The validation with local data improved the credibility of the models for the stakeholders and managers.

4.4 Selecting management alternatives

Together with the stakeholders several management alternatives were developed. These included among others closing car parks, redirecting visitors by signage and habitat restoration. Especially on the locations were the managers planned to close car parks, the stakeholders were very critical. For these locations we gathered more data and used MASOOR to evaluate the effect of management actions on the visitor patterns in the area.

In one of the locations the models showed that closing the car park would lead to a large, tranquil patch of suitable habitat for wader species, without affecting other habitat patches in the surroundings. In another location the models showed that closing the car park would lead to a large, tranquil patch of suitable habitat for wader species, but habitat patches in the surroundings would be affected. Because of these results the stakeholders selected the first alternative as pilot action and rejected the second alternative. We think that the acceptance of some of the management alternatives was higher because the models predicted that other alternatives will not be effective. If all management alternatives would be positive, the acceptance will be less.

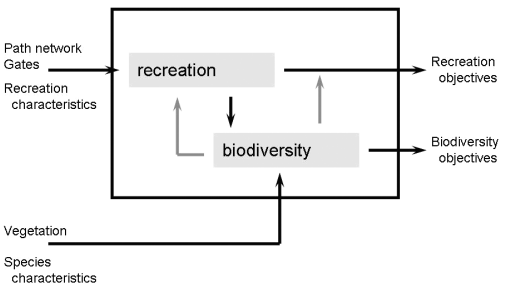


Fig. 1 Example of scientific tool containing a recreation tool and a nature tool [18]. The input are GIS-maps containing landscape characteristics and attributes managers can control. The output are indicators that can be linked to the objectives in the recreation framework. The arrow between the recreation tool and the biodiversity tool indicate the negative impact of recreation on biodiversity. The grey arrows indicate possible interactions between biodiversity values and recreation.

4.5 Follow up monitoring

The pilot actions were selected in spring 2007. A monitoring programme for 5 years should reveal if the pilot actions will lead to solutions profitable for recreation as well as for biodiversity.

5 Why were the scientific tools usefull in the process?

Within an adaptive management or transdisciplinary setting adaptation of existing scientific tools to local data is crucial. Local scientists play a crucial role as a key information conduit between participants (stakeholders, managers) and the team that is responsible for the adaptation of the scientific tools [19]. Regular meetings between manager, scientists and stakeholders help to transfer local knowledge and scientific knowledge between the different partners [7].

The visualization effects associated with, especially, agent based models are important tools for the discussion with stakeholder groups. It contributes to the awareness [20] and learning [21] of the different stakeholder groups. Stakeholders will learn each other's key processes and values and better understand the "other side of the table" [7].

Scientific tools should also meet general criteria. The tools have to be credible, salient and legitimate [4], [6]. To be credible the tool needs to be credible for scientists as well as for other parties [4]. Credibility is increasing when the tool is helpful in the translocation of knowledge [20], [21]. To be legitimate the tools should be transparent and user friendly. Different stakeholders often have competing demands, obligations and viewpoints. Therefore stakeholders should be involved in an early stage of development or they will see the process and the tools as illegitimate [4], [7], [19].

6 Reflections

Adaptive management is a promising approach to deal with changing landscapes in combination with uncertainties and conflicting objectives. However, it can only be used if the organisation that manages the nature area has a structure that is open, flexible, used to interrelated teams, and has a focus on incentives, innovation and shared learning [6].

Another drawback might be the current laws on biodiversity. Often they restrict managers to make any changes in the area if the consequences are uncertain [6], [7]. However, at this moment the problem is that doing nothing is unaccepted either, because increasing numbers of visitors is one of the reasons why many bird species are declining in nature areas in Northwest-Europe.

Finding the right balance between reuse or adaptation of existing tools and creating of new ones will always be a challenge [19]. Scientist should be aware not to try to use "ever-more" precise techniques [23], but bypassing scientific tools in favour of simplistic alternatives may restrict the flow of scientific knowledge into the planning process [19].

References

[1] W. Haider, "North American idols: pesonal observations on visitor management frameworks and recreation research", *Proceedings of the Third International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas* pp. 16-22, 2006.

[2] S.F. McCool, R.N. Clark and G.H. Stankey, "An assessment of frameworks useful for public land recreation planning", Tech. Rep. PNW-GTR-705. Portland, OR. Gen. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 2007

[3] www.naturalengland.org; www.natuurmonument-en.nl

[4] D.W. Cash, W.C. Clark, F. Alcock, N.M. Dickson, N. Eckley, D.H. Guston, J. Jäger and R.B. Mitchell. "Knowledge systems for sustainable development." *Proceedings of the National Academy of Sciences of the United States of America,* vol. 100, no. 14, pp. 8086-8091, 2003.

[5] H.R. Gimblett and H. Skov-Petersen, "Conclusion: Monitoring, simulation and management of visitor landscapes. "*Monitoring, Simulation and Management of Visitor Landscapes,* H.R. Gimblett & H. Skov-Petersen, Eds., Arizona: University of Arizona Press, pp, 425-438, 2008.

[6] B.K. Williams, R.C. Szaro, C.D. Shapiro, "Adaptive Management: The U.S. Department of the Interior Technical Guide", Washington, DC, Adaptive Management Working Group, The U.S. Department of the Interior, 2007.

[7] G. Fry, B. Tress and G. Tress, "Integrative landscape research: facts and challenges", *Key topics in landscape ecology*, J. Wu and R.J. Hobbs, Eds., Cambridge: Cambridge University Press, pp. 246-270, 2008.

[8] G.D. Peterson, G.S. Cumming and S.R. Carpenter, "Scenario planning: a tool for conservation in an uncertain world", *Conservation Biology,* vol. 17, no. 2, pp. 358-366, 2003.

[9] D.N. Cole, "Visitor and recreation impact monitoring: is it lost in the gulf between science and management?", *The George Wright Society Forum* vol. 23, no. 2, pp. 11-16, 2006.

[10] G.F. Wilhere, "Adaptive management in habitat conservation plans" *Conservation Biology* vol. 16 no. 1, pp. 20-29, 2005.

[11] R.D. Goater, D. Houghton and C. Temple, "New Forest Breeding Waders Survey 2004: A Survey of Breeding Waders in the New Forest Valley Mires, Hampshire". RSPB-report, 2004.

[12] D. Liley and R.T. Clark, "The impact of urban development and human disturbance on the numbers of Nightjar *Caprimulgus europaeus* on heathlands in Dorset, England", *Biological Conservation,* vol. 114, no. 2, pp. 219-230, 2003.

[13] J.W. Mallord, P.M. Dolman, A.F. Borwn and W.J. Sutherland, "Linking recreational disturbance to population size in a ground-nesting species", *Journal of Applied Ecology,* vol. 44 pp. 185-195, 2007

[14] G. Murison, J.M. Bullock, J. Underhill-Day, R. Langston, A.F. Brown and W.J. Sutherland, "Habitat type determines the effects of disturbance on the breeding productivity of the Dartford Warbler *Sylvia undata*", *Ibis* vol. 149 no. supplement 1, pp 16-26, 2007.

[15] P. Opdam, R. Pouwels, S. van Rooij, E. Steingröver and C. C. Vos, "Setting biodiversity targets in participatory regional planning: introducing ecoprofiles" *Ecology and Society* vol. 13, no. 1, art. 20, 2008.

[16] D.V. Westerhoff, "The New Forest Heathlands, Grasslands and Mires: A Management Review and Strategy", English Nature, Lyndhurst, 1992.

[17] R. Jochem, Marwijk, R. v., Pouwels, R., & Pitt, D. G. "MASOOR: Modeling the Transaction of People and Environment on Dense Trail Networks in Natural Resource Settings, "*Monitoring, Simulation and Management of Visitor Landscapes",* H.R. Gimblett & H. Skov-Petersen, Eds., Arizona: University of Arizona Press, pp 269-293, 2008.

[18] R. Pouwels, R. Jochem and J. Verboom, "Linking ecological and recreation models for management and planning", *Monitoring, Simulation and Management of Visitor Landscapes,* H.R. Gimblett & H. Skov-Petersen, Eds., Arizona: University of Arizona Press, pp. 253-268, 2008.

[19] B.R. Sturtevant, A. Fall, D.D. Kneeshaw, N.P.P. Simon, M.J. Papaik, K. Berninger, F. Doyon, D.G. Morgan and C. Messier, "A toolkit modeling approach for sustainable forest management planning: achieving balance between science and local needs" *Ecology and Society*, vol. 12, no. 2, art. 7, 2007.

[20] U. Pröbstl, P. Visschedijk and H. Skov-Petersen, "Agent-based modelling: views from the management perspective", *Monitoring, Simulation and Management of Visitor Landscapes,* H.R. Gimblett & H. Skov-Petersen, Eds., Arizona: University of Arizona Press, pp. 239-252, 2008.

[21] D. Marceau, "What Has Been Learned from Multi-Agent Based Simulation Modeling?", *Monitoring, Simulation and Management of Visitor Landscapes,* H.R. Gimblett & H. Skov-Petersen, Eds., Arizona: University of Arizona Press, pp. 411-424, 2008.

[22] A.T. Knight, R.M. Cowling and B.M. Campbell, "An operational model for implementing conservation action" *Conservation Biology* vol. 20 pp. 408–419, 2006.

Formal concept analysis – a method for exploring complex responses of tourist surveys

Karen Ziener

Abstract — The Formal concept analysis goes back to the 1940s and is advanced by Rudolf Wille in the eighties. Based on the algebraic lattice theory so-called concept lattices will be used for visualisation of hierarchical structures in a line diagram. The method needs as input a context consisting of sets of objects and attributes and a binary relation between these objects and attributes. In a concept lattice quantitative and qualitative data can be combined and relations between the objects as well as between the attributes can be analysed. Therefore concept lattices are suitable for analysing the results of surveys. The respondents and their answer patterns constitute the context. Precondition is a hierarchical structure of the answers (e.g. ordinal ordered data). In this presentation will be demonstrated how to use the line graph of the concept lattice for analysing complex questions of tourist surveys. As an example the main activities of about 600 tourists and daily visitors in the Lake Neusiedl Region are analysed. With the procedure of Formal Concept Analysis the different answer patterns of respondents are arranged as nodes in a line diagram. This diagram is constructed by means of two partial concept lattices that will be integrated later. The interpretation of the line graph will start at the biggest nodes, consider the whole structure of the graph and include additional attributes in order to describe groups of tourists with the same activity pattern.

Index Terms — Formal Concept Analysis, hierarchical structures, Lake Neusiedl Region, tourist surveys

1 Formal concept analysis as a method for analysing complex responses of tourist surveys

The Formal concept analysis goes back to the 1940s and is advanced by Rudolf Wille in the eighties. Based on the algebraic lattice theory so-called concept lattices will be used for visualisation of hierarchical structures in a line diagram. The method needs as input a formal context (matrix) consisting of sets of objects and attributes and a binary relation between these objects and attributes. In a concept lattice quantitative and qualitative data can be combined and relations between the objects as well as between the attributes can be analysed. The line diagram shows the order of objects, on the one hand, and the structure of the whole issue, on the other. In contrast to the creation of types the attributes of each object are unmodified visible.

Therefore concept lattices are suitable for analysing the results of surveys with mostly binary and nominal scale data. The respondents and their answer patterns constitute the context. Precondition is a hierarchical structure of the answers, e.g. ordinal scale data, attribute is not existent / is existent, less or more attributes are existent. Since the beginning of the nineties at the Geographical Institute of the Potsdam University Formal Concept Analysis has been used for analysing different results of surveys, see [1], pp. 80-88, [2], pp. 43-49, 127-129.

Karen Ziener, Dr. habil, geographer, currently self-employed, Klagenfurt, Austria. E-mail: kziener@web.de.

2 Activities of tourists and one day visitors in the Lake Neusiedl Region – construction and analysis of line diagrams

The mathematical foundations, which can be found in Ganter & Wille [3], are not subject of this paper. In this presentation should be demonstrated how to use the line graph of the concept lattice for analysing complex questions of tourist surveys.

TABLE 1

TOURIST ACTIVITIES IN LAKE NEUSIEDL REGION 2006

Activities	Percent
To relax	86,0
Being in nature	85,5
(Wine)tavern	64,8
Cycling	61,1
Bird watching	48,1
Bathing	46,4
Culture / Museums	39,1
Water sports	21,4
Sports	14,3

Source: questioning in the MaB-Project "Redesigning Biosphere Reserve Neusiedler See" in 2006, 588 persons

As an example the activities of 588 tourists and daily visitors in the Lake Neusiedl Region (questioning in the framework of the MaB-Project "Redesigning the Biosphere Reserve Neusiedler See", financed by Austrian Academy of Sciences, MAB Programme, in 2006) are analysed. The respondents were given a list of nine activities to say "yes" or "no", the result you can see in Table 1. But the aim was to get more information about the combination of activities, the activity patterns.

The combination of all activities shows 168 patterns of answer, most of them said by only one, two or three persons. In order to reduce this variety and to take only the main activity patterns into account the context include exclusively those answer combinations as objects which were mentioned by not less than 6 respondents (one percent). The formal context consists of 30 objects (respondents with the same activity pattern) and the 9 activities as attributes. It represents 337 persons (57 percent off all respondents). Now the concept lattice with 38 concepts can be created by means of Formal Concept Analysis software. The line diagram is hand-made because it should be human readable.

For a better construction of such complex line diagram a second step of preparation is required: segmentation of the formal context into two contexts with less attributes. In this case the first context includes the main activities (4) and all 30 objects and the created concept lattice has 7 concepts. The second context covers the other activities (5) and also all objects. The outcome of this is a concept lattice with 13 concepts. Later the two line diagrams of these concept lattices will be combined to the line diagram of the whole concept lattice (38 concepts respectively nodes).

In the line diagrams the different answer patterns of respondents are arranged as nodes. The lines show the relations between the objects representing through the change of attributes. The size of the nodes shows the number of persons with the same activity pattern. Going along the lines to the top of the graph the attributes of each node can be read.

2.1 First partial concept lattice – main activities

The analysis of the line graph of the first concept lattice (Fig. 1) starts at the biggest node. This node (173 persons) on the bottom of the graph combines all main activities. The opposite is the node on the top (6 persons) without any activities. Excepting these six persons all respondents make activities in nature and most of them like to relax. The attribute "nature" is standing at the second node an all other nodes are below it. But you can see a dichotomy – tourists making cycling-tours but they don't go to a tavern, in the left part of the line diagram, and tourist who visit restaurants and taverns and don't like cycling, in the right part.

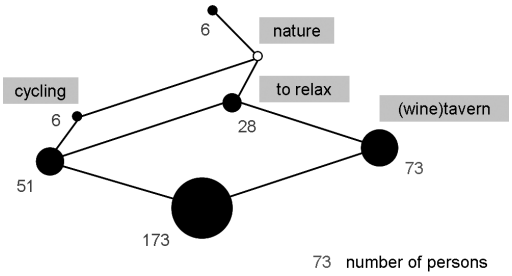


Fig. 1 First partial concept lattice (main activities)
Source: own compilation, survey in the MaB-Project "Redesigning Biosphere Reserve Neusiedler See" 2006

2.2 Second partial concept lattice – the other activities

The line diagram of the second concept lattice shows three activities – "bathing", "bird watching" and "museums" – in three different directions forming a cuboid. In addition water sports and sports are included (see Fig. 2).

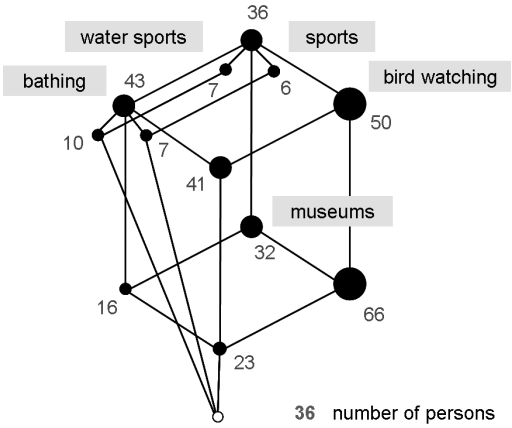


Fig. 2 Second partial concept lattice (the other activities)
Source: own compilation, survey in the MaB-Project "Redesigning Biosphere Reserve Neusiedler See" 2006

In this graph you can explore the various activity patterns. On the right below the node with the label "bird watching" you can see all activity patterns with bird watching. Most of them combine only bird watching and partly museums, but not bathing, sports or water sports. On the opposite side combinations of bathing, sports or water sports are located. The size of nodes shows the different number of respondents having these activity patterns. Of course there is also a relation between "bathing" and "bird watching" (nodes in front of the graph with 43 and 23 persons). The lower level of line diagram shows the interests of culture and museum. Here you can find the biggest node (66 respondents) with the activities "museums" and "bird watching".

2.3 Whole concept lattice – all activities

The construction of the line diagram for the whole concept lattice of all nine activities is based on these two small line diagrams. Initially the first graph is drawn to a larger scale. Afterwards the second line diagram is integrating in each node. However, this graph is only in the bottom node completely developed. Finally the lines between the nodes are supplemented.

Fig. 3 presents the complex line diagram developed in this manner. If you can read it you will get a lot of information in a very short time. The rules for analysing are the same. The graph combines two different structures – the main four activities and the other five activities (see 2.1 and 2.2). I want to explain only some aspects:

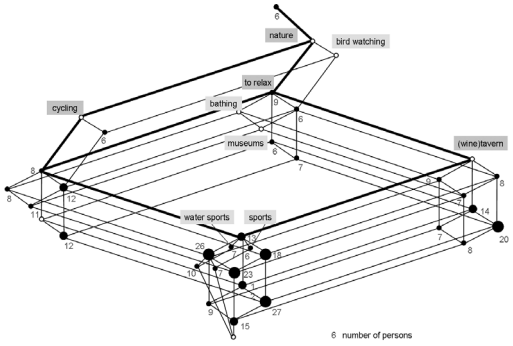


Fig. 3 Activity patterns in the Lake Neusiedl Region 2006,
Source: own compilation, survey in the MaB-Project "Redesigning Biosphere Reserve Neusiedler See" 2006

Most of the bigger nodes you can see in the lower part of the line diagram. These activity patterns combine a broad range of interests. Water sports and sports appear primary

in this bottom part, but their importance is very low.

The biggest node on the right side indicates the interesting relation between culture, nature and bird watching as well as the visit of taverns or wine taverns (so-called Heurige). This is a potential for an enlargement of the very short summer season.

The importance of "bathing" decreases not only quantitative and relative but also as sole activity. Bathing alone or with one or two activities doesn't exist in the concept lattice. The biggest nodes with bathing are situated on the bottom of the graph. This means that bathing is combined with several other activities.

2.4 Inclusion of additional attributes

A further possibility to explore complex responses of touristic surveys is the integration of additional attributes. In this case the time of questioning – spring, summer, autumn – should be correlated with the activities of tourist and one day visitors. In Fig 4 is shown in which season the different activity patterns dominate (residual smallest 1). The thick lines show all nodes with bathing in order to point up the relation to the summer tourism. In spring activity pattern are especially oriented to cycling and bird watching and in autumn we can find more complex interests with museums and wine taverns. Besides, some of the complex interests occur evenly in all seasons.

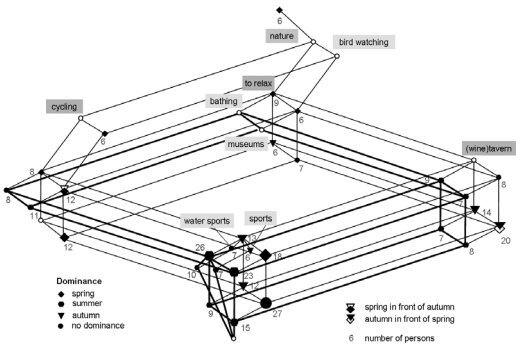


Fig. 4 Activity patterns in the Lake Neusiedl Region 2006 – time of survey, Source: own compilation, survey in the MaB-Project "Redesigning Biosphere Reserve Neusiedler See" 2006

Conclusion

Formal Concept Analysis is a world-wide used method of data analysis which identifies hierarchical structures between different objects. It can be applied in decision and modelling processes. For the analysis and interpretation of the results of questioning this method offers many possibilities. By means of concept lattices complex questions can be structured and relations between statements, opinions or perceptions as well as with other attributes of the persons or groups can be analysed. The line diagram of a concept lattice shows the whole structure of the answer patterns and the relations among it. The visual analysis of the graph provides the formation of groups and types if the structure of data is suitable. Until now the author of this paper is short on experience of attribute implications in concept lattices which can help to explore the relations between different answers and within complex answer patterns for a sample of tourists or visitors in protected areas.

References

[1] G. Saupe and K. Ziener, "Begriffsverbände zur Analyse von Nachfragestrukturen in Erholungs- und Freizeitgebieten", *Beiträge des 10. Kolloquiums für Theorie und quantitative Methoden in der Geographie (Göhren auf Rügen, 23. - 26.2.1994)*, pp. 80-88, Greifswald, 1994

[2] K. Ziener, „Das Bild des Touristen in Nationalparken und Biosphärenreservaten im Spiegel von Befragungen", pp. 43-49, 127-129, Potsdam

[3] B. Ganter and R. Wille, "Formal Concept Analysis: Mathematical Foundations", Berlin, Heidelberg, 1999

Karen Ziener, Dr. phil (1990) Dr. rer. nat. habil. (2003), Scientific Assistant at the University of Potsdam (Germany), Institute of Geography (1987-2000), and at the Alps-Adriatic-University of Klagenfurt (Austria), Department of Geography and Regional Studies (2003-2007), currently self-employed geographer, last project with research grants "Redesigning the Biosphere Reserve Neusiedler See", Books: Grenzüberschreitende Wirtschaftskooperationen zwischen Kärnten, Slowenien und Friaul-Julisch Venetien (2007, collective with P. Hössl), Auf dem Weg zu einer regionalen und vorausschauenden Konfliktstrategie

für Nationalparke und Biosphärenreservate: Sechs Regionen unter die Lupe genommen (2005), Das Konfliktfeld Erholungsnutzung – Naturschutz in Nationalparken und Biosphärenreservaten (2003, Habilitation Thesis), Das Bild des Touristen in Nationalparken und Biosphärenreservaten im Spiegel von Befragungen (2001), Current research interests: conflicts in national parks and biosphere reserves, regional development and spatial planning, cross-border economic cooperation, member of Austrian Geographic Society (ÖGG), Society for German Research (GfD), German Society for Tourism Science (DGT)

MMV4 PROCEEDINGS
DISTURBANCE

Assessing the impact of recurrent wildfires and tourist activities in a Mediterranean area

Bachisio Arca, Pierpaolo Duce, Michele Salis, Donatella Spano, Pierpaolo Dore

Abstract — The coastal landscapes of Sardinia are characterized by a mosaic of beaches, protected areas and lands subjected to several anthropogenic disturbances. The wildland fire can be considered as a permanent disturbance that induces changes in the spatial pattern of vegetation, canopy cover, and soil properties. The structural characteristics of fire prone species can support the action of other disturbances. The aim of this study was to estimate the impact of both wildland fire and touristic activities on the coastal area of northern Sardinia. A coastal area was sampled by the line intercept method in order to characterize the vegetation. The study found differences in species composition, plant cover, and plant height that can be attributed primarily to the effect of fire, but also to the increased vulnerability of the fire prone ecosystems to the other disturbances.

Index Terms — Coastal areas, shrubland vegetation, vulnerability, anthropogenic disturbances.

1 Introduction

The island of Sardinia is one of the most important touristic areas of Italy. The major influx of tourists occurs during the summer and is concentrated in the coastal areas, where the landscape is characterized by a mosaic of beaches, protected areas and lands with strong anthropogenic disturbances. At local level, a lively discussion about the sustainability of touristic development and methods to be used for measuring or estimating it has been recently developed.

The impact of tourism on coastal areas is usually coupled with the impacts of other natural and anthropogenic disturbances [1].

Fire is the most significant threats for the Sardinian forested areas. In the last three decades, over 3000 wildfires per year have been occurred, with a mean annual burned area of about 41000 ha [2], [3]. However, the last ten years of the wildland fire time series showed a decreasing trend in fire occurrence (about 2700 fires per year) and, particularly, in burned area (about 18000 hectares per year). In addition, the analysis of both fire size and fire number showed that, on average, the 92% of fires have a size lower than 10 ha, and only the 0.7% of fires have a size greater than 200 ha [4].

The above mentioned results can be attributed to improvements in early detection, fire fighting infrastructures, fire suppression efficiency, and also prevention measures. Nevertheless, during severe and extreme environmental conditions, the fire fighting

Bachisio Arca, Institute of Biometeorology, CNR-IBIMET, via Funtana di lu Colbu 4/a, I-07100 Sassari, Italy. Email: B.Arca@ibimet.cnr.it
Pierpaolo Duce, Institute of Biometeorology, CNR-IBIMET, via Funtana di lu Colbu 4/a, I-07100 Sassari, Italy. Email: P.Duce@ibimet.cnr.it
Michele Salis, Department of Economics and Woody Plant Ecosystems (DESA), University of Sassari, Italy. Email: miksalis@uniss.it
Donatella Spano, Department of Economics and Woody Plant Ecosystems (DESA), University of Sassari, Italy. . Email: Spano@uniss.it
Pierpaolo Dore, Institute of Biometeorology, CNR-IBIMET, via Funtana di lu Colbu 4/a, I-07100 Sassari, Italy. Email: pierpaolo83@gmail.com

organization and strategies can be unable to respond to all the intervention requests.

In these situations, wildfires can become uncontrollable [5], with high risk to determine serious damages to ecosystems and properties and injury and loss of human life.

Since forest fires are predominantly ignited by arson, fire frequency and fire danger are higher during severe and extreme environmental conditions (strong wind, high fuel dryness).

In addition, fire ignition points are mainly concentrated near roads, residential areas, and tourist resorts, especially along the coast.

Finally, since fire recurrence is increasing, wildland fire can be considered as a permanent disturbance that induces changes in the spatial pattern of vegetation, canopy cover, and soil properties [6], [7].

The aim of this study was to estimate the impact of both wildland fire and touristic activities on the coastal area of northern Sardinia.

2 Study area

The north-eastern coast of Sardinia (Fig. 1) is characterized by the typical Mediterranean sub-arid climate, with a remarkable water deficit from May through September, and most of the annual rainfall (~650 mm) occurring in fall and winter.

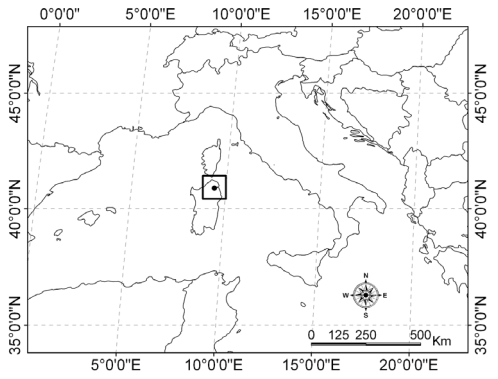


Fig. 1. Location of the study area in North East Sardinia (Italy).

The mean annual temperature is ~17°C, with summer season highs often near 30°C. The average wind speed is relatively high (~4ms^{-1}) in both winter and summer seasons, with ~50–70% of the days showing values between 1.6 and 8 ms^{-1}. The prevailing wind directions at the sites are typically west and north-west, with a cumulative frequency greater than 50%. However, the local wind direction can be modified by the complex terrain typical of the studied areas.

The area is characterized by a mosaic of vegetation types and development stages, where agricultural, grazing and also tourism activities play an important role in the vegetation distribution and landscape dynamics. The vegetation is a dense and uniform maquis shrubland, with plant height ranging from 1.5 to 2 m. Dominant species included *Pistacia lentiscus* L., *Cistus monspeliensis* L., *Arbutus unedo* L., *Olea europaea* L. var. oleaster, *Myrtus communis* L., *Pyrus amygdaliformis* Vill., *Calycotome spinosa* L., *Phyllirea angustifolia* L., *Juniperus phoenicea* L.

In the areas subjected to recurrent fires, the plant height is in the range 0.5 - 1 m and the dominant species is *Cistus monspeliensis* L.

During the summer season, the prevailing intensity and direction of wind, in conjunction with the drought conditions, can sustain high intensity fires that threatened the resort areas and also the beaches, requiring both the adoption of direct suppression attacks and the evacuation of villages, campsites and sometimes beaches.

3 Methods

The time series of wildland fire that occurred during the period 1995-2007 was analyzed in order to establish the main characteristics of fires and the information about the principal variables that describe fire behaviour.

Several themes were acquired and managed using a geographic information system to quantify the spatial variation of the different parameters related to land cover and vegetation characteristics.

Three different plots were used to study the characteristic of vegetation. The first two plots were located on the burned area; the third plot was located in the unburned area. For each plot, three 30 m line transect parallel to the coast and at a distance of 5 m each other were constructed. Shrub vegetation plants were sampled in order to determine plant height and the plant cover by the line intercept method.

Experimental data were analyzed for differences between burned and unburned areas by calculating the t-Student test.

4 Results and discussion

The values of plant height and canopy cover observed over both burned and unburned areas are shown in table 1. Results showed significant differences (t-test, P=0.01) in plant height between burned and unburned areas, while plant cover showed similar values.

TABLE 1

STATISTICS OF PLANT HEIGHT AND PLANT COVER FOR BURNED AND UNBURNED AREAS

		Burned	Unburned
Plant height (m)	mean	0.56a	1.30b
	min	0.15	0.45
	max	1.15	2.60
Plant cover (%)	mean	82.6a	93.7a
	min	74.0	82.0
	max	89.0	100

Mean values followed by the same letters are not significantly different at a P-value=0.01 by t-Student test

These results confirm the general description of the effects of recurrent fires in Mediterranean areas [8]. The recurrent fires that characterized the experimental area reduced the structural evolution of the shrubland vegetation, with direct effects on plant height and species composition.

Table 2 shows the values of plant cover measured in the burned area by the line interception sampling procedure. An increase of plant cover can be observed for increasing distances from the coast. This result seems to suggest that the vegetation near the coast is more affected by the impact of touristic pressure, but also the spatial variations of the environmental conditions (e.g. soil properties, wind intensity, etc.) probably plays a role in this results. The effect of human pressure on the natural process of vegetation recovery after the fire can be attributed to the impact of trampling by tourist, vehicles circulation, parking places.

TABLE 2

MEAN VALUES AND STANDARD ERRORS OF PLANT COVER FOR INCREASING DISTANCES FROM THE COAST; BURNED AREA.

Area	Transect	Plant cover (%)	Standard error
1	5 m	74	0.20
	10 m	83	0.40
	15 m	85	0.48
2	5 m	80	0.32
	10 m	84	0.47
	15 m	89	0.82

The fire regime can probably play a major role; evolved shrubland vegetation preserves itself and the landscape as a mechanical barrier to both natural (weather, soil erosion, etc.) and anthropic effects.

In relation to the species composition, the experimental results showed (table 3) that the burned area is characterized by a low number of species, and a general low frequency of the species already observed in the unburned area, with the exception of the *Cistus monspeliensis*, that increase its frequency from about 32% to 57%.

Fire is the main factor that controls the species composition, with the reduction of tree and shrub sprouters, and the diffusion of

the shrub obligate seeders. Changes in species composition can affect the vulnerability to both recurrent fires and other anthropic disturbances; for example, shrubland vegetation dominated by *Cistus monspeliensis* L. is characterized by the following factors influencing the impact: low height, high values of fine fuel, low values of fuel moisture, and high values of dead fuel.

TABLE 3

DISTRIBUTION OF PERCENT PLANT COVER FOR THE DIFFERENT SPECIES IN BURNED AND UNBURNED AREAS

	Unburned	Burned
Cistus monspeliensis	31.6	57.0
Myrtus communis	-	3.4
Calycotome spinosa	18.0	2.3
Juniperus phoenicea	21.0	-
Phyllirea angustifolia	19.3	11.8
Pistacia lentiscus	-	5.8
Erica scoparia	1.3	-
Olea europaea, var. oleaster	2.3	0.2
Herbaceous	-	1.8

5 CONCLUSION

The study found that the recurrence of fire were primarily responsible for changes in species composition, plant cover, and plant height. The indirect effect of fire disturbances on plant composition and soil properties can be locally aggravated by the impact of touristic activities.

REFERENCES

[1] F. Van der Meulen, AHPM. Salman, Management of Mediterranean coastal dunes. Ocean & Coastal Management 30: 177-195, 1996.

[2] European communities, Forest Fires in Europoe: 2005 fire campaign, 2006.

[3] C. Boni, Il Fenomeno degli Incendi in Sardegna". Atti del Convegno "Incendi Boschivi e Rurali in Sardegna-Dall'Analisi delle Cause alle Proposte di Intervento, pag. 9-17. Cagliari, 2004.

[4] Regione Autonoma della Sardegna. Piano regionale di previsione, prevenzione e lotta attiva contro gli incendi boschivi 2005-2007 - Revisione 2007.

[5] S.J. Pyne, Introduction to Wildland Fire. New York: John Wiley & Sons; 455 pp., 1984.

[6] Z. Naveh, The Evolutionary Significance of Fire in the Mediterranean Region. Vegetatio 29: 199-208, 1975.

[7] Z. Naveh, The role of fire and its management in the conservation of Mediterranean ecosystems and landscapes. In The Role of Fire in Mediterranean-Type Ecosystems (J. M. Moreno and W. C. Oechel, eds), Vol. 107, pp. 163±186. Ecological Studies, Springer-Verlag, 1994..

[8] MJ. Baeza, M. De Luis, J. Raventos, A Escarré, Factors influencing fire behaviour in shrublands of different stand ages and the implications for using prescribed burning to reduce wildfire risk. Journal of Environmental Management 65, 199 208, 2002.

ACKNOWLEDGEMENTS

The authors would like to thank the personnel of the Sardinian Forestry Corps for providing GIS data and most of the information about the fire events. We also thank the Sardinian Agrometeorological Service for providing weather data and climatological data.

Vandalism and its prevention possibilities in the region of Lake Balaton

Réka Bodnár

Abstract — Lake Balaton – the largest freshwater lake in Central Europe – has been a favourite destination for hundred thousands of Hungarian and foreign visitors for long decades. The study area of the present paper, the Tapolca Basin that has a Mediterranean atmosphere is found on the northern shore of the lake. Nature protectional measures were able to impede mining damaging the basalt capped buttes of the basin providing scenery of European fame, however, they seem to be powerless against vandalism. Sad picture is gained while hiking on the study trails of the Balaton Uplands National Park experiencing that pointless destruction makes site tables unreadable. The main aim of the paper is to draw attention to that harmonizing current known methods and measures and applying new ideas significant improvement could be reached in protecting our natural values against vandalism at relatively low cost and with some care.

Index Terms — Environmental education, solution possibilities, vandalism, visitor conflicts

1 Introduction

Lake Balaton – the largest freshwater lake in Central Europe – has been a favourite destination for hundred thousands of Hungarian and foreign visitors for long decades thus the lake is exposed to serious and varied environmental effects primarily due to the seasonal load. The lake and its surroundings have numerous unique natural and cultural values for the protection of which the Balaton Uplands National Park was established in 1997.

Nature protectional measures were able to impede mining damaging the basalt capped buttes of the Tapolca Basin (Figure 1) that has a Mediterranean atmosphere and providing scenery of European fame. In contrary they seem to be powerless against vandalism and pointless destruction. Sad picture is gained while hiking on the study trails of the National Park experiencing that pointless destruction makes site tables unreadable (Figure 2).

2 Who are vandals, what are their motivations?

In order to take effective measures against the harms of vandalism we have to identify and define potential criminals and gain information on who with what behaviour attitudes, when and why commit their outrages. It is important to reveal motivations and to understand cause and effect relationships.

Vandalism is defined in the lexicons as follows: “word originating from Latin; meaning wild ravage, pointless destruction committed by the Vandals against the art treasures of the city of Rome. The Vandals were stigmatized forever by unwritten tradition with this word” [1].

Lake Balaton is the place of enthusiastic bathing and untroubled resting for many visi-

R. Bodnar is with the Department of Landscape Protection and Environmental Geography, University of Debrecen, Hungary E-mail: fyp444@gmail.com

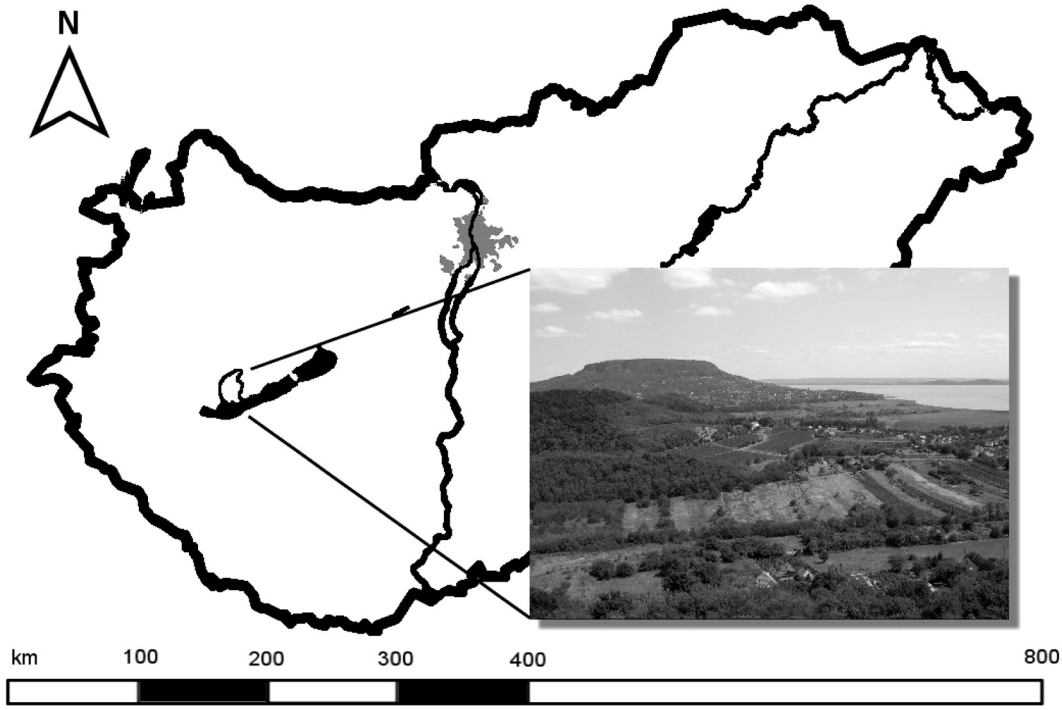


Fig. 1. Tapolca Basin with its beauty and basalt capped buttes on the northern shore of Lake Balaton unique in Europe

tors in hot summers. Or not?! There are few more annoying things than lumbering music of discos nearby makes our head pulsating or ramping drunken people make nights loud when we would like to rest while on holiday.

Naturally this might be true for local bored youngsters as well but as there are no statistics – due to the lack of surprise in the act – on the personality of the vandals we do not know whether they are local or irresponsible tourists. Anyway that segment among the main tourist types can be clearly determined that are liable to vandalism. This segment is fundamentally involves exhibitionist youngsters in all their strength, in abandon partying far away from parent control travelling with friends. We have to find those tasks and activities that would make these youngsters feeling useful for their environment including Nature as well.

Importance of **environmental education** is well known in Hungary today. Therefore, it is important to take measures as soon as pos-

Fig. 2. Traces of vandalism along the study trail on the hill of Badacsony

sible and as effectively as possible, bearing in mind the tight balance of strict measures (surprise in the act), strict control and environmental experience based on the "*AHA-effect*" (recognition, realisation).

This can be experienced by the youngsters when active leisure time is based on the methods of experience pedagogy as this means primarily direct experience.

Orientation, calling attention are important and widely used measures of nature protection. On the other hand publications are rare that give information particularly on the magnitude of destruction and abuse (including e.g. flower collection and wood stealing as well) and on the fines for them. Most damage is caused by ignorance. If visitors knew that which activity entails what fines most destructions would be impeded.

As this type of environmental risks triggered by tourism is increased further by that Lake Balaton is advertised as the "place of stormy parties" by the offers of some travel agencies of certain countries, it is important to draw attention to **the role of marketing**. This kind of control could be the first step towards protection.

3 ZONE SYSTEMS TO CONSERVE PROTECTION AREAS

The next step is the question of **areas** i.e. how and where to orientate visitors once they are at the site. The Balaton Act of 2000 outlines the idea of dissecting the area of Lake Balaton and its environment into 5 regions of different profiles in order to classify visitor activities of different type that even disturb each other occasionally. Logically associated activities are concentrated into one area unit [2].

This corresponds well to the ideas of foreign property investors preparing for large investments in the region according to which the western part of the Balaton Uplands – including our study area the Tapolca Basin as well – would specialise in wine and gastronomy together with ecological and wellness tourism. On the other hand amusement centres together with outing and event sites would be concentrated solely – in order to reach the above aims as well – to the southern shore [3].

Probably this regional dissection could not solve entirely the problem that is focused in this paper as free transition would be present among the areas, however, different types of visitors would certainly be concentrated. In simple everyone would visit that part of Lake Balaton – and would probably book his/her accommodation as well – where visitor's activities most suitable for him/her are offered. To keep those visitors at the chosen site, appropriate number and type of programmes shall be offered.

Spatiality can be studied from the nature protection point of view as well, i.e. visitor's activities at a given area can be regulated on the basis of degree of protection. Considering categorising based on zone systems the most widespread is the IUCN categorising, most national parks apply it in Hungary as well. Its essence is based on the onion skin structure as most protected areas are situated in the innermost zone while the rest surround it as buffer zones. This system may operate not just in protected areas but turning the principle inside-out it might could be applied onto every tourist object and their surroundings.

For example (Figure 3) ***zone one*** can be the visitors' centre where the average visitor gains every important information concentrated in a building, briefly, however, in entertaining form. The ***next zone*** can be the site of exhibitions established in the park or garden of the visitors' centre. This is a higher grade of meeting Nature as presentations are held outdoor, however, still in closed and controlled environment.

Zone three is the largest regarding spatial extent and it has the highest degree of protection as well. Today in Hungary study trails operating completely without control are most prone to vandalism even if most of them runs through protected areas (e.g. national park, landscape protection area, nature reserve) and they are under the control of the given

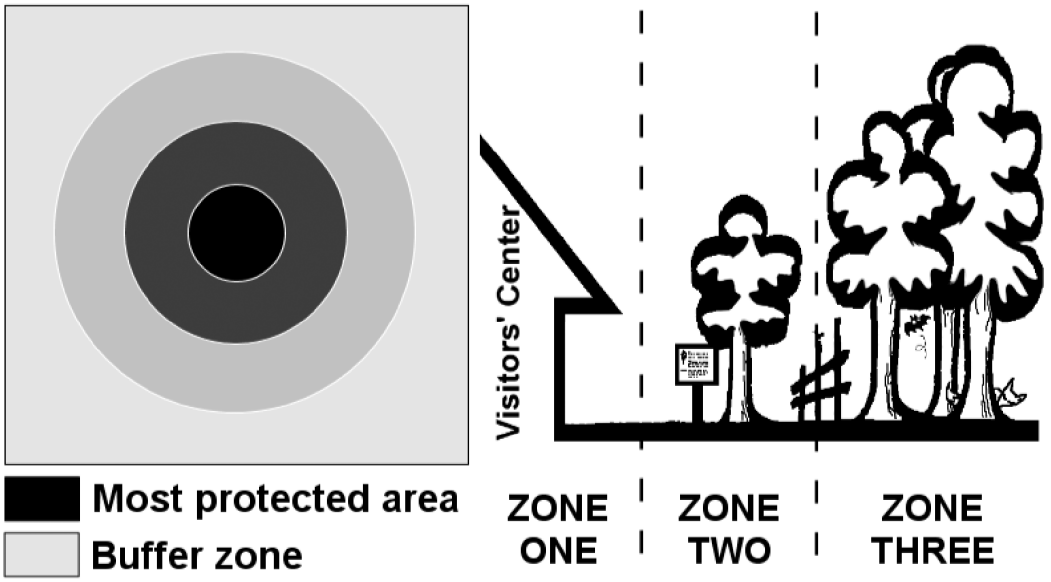


Fig. 3. Sketch figure of IUCN categories and zones according to intensity of visitor interest *Draw: Sz., Molnár*

nature protection guard in theory. This means complete lack of control in practice because in contrary to the European practice (1000 ha/guard) in Hungary areas of around 4000-5000 ha are under the control of one nature protection guard [4]. With such areas and number of guards continuous presence and effective control is impossible.

On the other hand most of the study trails in Hungary are free of charge in order to enable more-and-more people to improve their environmental attitude in a country that stays significantly behind other European countries in this respect. However, this aim is worth nothing if people demanding information and knowledge gain only annoyance when information tables are unreadable (see Figure 2)...

Regarding the above, the idea is worth consideration to establish entrance systems – similarly to caves that can be visited by tourists – in the study trails of Hungary the operational costs of which would be financed by an entrance fee chosen well from every aspect. This means a fee that does not frightens away visitors enjoying Nature and demanding environmental information but keeps out those who enter the trail only to destroy. Thus **spending willingness** is also a kind of differentiating factor and may prove to be a filter among visitors.

4 Other recommendations to eliminate vandalism in natural sites

In the following some concrete ideas and simulation practices regarding effective measures against vandalism are given.

1. Simulation: Entering study trails only with professional guides, park guards, vigilantes or volunteers wearing national park T-shirt would solve the problem. Continuous presence of authority (liveried) would prove to be retentive. The operation costs of patrol services should be financed by those charged for destruction giving even further emphasis to deterrence and prevention.

Hungarian law recognises the trainband as a volunteering civil social organisation and its operation is regulated by Act LII of 2006. This act emphasises the importance of the organisation and strengthens and institutionalizes the possibility of volunteer participation of inhabitants as a social or-

ganisation in environment and nature protection that are important in our study as well. Adding the 75000 members of the trainband [5] to the **nature protection guards** and **foresters** their work can be made more effective and problems caused by the lack of staff described in the previous chapter can be solved by the **harmonized work** of 4 officials if they are completed by the **police** [6].

2. Simulation: A solution would be presented regarding visitor control if a volunteer would work at the start points of study trails who has basic psychological and sociological knowledge – that could be obtained in courses organised by the affected national parks or local governments – and who based on the above mentioned criteria could easily recognise visitors of potential danger. The only task of such a volunteer is to detect and filter "suspicious visitors" and still to behave so that tourists would not feel this kind of discrimination. The volunteer would sign at detection – via mobile phone or any other non striking sign – to another volunteer guard e.g. with a bicycle.

From this point the guard with the bicycle takes over the task and companies the group inconspicuously. For example he/she cycles past the group as if working on some sort of a task and as if he/she would ignore the group. In several cases the fact that a guard in a national park T-shirt cycles here-and-there around the group would prevent (prevention) destruction. In more serious cases the cycling guard could record (e.g. photo) destruction while he/she is in continuous connection to authorities having tether for surprise in the act [1] (the police in Hungary) who could take measures following the alert of the volunteer guard.

The task of the so called psychological observer at the starting point of study trails could be extended by a moderator role as he/she offers programs – discussed above – for visitors targeted from vandalism point of view to spend their time actively thus his/her activity may has double use. On the one hand the target group may get closer to the ***"AHA experience"*** via participating in the programs (mountaineering, castle siege, etc). On the other hand his/her energy is spent for an activity that he/she likes and chose and he/her will has no time to cause trouble by destruction.

3. Simulation: For protection the modern technology can be applied as well for example for subsequent calling to task. Its practical implementation could be an expensive, however, effective method if the visitor may enter and exit the study trail via and entrance gate – similar to the line number issuing automats. Visitors would receive a decorative ticket or card, etc. when entering that can be a memory and it has a number registered in the computer system. Damage could be recorded by for example web cameras operated by PV-panels and hidden in e.g. the bushes in the surroundings of the objects prone to destruction – e.g. information tables, sheds – of course with appropriate law background (e.g. information on camera in action).

The system can be further improved when for example the camera that is in electric connection to the information table records only if the state of the observed object changes (e.g. tear in the covering foil). The automate ticket with recorded list number and microchip received at the entrance can identify those people who were at the place of destruction at the time of recording. Identification can be performed on the basis of bank data recorded on the microchip at purchase or on the basis of mobile phone number if the purchase of the ticket was made by mobile phone. Of course this method may seem to be futuristic, however, as we have experienced so far technology can develop rapidly with large steps…

[1] According to the Hungarian legislation only surprise in the act can be accounted regarding calling to task. Thus modification of the Act could be recommended in order to accept photos and videos, etc. on destructions as evidence in such cases.

5 Summary

Vandalism leaves its traces not only on the walls of houses and in mass transport vehicles of large cities but it deteriorates our nature protection areas and natural values. Besides the methods of environmental education – informing, giving environmental experience, etc. – returning in long term numerous other measures and methods like the principle of regionality, marketing, harmonized work of authorities, civil organisations and volunteers – and the list could be continued for long – are present to restrain pointless destruction.

None of the methods mentioned in the paper is new, all of them are currently in operation in some kind of form and the principle of all of them is applied directly or indirectly in numerous fields. The main aim of the paper is to draw attention to that harmonizing current known methods and measures and applying new ideas significant improvement could be reached in protecting our natural values against vandalism at relatively low cost and with some care.

In conclusion the methods and measures mentioned in the paper alone or in combination, adjusted to the local conditions can be applied in most of the visitor destinations both in Hungary and abroad where appropriate legal background is present and/or there is wish to modify the present law in order to serve the effective protection against vandalism.

References

[1] Pallas Lexicon: “Vandalism” entry-word, Source: http://www.pallaslexikon.hu
[2] Act CXII of 2000 Regional planning in the Special Holiday Resort of Lake Balaton, Source: http://www.balatoninfo.net/uj/hasznos/anyag/bataton_torveny/balaton_torveny.pdf
[3] A. Sugataghy, “Befektetési hullám (Investment wave)”, In: Turizmus Trend professional journal, March 2008.
[4] J. Baczur, based on personal communication (during an interview with the colleague of the Bükk National Park)
[5] Act LII of 2006 on trainband. In: Polgárőr Magazin XI. issue 3
[6] A. Kopek, based on personal communication (during an interview with the colleague of the Balaton Uplands National Park)

Reka Bodnar PhD student, geographer (2002); Department of Landscape Protection and Environmental Geography, University of Debrecen, Hungary. Participant 10 conferences, 5 of this international. 5 month research grant (ERASMUS) in Norway. Publications: 23 numbers of paper. Research interests: ecotourism, landscape protection, landscape ecology, environmental education.

Nobody knows the trouble they cause? The behaviour of forest users and their knowledge about wildlife disturbance

Christiane Brandenburg, Wolfgang Lexer, Felix Heckl, Andreas Muhar, Friedrich Reimoser, Richard Zink, Andreas Bartel

Abstract — The Biosphere Reserve Wienerwald frames the west and south side of Vienna, the capital city of Austria. High biodiversity and conservation values are given by a large contiguous forest area and interlocked grass lands. The Wienerwald is a major large-scale wildlife habitat and part of a supra-regional ecological corridor. Due to the close proximity of the city, the area is characterised by high use intensities and pressures caused by intense recreational uses, a strong demand for hunting opportunities: high hunting pressure as well as urban sprawl, land take, habitat loss and fragmentation. In order to reduce negative impacts towards wildlife caused by recreational activities, foresting and farming, landowners and tourism management organisations developed various regulations and management regimes for the use of the Wienerwald. The aim of the presented research project funded by the Austrian Academy of Science was to investigate the familiarity with those rules as well as the level of acceptance and compliance with the site regulations. On-site interviews and mailing surveys using standardised questionnaires were taken to address the project objectives. Altogether 1334 land users like foresters and farmers as well as recreationists, like hikers, horse riders, mountain bikers and joggers were asked if they were aware of the problems and conflicts caused to wildlife and wildlife management by certain behaviour such as off-trail use, off leash dog walking, if they knew the further-reaching implications of disturbing wildlife, and in the end if they observed the rules.

Index Terms — Awareness of wildlife disturbance, sustainable recreational use, visitor management

Christiane Brandenburg is with the Institute of Landscape Development, Recreation and Conservation Planning, BOKU - University of Natural Resources and Applied Life Sciences in Vienna, Austria

Wolfgang Lexer is with the Umweltbundesamt GmbH Vienna, Austria

Felix Heckl is with the Umweltbundesamt GmbH Vienna, Austria

Andreas Muhar is with the Institute of Landscape Development, Recreation and Conservation Planning, BOKU - University of Natural Resources and Applied Life Sciences in Vienna, Austria

Friedrich Reimoser is with the Research Institute of Wildlife Ecology, University of Veterinary Medicine Vienna, Austria

Richard Zink is with the Research Institute of Wildlife Ecology, University of Veterinary Medicine Vienna, Austria

Andreas Bartel is with the Research Institute of Wildlife Ecology, University of Veterinary Medicine Vienna, Austria

Does tourism affect bird populations in protected areas?

Katja Kangas, Pirkko Siikamäki, Miska Luoto and Antti Ihantola

Abstract — Human induced disturbance can have various impacts on birds. Disturbance has been found to affect for example behaviour, breeding success, species composition and density of birds. Despite of the growing number of disturbance research, little is known about impacts of recreation on forest bird communities as the focus has been mainly on behavioural responses of single species. There is a need for research on tourism-induced changes in bird communities in protected areas, as they are important for many rare and threatened species preferring natural habitats. We studied impacts of tourism on birds in Oulanka National Park, north-eastern Finland. Data on breeding bird pairs were collected with line transect method in hiking trails and in undisturbed control areas. We used general additive models (GAM) to investigate the importance of the tourism-related variables, i.e. visitor numbers in hiking trails and the area of infrastructure, as well as the habitat variables in explaining the variation in bird communities. The preliminary results show that the current tourism pressure has not caused substantial changes in bird communities of Oulanka NP. However, open-cup nesters showed negative response to the number of visitors.

Index Terms — Birds, Disturbance, Protected areas, Tourism

1 Introduction

Popularity of nature-based tourism has been increasing during past few decades. Furthermore, nature-based tourism often concentrates on protected areas like national parks. For example, national parks in northern Finland have nearly tripled their visitor numbers in the past decade [1]. When recreation is directed to protected areas managers are facing the challenge to preserve both conservational and recreational value of the area. Disturbance has been found to affect behaviour, breeding success, species composition and density of birds e.g. [2], [3]. Recreation induced negative impacts can result from direct disturbance, which can cause stress to wildlife, change their behaviour and inhibit them using otherwise important habitat. But recreation can affect also indirectly through modification in the species breeding or feeding environment caused by construction of tourism infrastructure [3]. If the recreational use and construction of infrastructure are intense the populations of original species may decline and new more urban species may benefit and colonize area e.g. [4].

Despite of the growing number of disturbance research, little is known about impacts of recreation on forest bird communities as the focus has been mainly on behavioural responses of species [5]. In Finland, the forests are very intensively used for forest industry and because of the resulting habitat loss and fragmentation of old growth forests populations of many spe-

- *K.K. Author is with the Oulanka research station, Thule institute and Department of Biology, university of Oulu, P.O.Box 3000, FI-90014 Oulu, Finland. E-mail: katja.kangas@oulu.fi*
- *S.P. Author is with the Oulanka research station, thule institute, Liikasenvaarantie 134, FI-93999 Kuusamo, Finland. E-mail: pirkko.siikamaki@oulu.fi.*
- *M.L. Author is with the Thule institute and Department of Geography, University of Oulu, P.O.Box 7300, FIN-90014, Oulu, Finland E-mail: miska.luoto@oulu.fi.*
- *A.I. Author is with the Department of Biology, University of Oulu, P.O.Box 3000, FI-90014 Oulu, Finland. E-mail: anttiiha@mail.student.oulu.fi*

cies preferring old forests have declined e.g. [6], [7]. Thus, there is a need for research on tourism-induced changes in bird communities in protected areas, as they are important for many rare and threatened species preferring natural habitats.

We studied impacts of tourism on bird community of Finnish National Park. We used modelling approach (general additive models) to investigate the importance of the tourism-related variables, as well as the habitat variables in explaining the variation in bird communities. It is expected that different bird species (e.g. open nesting species and cavity nesting species) respond differently to disturbance. More specifically we were interested in: Does the tourism related disturbance affect bird density and species composition? And can some bird groups be used as indicators of tourism-induced impacts?

2 METHODS

Study was conducted in Oulanka National Park, north-eastern Finland. Park is situated in boreal forest zone and is mainly covered by coniferous forest, but is also characterized by two river valleys and some mires and lakes. Oulanka National Park is one of the most popular parks in Finland with over 180 000 visitors per year [1].

Bird data were collected with Finnish line transect method in 2006 [8], in June, which is the peak breeding season of birds in the area. Transect lines covered hiking trails with varying visitor pressure but also undisturbed control areas further from tourism infrastructure. Information of visitor numbers in different hiking trails of Oulanka National Park was received from park managers. Some of the most common individual species observed in the area were chosen for statistical analyses. Furthermore, observed bird species were grouped based on their nesting site preference i.e. open nesting species nesting on ground, open nesters nesting on trees or shrubs and cavity nesting species.

Bird transect lines were digitized to the digital map with ArcGIS program and were further divided to 500m long stretches. Around each stretch a 500m wide buffers were created. And from the area of each 500 meter buffer we calculated the proportion of different habitat variables (proportion of dominant tree species, water and wetland area) and tourism related variables (the area of infrastructure and the number of visitors). We also calculated one extra explanatory variable autocovariate [9] to control for spatial non-independence in the data, which could have arisen from grouped observations in the study area. Statistical analyses were performed by using general additive models (GAM).

4 RESULTS AND CONCLUSIONS

In total 3527 observations were made and 62 species were observed during the study. Brambling (*Fringilla montifringilla*) and Willow warbler (*Phylloscopus trochilus*) were the most common passerine bird species and wood sandpiper (*Tringa glareola*) most common wader observed in the Oulanka National Park area. There were no significant differences in observed number of species between hiking trails and control areas. However, the species composition differed between control areas and highly used recreational areas. Some species like wood sandpiper were more common in control areas, whereas, one species redwing (*Turdus iliacus)* showed positive response to number of visitors. From studied bird groups open-cup nesters both nesting on ground and nesting on trees or shrubs were negatively related to number of visitors, whereas visitor pressure did not affect cavity nesting species.

Our results show that the tourism can affect the species density and distribution within the Oulanka national park. The results can be used in planning and managing protected areas. We recommend regular monitoring of bird species in protected

areas in future. Bird group like open-cup nesters nesting on ground could be used as an indicator of sustainable level of recreational use in the area.

References

[1] R. Puhakka, "Kansallispuistot murroksessa – Tutkimus luonnonsuojelun ja matkailun tavoitteiden kohtaamisesta," *PhD thesis, University of Joensuu, Publications in Social Sciences,* 2007. (In Finnish, abstract in English)

[2] W.E. Hammit and D.H. Cole, Wildlife recreation: ecology and management, 2nd edn. John Wiley & Sons, New York. 1998.

[3] R. Buckley, Impacts of ecotourism on birds. In: Environmental impacts of ecotourism. (ed. R. Buckley) pp. 187-209. CABI Publishing. 2004.

[4] J. Jokimäki, M-L. Kaisanlahti-Jokimäki, E, Huhta and P. Siikamäki. Bird species as indicators of environmental changes at tourist destinations.

[5] W. Sutherland,. Future directions in disturbance research. Ibis 149:120-124. 2007.

[6] P. Helle and O. Järvinen, Population trends of North Finnish land birds in relation to their habitat selection and changes in forest structure. Oikos:46 107-115. 1986

[7] R.A. Väisänen, O. Järvinen and P. Rauhala, How are extensive, human caused alterations expressed on the scale of local bird populations in boreal forests? Ornis Scandinavica 17:282-292. 1986.

[8] O. Järvinen and R.A. Väisänen Estimating relative densities of breeding birds by line transect method. Oikos 26: 316-322. 1975.

[9] S. Ferrier, G. Watson, J. Pearce & M. Drielsma Extended statistical approaches to modeling spatial pattern in biodiversity: the north-east New South Wales experience. I. Species-level modeling. Biodiversity and Conservation, 11, 2275–2307. 2002

Katja Kangas is M.Sc in Biology (Animal sciencies) 2005. She is currently working as researcher in Oulanka Research station, Thule institute, University of Oulu and preparing a doctoral thesis about "Long term ecological impacts of nature based tourism".

Pirkko Siikamäki is docent and director of Oulanka research station, University of Oulu. The emphasis of her research is on sustainable nature-based tourism, biodiversity in boreal terrestrial environments and evolutionary ecology.

Miska Luoto is professor (Physical Geography) in Department of Geography, University of Oulu. His main research interests include integration of land-cover and climate data in biodiversity modelling.

Antti Ihantola is a master student in the University of Oulu, Deparment of Biology.

Visitor attitudes towards natural disturbance: the case of the bark beetle in Bavarian Forest National Park, Germany

Martin Müller, Marius Mayer, Manuel Woltering and Hubert Job

Abstract — Management authorities of protected areas have recently been faced with a considerable rise of natural disturbance such as fire or insect pests in ecosystems. Incorporating visitor experience of natural disturbance into management strategies is a crucial task. The present study uses multivariate statistical analysis to examine visitors' attitudes towards large-scale bark beetle infestation in the case of Bavarian Forest National Park, Germany. Findings indicate that visitors have a neutral attitude towards the bark beetle and slightly reject controlling the bark beetle in the national park. Expectations of a successful recovery of the affected areas (green-up) and low personal issue salience are the two strongest predictors for support of not controlling the bark beetle. Our findings suggest that it is well possible to position protected areas as refuges where nature is supposed to follow its course without intervention rather than as landscaped representations of cultural ideal types. In order to communicate this idea of wilderness to visitors, park management authorities should design educational measures to raise visitors' awareness of the ecological mandate of protected areas and of the role of disturbance agents in ecosystems.

Index Terms — perception, attitudes, natural disturbance, protected areas, tourism, bark beetles

1 Introduction

Protected areas managed according to category II of the classification scheme of the World Conservation Union (IUCN) are mandated to protect ecosystems from human interference and make them accessible for recreational activities to a limited degree [1]. In Bavarian Forest National Park (Germany) the designation of areas as core zones (Naturzone) prohibits any management intervention in natural forest dynamics. This also applies to the management of the spruce bark beetle (mainly Ips typographus).

Bavarian Forest National Park was established in 1970 as the first German national park (see Fig. 1). It covers an area of 24,250 ha which is dominated by forest ecosystems of Norway Spruce (*Picea abies*) and European Beech (*Fagus sylvatica*). Since the beginning of the 1990s, the mature spruce stands of the mountain spruce forest above 1,100 m have suffered from severe bark beetle attacks [2]. As of 2007, total tree mortality across all forest communities amounted to 5,500 ha or 22 % of the park area.

Being a popular tourist destination, Bavarian Forest National Park receives more than 750,000 visitors annually [3]. It is especially

Martin Müller MPhil, Goethe-Universität Frankfurt am Main, Department of Human Geography, Robert-Mayer-Str. 8, 60325 Frankfurt am Main. E-mail: martin.muller@cantab.net.
Dipl.-Geogr. Marius Mayer, Dipl.-Geogr. Manuel Woltering and Univ.-Prof. Dr. Hubert Job, Julius-Maximilians-Universität Würzburg, Department of Geography, Am Hubland, 97074 Würzburg. E-mail: marius.mayer@uni-wuerzburg.de.

on hiking tours in the back country of the national park that visitors are directly exposed to areas with dead wood. The visual transformation effected by the bark beetle confronts visitors with a new, unfamiliar type of forest image: instead of the usual dark green of commercially-managed forests the visual field is dominated by the grey of standing or lying dead trees (see Fig. 3). Visitors respond in completely different ways to this view. Reactions range from surprise, shock or anger to fascination and marvel.

The radical transformation of the visual forest imagery by the bark beetle prompted concerns within the local population about negative impacts on tourism. Some residents argue that visitors could be deterred by the unaesthetic visuality of the vast dead wood areas and are not able to enjoy their stay. The present survey therefore seeks to answer twoquestions:

- What are visitors' attitudes towards bark beetle infestation and management in Bavarian Forest National Park?
- What are implications for beetle management strategies?

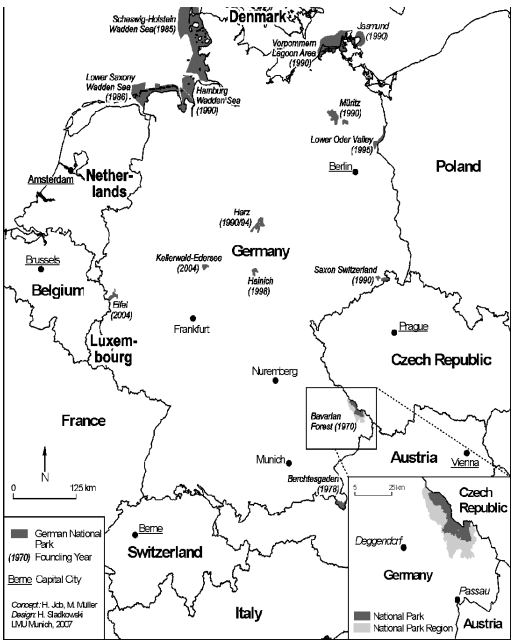


Fig. 1: German national parks and location of Bavarian Forest National Park

2 Research Design

Research design was chosen to enhance cross-study comparability with existing literature on the perception of bark beetles. Relevant previous studies were conducted in Bavarian Forest National Park in 1997 and 2001 [4], [5] and in several locations inside and outside of protected areas in North America (especially [6], [7] but also [8], [9]). Face-to-face on-site interviews were carried out in the summer of 2007 during weekdays and weekends. Of a total of 783 contacts 617 questionnaires were completed by the interview team of which 608 were valid (N = 608, rejection rate 21.2 %).

Because appreciation of the national park potentially influences visitors' attitude towards the bark beetle, we introduced a distinction between two types of visitors to test for this hypothesis: national park tourists and traditional tourists [10]. National park tourists rate the importance of the national park for their trip as high and very high and state that they would not or maybe not have come here if it did not exist (n = 173). Traditional tourists, on the opposite, rate the importance of the national park for their trip as low and very low and state that they would have come here, even if the national park did not exist (n = 246).

3 Results

3.1 Visitor attitudes towards the bark beetle

To evaluate the attitudes towards the bark beetle the arithmetic mean of eight attitudinal items was calculated (Fig. 2). On a Likert scale from -2 to +2 the most negative attitude is -2, a neutral attitude 0 and +2 the most positive attitude. On average, visitors had a neutral attitude towards the bark beetle in Bavarian Forest National Park (arithmetic mean M = 0.0, standard deviation σ = 0.9), yet evaluations vary for different statements. 29 % of respondents

each show a firmly negative and firmly positive attitude (M < -0.5 resp. M > +0.5), whereas 41 % of respondents have a balanced attitude towards the bark beetle (-0.5 < M < +0.5).

National park tourists have a significantly more positive attitude towards the bark beetle than traditional tourists for all items except for their evaluation of the beetle's impact on tourism (Fig. 2). They regard the bark beetle as less detrimental to forest rejuvenation and tend to concede a right to exist for the insect within the boundaries of the national park. Traditional tourists see the bark beetle as a threat to the health of forests and rate it as detrimental to the forest in the national park. It is probably for this reason that traditional tourists tend to somewhat support controlling the bark beetle (M = -0.1, σ = 1.4), whereas national park tourists clearly reject such a measure (M = 0.6, σ = 1.3).

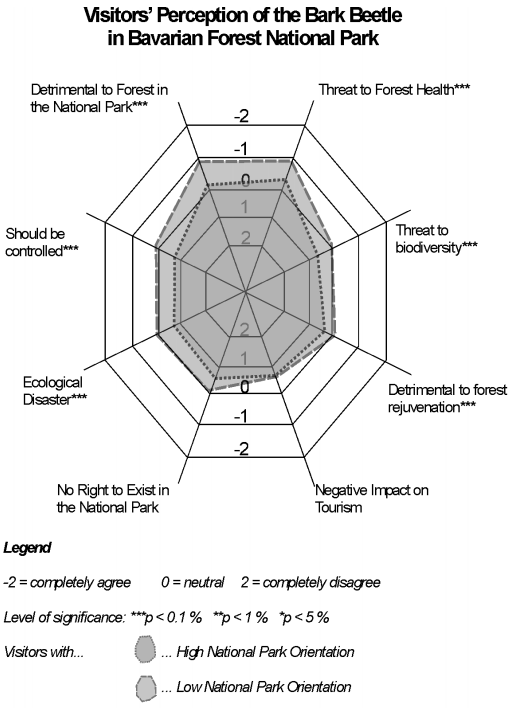


Fig. 2: Differences in the perception of the bark beetle in Ba-va-rian Forest National Park by visitor type (positive statements inverted).

3.2 Visitor attitudes towards controlling the bark beetle

Attitude towards controlling the bark beetle shows a relatively even distribution across the five answer categories. On average there exists a slight preference for non-intervention (M = 0.2, σ = 1.4). But what factors drive support of non-intervention? Table 1 shows the results of a statistical model with potential factors of influence. Model 1 includes the attitude towards the bark beetle as an explanatory variable for the attitude towards controlling the bark beetle. As expected, the correlation between the attitude towards the bark beetle and the attitude towards control are highly correlated: the more positively visitors assess the bark beetle, the weaker is their support for controlling it. The only other significant variables in this regression model are expectation of recovery and personal issue salience: if respondents expect a rejuvenation of the infested forest patches and if the outbreaks are of a low importance to them, they tend to reject beetle management.

A second model was estimated without the attitude towards the bark beetle as an explanatory variable (Model 2, Table 1). This model has a considerably higher number of significant predictors. Issue salience and recovery still have the strongest correlation with the attitude towards control. Similarly, a higher level of education and better subjective knowledge about the bark beetle correlate positively with the attitude towards control as do a high national park orientation and a pro-environmental worldview. A weak correlation with the number of visits can be found: support for management intervention increases as the number of repeat visits increases. Variables like the age or the sex of respondents, urban residence or the distance of respondents' residence to the national park do not act as significant predictors.

TABLE 1

Factors influencing visitors' attitudes towards controlling the bark beetle

Independent Variables	Standardised β-oefficients	
	Controlling the Bark Beetle (N = 572)	
	Model 1 with „attitude“	Model 2 without „attitude“
Age	0.01	-0.01
Sex (1=male)	0.02	0.04
Education	0.06	0.15***
Urban Residence	0.04	0.03
Distance	-0.06	-0.09
Duration of Stay	0.01	0.02
Number of Visits	-0.07	-0.09*
Intensity of Perception	-0.03	-0.04
Environmental Worldview	0.04	0.10**
National Park Orientation	0.06	0.13***
Issue salience	-0.09**	-0.23***
Subjective knowledge	0.02	0.15***
Recovery (1 = rejuvenation)	0.09**	0.25***
Correct Cause (1 = bark beetle)	0.03	0.04
Attitude towards Bark Beetle	0.61***	—
R2 (adjusted)	0.52	0.26
F	30.1**	11.0**

Level of significance: *** < 0.1 %. ** < 1 %. * < 5 %
Results of OLS regression with "attitude towards controlling the bark beetle" as dependent variable.

4 Discussion

Survey respondents in Bavarian Forest National Park show a balanced attitude towards the bark beetle and a slight tendency towards rejecting measures to control it. Attitudes towards controlling the bark beetle are mainly driven by the expected development of dead wood areas, the subjective knowledge about the bark beetle and the role of the national park. These factors could be influenced directly by the park management by way of public relations and environmental education. Our results suggest that it is important for visitors to be reassured that bark beetle infestations do not harm nature or inflict irreversible damage on ecosystems. Intensified education of visitors about the role of the bark beetle as a naturally occurring organism in spruce forests can foster acceptance. Expecting or perhaps even experiencing firsthand the rejuvenation of dead wood areas can equally contribute towards an enhanced understanding of the natural processes following bark beetle infestations.

The relatively open-minded attitude towards the bark beetle, especially as compared to similar surveys in other countries [7], is also reflected in respondents' opinion that dead wood areas do not negatively affect tourism. Similarly, previous research in the Swiss National Park [11] indicates visitors are quite able to appreciate the characteristics of a natural-state forest without management. It should be of particular interest to national park management that visitors' affinity to the national park and also to the idea of national parks as refuges of nature crucially influences the attitude towards the bark beetle. Visitors who display a strong orientation towards the national park have a significantly more positive attitudinal profile: they disapprove of controlling the bark beetle and do not regard it as an ecological catastrophe.

In order to foster visitors' acceptance of the bark beetle it is mandatory to actively position the national park - with its conservation mandate - as an attraction for tourists. The ordinary landscapes of commercially-managed forests, as they are found all over Germany, cannot be the unique selling proposition of a national park. Quite to the contrary, the label "national park" promises something special. If, as social psychology suggests, tourism functions through an experience of contrast and difference, it is only logical to give up the ordinary forest imagery in favour of the rough, rugged landscapes produced by the bark beetle. It is crucial, however, for national park management to communicate to visiotrs this new, dynamic concept of nature and nature conservation - of wilderness [12].

Fig. 3: Aerial view of area affected by spruce bark beetle (Ips typographus) in Bavarian Forest National Park. Mount Lusen is on the right.

NB: The results presented in this short paper are the outcome of a research project funded by Bavarian Forest National Park. As they have been significantly abridged and are in a preliminary stage, this contribution is not appropriate for citation. If interested in a full analysis, a working paper [13] and the research report [14, in German] can be obtained from the first author upon request.

REFERENCES

[1] IUCN, "Guidelines for protected area management categories", Gland, 1994.

[2] M. Heurich, A. Reinelt, L. Fahse, „Die Buchdruckermassenvermehrung im Nationalpark Bayerischer Wald", Nationalparkverwaltung Bayerischer Wald (ed.), *Waldentwicklung im Bergwald nach Windwurf und Borkenkäferbefall* (= Nationalpark Bayerischer Wald Wissenschaftliche Reihe 14), Grafenau, pp. 9-48, 2001.

[3] Job, M. (ed.), *Die Destination Nationalpark Bayerischer Wald als regionaler Wirtschaftsfaktor.* Grafenau, 2008.

[4] M. Suda, E. Feicht, „Wahrnehmung, Bewertung und Konsequenzen großflächig abgestorbener Bäume im Bereich des Nationalparks Bayerischer Wald aus der Sicht von Touristen", München, 2002.

[5] M. Suda, B. Pauli, „Wahrnehmung und Bewertung großflächig abgestorbener Bestände im Nationalpark Bayerischer Wald", München, 1998.

[6] B.L. McFarlane, R.C.G. Stumpf-Allen, D.O. Watson, "Public perceptions of natural disturbance in Canada's national parks: the case of the mountain pine beetle (Dendroctonus ponderosae Hopkins)." In: *Biological Conservation*, vol. 130, no. 3, pp. 340-348, 2006.

[7] B.L. McFarlane, D.O. Watson, "Perceptions of ecological risk associated with mountain pine beetle (Dendroctonus ponderosae) infestations in Banff and Kootenay National Parks of Canada", *Risk Analysis*, vol. 28, no. 1, pp. 203-212, 2008.

[8] C.G. Flint, R. Haynes, "Managing forest disturbances and community responses: lessons from the Kenai Peninsula, Alaska", *Journal of Forestry*, vol. 104, no. 5, pp. 269-275, 2006.

[9] C.G. Flint, A.E. Luloff, "Community activeness in response to forest disturbance in Alaska", *Society & Natural Resources*, vol. 20, no. 5, pp. 431-450, 2007.

[10] H. Job, "Estimating the regional economic impact of tourism to national parks", GAIA, vol. 17, S1, pp. 134-142, 2008.

[11] M. Hunziker, "Totholz in den Nationalparkwäldern: Attraktion oder Störfaktor?" [Dead wood in national park forests: attraction or nuisance?], *Cratschla*, vol. 3, pp. 2-8, 1997.
[12] J.D. Shultis, P.A. Way, "Changing conceptions of protected areas and conservation: linking conservation, ecological integrity and tourism management", Journal of Sustainable Tourism vol. 14, pp. 223-237, 2006.
[13] M. Müller, H. Job, "Managing natural disturbance in protected areas: visitors' attitudes towards the bark beetle in a German national park". Working paper.
[14] M. Müller, M. Mayer, and H. Job, "Totholz und Borkenkäfer im Nationalpark Bayerischer Wald aus touristischer Perspektive", Die Destination Nationalpark Bayerischer Wald als regionaler Wirtschaftsfaktor, H. Job, ed., Grafenau, pp. 98-114, 2008.

Managing Soundscapes in National Parks: an adaptive management approach in Muir Woods National monument, California

Peter Newman, Robert E. Manning, Kurt Fristrup

Abstract — Research in national parks has begun to address the issue of human-caused noise and its resource and social impacts. This paper reports the results of a study conducted in the summer of 2007 that tested the efficacy and acceptability of management actions designed to reduce visitor-caused noise The study used an experimental or "adaptive" management" approach designed to test the effectiveness of temporal and spatial zoning to protect natural quiet in Muir Woods National Monument, California, an old growth redwood forest. The adaptive management experiment consisted of two treatments and an associated control. During all three periods, visitor-caused noise was recorded at a fixed location in the park and a visitor survey was conducted. The first treatment tested the effectiveness of a spatial zoning approach by establishing a "quiet zone" in Cathedral Grove through a series of park signs. The second treatment tested the effectiveness of a temporal zoning approach by establishing "quiet days" throughout the park through a series of park signs. The control period included neither of these treatments. Study findings indicate that both the "quiet zone" and "quiet day" treatments were effective in lowering the level of visitor-caused noise in the park as measured during the control period, and that visitors were highly supportive of these management actions.

Index Terms — Soundscapes; visitor-caused noise; adaptive management; Muir Woods National Monument; national parks.

Peter Newman Assistant Professor, Dave Stack, MS Candidate, Department of Human Dimensions of Natural Resources, Colorado State University, Fort Collins, CO 80521, Email: pnewman@cnr.colostate.edu

Robert E. Manning, Professor, Rubenstein School of the Environment, University of Vermont, Burlington, VT

Kurt Fristrup Senior Scientist,Natural Sounds Program, U.S. National Park Service, Fort Collins, CO.

The impact of ecotourism on vegetation cover in Almaty Nature Reserve

Dilya B. Woodward, Lucy Bastin

Abstract — The results of a pilot research project to assess the impact of ecotourism on vegetation cover in Almaty Nature Reserve, Kazakhstan, are presented in this paper. Geobotanical, GIS, ground truth and statistical methods were used. The results proved that significant differences existed between the species richness, vegetation condition, vegetation cover and the mean height of grass stands in experimental quadrats compared to the control quadrat. The recommendations include strategies to mitigate the impact of ecotourism on vegetation in the Reserve.

Index Terms — Kazakhstan, Almaty State Nature Reserve, ecotourism, impact on vegetation.

1 Introduction

Almaty Nature Reserve, IUCN category 1a, was founded in 1964 and occupies a territory of 71,700 ha on the northern slope of Transili Alatau, one of the Tian Shan mountain ranges. The main purpose of the foundation and existence of the Reserve is to protect natural mountain complexes of the Transili Alatau, including its flora and fauna. The secondary purpose is conducting research on natural processes occurring in these complexes. Flora of the Reserve includes 1,100 species of higher plants, more than 50 species of rare plants including 26 listed in the Red Data Book of Kazakhstan, a publication similar to an endangered species list. Abundant species include wild apricot trees (Armeniaca vulgaris), Sivers' apple trees (Malus Sieversii), Kolpakovskiy tulips (Tulipa kolpakovskiana) etc. Fauna diversity is very rich with 2,000 species of identified invertebrates and 255 vertebrates, including 3 fish species, 2 amphibians, 6 reptiles, 177 birds and 42 mammals. Mammals include the Tian Shan brown bear (Ursus arctos isabellinus), snow leopard (Uncia Uncia) and stone marten (Martes foina) [1], [2]. The Reserve is an attractive destination from an ecotourism perspective due to its rich biodiversity, pristine ecosystems and proximity (25 km) to major metropolis of Almaty with its modern tourism infrastructure and international airport.

The impact of recreation and tourism on plants is well-studied in North America, Europe and Australia (e.g. Cole [3], Buckley [4], Bayfield [5], Liddle [6], Newsome, Moore and Dowling [7], Turton [8] to name just a few). However, in CIS countries, Kazakhstan in particular, there is a limited amount of research conducted on this issue. Kazanskaya [9] has identified and described 5 stages of recreational degradation of plants. Anthropogenic

D.B. Woodward is with the Institute of Geography, Almaty, Kazakhstan. E-mail: dilyara@alum.rit.edu
Dr. L.Bastin is with the School of Engineering and Applied Science, Aston University, United Kingdom. E-mail: l.bastin@aston.ac.uk

influence has also been noted in central European reserves, most notably the Karadagskiy and Mys Martyan Reserves, Ukraine [10], where high numbers of anthropophilous and introduced plant species are observed (41.5% and 58.8% of reserve floras, respectively) demonstrating significant abnormalities in aboriginal plant communities.

2 Materials and Methods

In order to study the impact of ecotourism on vegetation cover in Almaty Nature Reserve, four experimental quadrats, each measuring 1m x 1m, were placed within an "ecocamp" site. At the site, 125 ecotourists (children and students) were accommodated, causing 24-hour recreation pressure for the duration of one month. The ecocamp has been held in the same location for 3 consecutive years. The same area was used by mountaineers and other visitors for 30 years prior to that, so an assessment of its sensitivity is vital for reserve management. One control quadrat was selected, using GIS layers derived from DEMs, satellite imagery and historical survey of the park, as representative of the geobotanical conditions within the ecocamp area. This quadrat had a comparable flora, both in terms of species assemblage and habitat condition, to the ecocamp area before ecotourism began. Seven days before the start, and seven days after the ecocamp, all quadrats were marked, measured, and photographed. All plant species were identified and projective cover was estimated for every species. The control quadrat was not physically impacted by visitors. Quadrat 1 was located at the side of the camp and was subjected to a *medium* degree of trampling, as was quadrat 3. Quadrat 2 suffered a *weak* degree of trampling, and quadrat 4 a *strong* degree of trampling, since it was located right in the middle of the campsite, where meals and outdoor games took place.

Assessment of species condition was conducted on a three-point scale, as follows: 'good' – the plant is in healthy condition, flowering and fruiting as expected; 'satisfactory' – plant growth is visibly suppressed with weak flowering and fructification; 'poor' – the plant is in extremely poor condition with only vegetative reproduction.

3 Results

TABLE 1

STATUS OF CONTROL QUADRAT ON 24TH OF JULY, 2007. MEAN HEIGHTS IN ALL TABLES ARE IN CM.

Plant species	Mean height	Cover, %	Species condition
Dactylis glomerata	105	20	good
Helictotrichon pubescens	75	15	good
Carex sp.	40	10	good
Origanum vulgare	58	5	good
Crepis sibirica	100	5	good
Geranium pratense	55	15	good
Trifolium pratense	32	5	good
Orobus luteus	105	1	good
Geranium rectum	40	5	good
Alchemilla sp.	23	1-3	good
Prunella vulgaris	30	1	good
Taraxacum officinale	20	5	good
Urtica dioica	25	single	good
Ranunculus sp.	50	single	good
Vicia sp.	90	1-3	good
Polemonium caucasicum	65	single	good
Euphorbia sp.	32	single	good
Lamium album	77	single	good
miscellaneous herbs (not identified)	25	single	good
	30	single	good

Vegetation in the control quadrat (Table 1, Fig. 1) comprised 100% projective vegetation cover, composed of 60% graminoid and 40% mixed herb species. There were 20 species altogether, and no change in projective cover was noted across the study period.

Fig. 1. Control quadrat. Graminoid and mixed herb plant community in mid-mountain forest-meadow zone, absolute heights 1200-2600 m. July, 2007. All photos - Woodward D.B.

TABLE 2

Survey data for quadrat 1. For all tables, 'a' denotes 'before ecotourism. 'b' denotes 'after ecotourism'

	Plant species	Mean height	Cover, %	Species condition
a	*Plantago major*	19	40	average
b		6	30	poor
a	*Polygonum aviculare*	6	20	good
b		4	1	poor
a	*Poa pratensis*	12	single	average
b		10	single	average
a	*Potentilla reptans*	10	10	average
b		4	3-5	poor
a	*Taraxacum officinale*	5	5	average
b		5	25	poor
a	*Achillea sp.*	10	5	average
b		5	1	poor
a	*Fragaria vesca*	6	5	poor
b		–	0	–

TABLE 3

Survey data for quadrat 2

	Plant species	Mean height	Cover, %	Species condition
a	*Potentilla reptans*	9	20	average
b		9	0	average
a	*Trifolium pratense*	18	20	average
b		16	10	average
a	*Poa pratensis*	14	20	average
b		10	70	average
a	*Geranium sp.*	10	5	average
b		–	0	–
a	*Alchimilla sp.*	5	20	average
b		11	5	average
a	*Plantago major*	17	15	average
b		12	5	average

TABLE 4

Survey data for quadrat 3

	Plant species	Mean height	Cover, %	Species condition
a	*Poa pratensis*	15	90	average
b		9	90	average
a	*Trifolium repens*	15	10	poor
b		10	< 1	poor
a	*Stellaria sp*	7	single	average
b		7	single	average

TABLE 5

Survey data for quadrat 4

	Plant species	Mean height (cm)	Cover, %	Species condition
a	*Poa pratensis*	7	30	average
b		3	20	poor
a	*Trifolium repens*	1.5	5	poor
b		1	single	poor
a	*Taraxacum officinale*	10	25	average
b		7	20	poor
a	*Plantago major*	8	single	poor
b		5	single	poor
a	*Achillea sp.*	3	sinlge	poor
b		2	Single	poor

Quadrat 4 (Figs. 2 and 3) consisted of a ruderal plant community, with only 5 species identified and counted before the start of camping season. The quadrat was subjected to a strong degree of trampling, but, as in quadrat 3, no species were actually lost during the study period. However, in quadrats 1 and 2 the number of species decreased by 1.

Fig. 2. Quadrat 4 during the ecocamp.

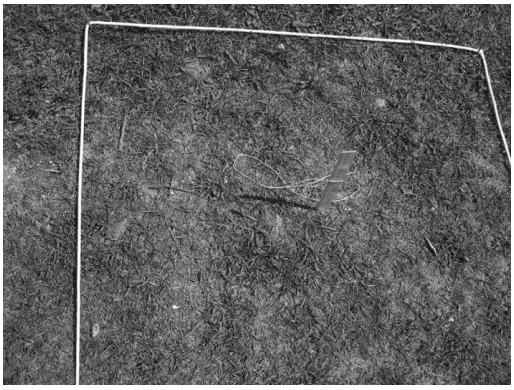


Fig. 3. Quadrat 4 after the ecocamp activities.

Total projective vegetation cover in the trampled quadrats was universally reduced by tourism pressure, as follows: quadrat 1 - 85% to 60%: quadrats 2 and 3 - 100% to 90%: quadrat 4 - 60% to 20%.

All species in the control quadrat remained in good condition throughout. In quadrat 1, which suffered medium trampling, initial species condition was 15% good, 70% average, 15% poor, but showed a decline after camping to 0% good, 17% average and 83% poor. In quadrat 2 (weakly trampled), all species were initially in average condition and in quadrat 3 (medium trampling) 66% of species were in average condition and 34% in poor – no significant change was observed in either quadrat after the camping visit. In quadrat 4, the most strongly trampled quadrat, 40% of species were initially in average condition and 60% poor - after camping, all species had declined to a poor state. Severe mechanical damages to vegetation were noted with all species in a highly depressed state.

A general decline in vegetation height was observed in trampled quadrats (see Table 6) with mean height of grass stands in the control quadrat exceeding the experimental quadrats by 43.8 cm at the end of the study.

TABLE 6

MEAN HEIGHT OF GRASS STANDS IN ALL FIVE QUADRATS BEFORE (A) AND AFTER (B) THE ECOCAMP

	Quadrat	Mean height (cm)
a	*Quadrat 1*	9.7
b		5.7
a	*Quadrat 2*	12.2
b		8.7
a	*Quadrat 3*	12.3
b		8.7
a	*Quadrat 4*	5.9
b		3.6
a	*Control*	53.85

4 CONCLUSION

Significant differences existed between experimental and control quadrats even before the start of the ecocamp, implying that ecotourism activity over the past 30 years has led to declines in species richness, vegetation condition and projective cover. The mean height of grass stands in experimental quadrats was greatly reduced, reflecting

a shift from native grass meadow to ruderal communities. Within the 6-week study period (during which mean vegetation height in the undisturbed quadrat increased by 20%, with no change in species number or vegetation condition) the trends noted above were exacerbated in all experimental quadrats. Based on the long-term and short-term comparisons, the rate of extinction of aboriginal species in Almaty Nature Reserve was estimated at 0.47 species per year.

It was also observed that quadrats 3 and 4, whose species communities were more characteristically ruderal, were more robust to species loss across the study period, though overall species condition was still damaged by recreation pressure. The implication, again, is that over a long period of tourism activity, these areas have already lost species which are most susceptible to trampling pressure. The total projective cover decreased in all experimental quadrats, with the highest decrease noted at the most strongly trampled site. The biggest changes were noted in condition of species, where strong trampling has caused consistent decline. Therefore, both long-term and short term ecotourism activity cause changes in the number of species, projective cover, mean heights of grass stands and species condition.

Hammitt & Cole [11] point out that control of visitor numbers will naturally fail to reduce ecological pressure while site access remains unrestricted. In fact, visitor numbers in Almaty Reserve are likely to rise in coming years, increasing the pressure on the camp site. If vegetation at the ecocamp site is to recover, some rotation or 'resting' of sites will be required. It is, therefore, proposed that future ecotourists be accommodated in the town of Talgar, while still participating in hikes along ecotrails within the Reserve. Alternatively, the ecotrails could be equipped and maintained in the same way as trails in American/Australian/Canadian/European national parks. The wooden coverings of the reserve's ecotrails would help to prevent erosion and mitigate trampling. Further studies on anthropogenic tolerance of different species, their biomass and spatial distribution changes under the impact of ecotourism in the given protected territory are recommended.

The authors express their gratitude to Dr. Ivashenko A.A. for her valuable consultations and advice.

References

[1] A.D. Dzhanyspayev, "Almaty Reserve," *Nature Reserves and National Parks of Kazakhstan,* Ivashenko A.A., Almaty: Almatykitap, pp. 64-81, 2006. (А.Д. Джаныспаев "Алматинский заповедник», *Заповедники и Национальные Парки Казахстана,* Иващенко А.А., Алматы: Алматыкітап, стр. 64-81, 2006.)

[2] A.A. Ivashenko, *Treasures of Flora of Kazakhstan. Through the pages of the Red Data Book*. Almaty: Almatykitap, 2005. (Иващенко А.А. *Сокровища растительного мира Казахстана. По страницам Красной книги*. Алматы: Алматыкітап, 2005.)

[3] Cole D.N., "Estimating the susceptibility of wildland vegetation to trail-side alteration," *Journal of Applied Ecology*, vol. 15, no. 4, pp. 281-286, 1978.

[4] Buckley, R.C., "Environmental impacts," *The Encyclopaedia of Ecotourism*, D. Weaver, ed., Oxford: CAB International, pp. 379–394, 2001.

[5] Bayfield N. G., "Recovery of four montane heath communities on Cairngorm, Scotland, from disturbance by trampling," *Biological Conservation*, vol. 15, pp. 165–179, 1979.

[6] M.J. Liddle, "A selective review of the ecological effects of human trampling on natural ecosystems," *Biol. Conserv*., vol. 7, no 17, p. 36,1975.

[7] D. Newsome, S.A. Moore and R. K. Dowling, *Natural Area Tourism: Ecology, Impacts and Management.* Sydney: Channel View Publications, 2002.

[8] S.M. Turton, "Managing environmental impacts of recreation and tourism in rainforests at the Wet Tropics of Queensland World Heritage Area," *Geographical Research*, 43, pp.140-151, 2005.

[9] N.S. Kazanskaya, "The Study of Recreation Digression in Natural Plant Groups," *Transactions of Academy of Sciences of USSR.* Geography series, 1972. (Н.С. Казанская, "Изучение рекреационной дигрессии естественных группировок растительности," *Известия АН СССР. Серия географическая*, 1972).

[10] L.P. Mironova, Yu.D. Nykhomovskaya, "Results And Issues in Phytodiversity Preservation in Karadagskiy Nature Reserve of the National Academy of Sciences of Ukrain," Pontida: 2000 N2. (Миронова Л.П., Нухимовская Ю.Д., "Итоги и

проблемы сохранения фиторазнообразия в Карадагском природном заповеднике НАН Украины ," Понтида: 2000 N2).
[11] W.E. Hammit & D.N. Cole, *Wildland recreation: Ecology and management*. New York: John Wiley & Sons, 1998.

Dilya B. Woodward B.S. in Tourism, summa cum laude, 1996, Almaty State University; M.S. in International Tourism, summa cum laude, 1998, Almaty, State University; M.S. in Hospitality-Tourism Management, summa cum laude, 1999, Rochester Institute of Technology. She is a winner of a full President's scholarship for graduate studies in the US. Woodward served in National Company "Silk Road – Kazakhstan", lectured at the Kazakh Academy of Sports and Tourism, since 2005 until present is a PhD student at the Institute of Geography, Kazakhstan. D. Woodward has 12 publications with primary research focus on landscape science, ecotourism, carrying capacity and protected areas, including one monograph on ecotourism carrying capacity assessment in Almaty Nature Reserve. Latest research interests include biology and ecology of snow leopard *(Uncia uncia)*.

Lucy Bastin (BSc. in Zoology, 1991, MSc in GIS, 1995, PhD in Ecology, 1996) is a Lecturer in GIS and Environmental Science at Aston University. After a PhD on urban plant metapopulations, and research into fuzzy classification / uncertainty visualisation at Leicester University, she spent 3 years as a GIS software developer. Her current research interests include Web Processing Services for automatic interpolation, the incorporation of uncertainty into reserve design algorithms and spatial epidemiology.

MMV4 PROCEEDINGS
LOCAL COMMUNITY

Right or responsibility? Local people as 'visitors' in protected areas on the south coast of Western Australia

Amma Buckley

Abstract — The environmental impact of local people recreating in nature is an under-studied aspect of protected area management. A recent review of nature-based recreation was undertaken in regional south-western Australia. Surrounded by an array of protected areas — including a national park with World Heritage status — the local residents of this remote Western Australian location have relatively unrestricted access to a variety of protected landscapes. A recent mineral resources boom in Western Australia has heralded a return to mining in the area, accompanied by a considerable population increase — both as itinerant and permanent miners. For local people and environmental managers alike, this influx has raised concerns about the carrying capacity of this fragile ecosystem to sustain the wilderness recreation activities of the newly arrived mining community. This paper draws on evidence gathered from a study commissioned by the regional environmental authority and outlines the extent to which local people, both long term and recent arrivals can be considered 'visitors' to these protected places.

Index Terms — Australian protected areas, local people, passive and active nature-based recreation, remote areas.

1 Introduction

Local people have become a persistent theme in discourses on protected area management. For the past decade, social dimensions — particularly the idea or ideal of local participation and/or community involvement — have become more prominent in conservation science [1]. Likewise, there is a growing awareness that 'place' nuances the relationship between people and the landscape [2]. Importantly, literature examining local custodians and protected areas focuses on indigenous knowledge and rights as well as the traditional subsistent activities in national parks, often associated with Asian and African nations [3]. Less evident is the examination of local people as nature-based recreators in protected areas. Collecting baseline data on particular numbers of people, activities, frequencies, equipment, management regimes and, seasonal variations in particular ecosystems and environments marks an important reference point for ongoing impact assessment [4]. This paper examines the particularities of local people in nature-based recreation in a remote Australian community. Commencing with a brief overview of the place central to the discussion, the paper outlines the methodology, summary of selected results and implications.

The Shire of Ravensthorpe is 13,000 sq. km. and located 550 kilometres south-east of Perth in the State of Western Australia (WA). It sits within the Fitzgerald Biosphere Reserve (FBR) containing the Fitzgerald River National Park with World Heritage status. While characterised as agricultural heartland, the Shire has a history of mining, scaled back since the 1960s with low level mining exploration continuing unabated. One-third of the Shire's area is farming communities, predom-

Amma Buckley is with the Alcoa Research Centre for Stronger Communities, Curtin University of Technology, Perth 6845, Western Australia, Australia. E-mail: A.Buckley@ curtin.edu.au.

inantly broad acre farming and wool production. The remaining two-thirds of the Shire's area is set aside for nature parks and nature reserves — essentially biodiversity hotspots within what is Australia's only internationally recognized hotspot [5] — including over one hundred kilometres of coastal reserve [6]. For both locals and visitors this constellation of south coast protected areas showcases a unique yet fragile Mediterranean ecosystem. Recent land-use changes and ensuing population increases have sparked concerns about the sufficiency of protective arrangements.

A central objective of a biosphere is that people living within the reserve develop sustainable resource use practices. Complicating this objective is recent land use change, namely mining and the identified pressures arising from nature-based recreation, particularly by a newly arrived workforce. In this remote rural setting, resurgence in mining has precipitated a pull factor resulting in a significant population increase of both itinerate (fly-in-fly-out) and permanent (on-site) miners and their families. In the past three years, this has led to a 25 per cent increase in population from around 1,400 in 2001 to 1,950 in 2006 [7] and corresponding infrastructure development associated with both mining and in-migration. A common perception is that these in-migrants lack both an attachment to place and the knowledge to manage impacts of their recreational activities. Although there are landscape scale concerns about mining, long term residents and natural resource managers question the carrying capacity of this fragile environment to sustain the nature-based recreation incursion of this temporary population.

Mining in Australia is in a prosperous phase with high demand and expectations of capitalising on the mineral resources boom. To date, much of Australia's minerals exploration and mining has been at the level of 'low hanging fruit' or relative ease of access. However, as these resources are rapidly depleting, exploration is moving into more fragile and complex environments with resultant social and environmental impacts as mirrored in this study site. The lucrative nature of the mining industry lends itself to images of the 'cashed up miner' with the latest sports utility vehicle (SUV) free wheeling into unsettled parts of the Shire. Such concerns are somewhat compounded by a regional protected area management characterised as 'passive' and under-resourced, largely confined to fire regime and disease management [8] and with limited capacity to monitor visitor impacts.

This study establishes a social baseline of local people and nature-based recreation with the aim of contributing to a broader understanding of the impacts of land use change on protected area management.

2 Methodology

Data were collected using a community-as-researcher methodology, an approach that recruits local people to assist in the design and delivery of a community survey. This was undertaken from November 2007 to January 2008. Informed by a participatory action framework, this approach — known as the Balingup model — incorporates a group of locally identified people who undertake training to administer a survey to fellow community members [9]. A key component of the model is the role these local researchers play in the development of the survey instrument, ensuring input of local knowledge and context. Community researchers agree to survey a quota of respondents representing a cross section of key stakeholder interests. This sampling method, described as respondent driven or social networks sampling [10], captures the views of local people broadly and includes identified stakeholder groups, for example, farming, mining, off-road trail bike riding or tourism. Table 1 (below) provides an overview of these stakeholders. Importantly, this type of sampling approach serves as a 'snapshot' of a selection of the community.

TABLE 1

SUMMARY OF STAKEHOLDERS AND ACTIVITIES

Local residents - Geographical areas specifically targeted include: towns, smaller townships and farming communities within Ravensthorpe Shire.
Active wilderness recreational groups – horse riding, formal and informal motor bike riding, 4WD driving, camping and mountain biking.
Passive wilderness recreational groups – wildflower viewing, bushwalking, bird watching, photography and botanical study.
Tourism – local businesses, local promotion group, tour operators and geological excursions.
Economic interest groups – local businesses, farming, mining and apiarists.
Environmental interest groups – Flora and fauna groups, Friends of the Fitzgerald, NRM networks and scientific community.

Source: Williams et al 2008 [11]

3 RESULTS

This section includes a summary of findings relating to relationships with the environment, range and frequency of both passive and active wilderness activities, associated values, threats and possible impact mitigation.

One hundred and eighteen respondents completed the survey, representing ten per cent of the Shire's overall population. Of interest, twenty seven per cent of this sample have moved into the area within the past three years. These respondents chiefly describe their occupation as mining or mining affiliated. When the top three occupational classifications — agriculture (18%), mining (13%) and natural resource management (NRM) (12%) — form part of a cross sectional profile, including length of time in the area, what emerges are some distinct differences particularly in the domains of relationships, attitudes, activities and actions in the natural environment.

The survey instrument contains a list of statements about relationships with the natural environment. Not surprisingly, agriculturalists figure dominantly in statements around management and livelihood relationships associated with the land. However, this group also highly rate statements such as 'I see myself as a custodian or a carer of the environment', 'I study the natural environment' and 'I appreciate the natural beauty'. Survey respondents working in NRM also rate their role as 'custodian or carer' highly. The statement, 'I recreate in natural areas' is the strongest relationship identified by the mining sector.

Questions about activities establish the type, scope and frequency of local residents' nature recreating within the Shire. These are separated into passive and active activities due to impact factors (see Table 1). Ranked passive nature recreation activities are wildflower viewing, bush walking, visiting the National Park and bird watching. These activities are most commonly undertaken in protected areas, although bushwalking and bird watching are reported in various landscapes. The identified frequency of passive recreational activities is regularly (daily or weekly). For active recreational activities, four wheel driving (4WD) and off-road motor biking are the most frequently identified, followed by camping. Importantly, access into many protected areas in the region is via unsealed roads necessitating off-road vehicles usage irrespective of season. Likewise many beaches in the area are accessible by 4WD only and in some locations this includes driving on the beach. Off-road motor biking and 4WD are generally undertaken often (fortnightly to monthly) while camping occurs occasionally (annually). In assessing the activities by length of time in the Shire, for newly arrived residents wildflower viewing is the lead passive activity, while 4WD is the dominant wilderness activity and visiting the beach, the leading coastal activity. For longer term residents, bushwalking is the highest ranked passive activity, while the dominant terrestrial activity is camping and coastal activity is visiting the beach.

Values associated with the environment within the Shire are grouped into four categories i.e. natural, visual, social and economic aspects. All survey respondents prioritise

natural values over the remaining categories. Significantly, recent arrivals assign as their highest values 'unlimited recreational opportunities' followed by 'future mining discoveries' while for longer term residents the values of 'personal connection to the area' and 'childhood memories' dominate. This finding suggests that for new arrivals the natural environment has a consumable quality, while for longer term residents its significance is more intrinsic.

Perceived threats to protected areas vary depending on the length of time respondents have lived in the Shire. Short term residents consider the greatest threats to the environment to be 'farming', 'land clearing' and 'lack of environmental management'. 'Overuse' is considered the greatest threat by longer term residents, followed by 'increased traffic' and 'too many tourists'. Interestingly, the exercise of prioritising threats to the environment reveals the under-lying tension and divisiveness linked to land use and land use change for this community.

The final aspect draws on the survey's qualitative responses to investigate ways to ameliorating environmental impacts. Responses range from maintaining the status quo to imposing restrictions on access and activities as a measure of protection. Strong concern is expressed by local people to the possibility of being 'locked out' of protected areas. This is contrasted with high levels of agreement for minimising, controlling and monitoring visitors in particular areas — in essence a 'them' and 'us' binary. A middle road is to educate people while introducing reasonable measures to minimise impact such as limiting access during the rainy season to prevent the spread of fungal dieback (*Phytophthora Cinnamomi*). Dieback is a soil-borne pathogen chiefly spread through transport of infested soil which adheres to vehicles and heavy machinery [12].

Evident is a concern for workable solutions involving the community, just as local people don't want to be shut out of the park they don't want to be excluded from consultation. As Bushnell (2003) [13] argues, denying use of resources and avenues of participation to local people severely reduces their incentives to conserve.

4 Conclusion

The results of the study confirm an active recreating community participating in and deriving pleasure from an array of nature-based pursuits. There is considerable evidence to confirm anecdotal claims that the newly arrived population is highly engaged in both passive and active activities, taking advantage of few restrictions on access to protected areas. What is less clear is their understanding of the environmental affects of recreating and their willingness to increase their awareness. While longer term residents claim a stewardship role of the natural environment, they too are engaged as nature recreators, albeit in chiefly low impact activities. There does appear, however, to be an under-reporting of active wilderness activities, especially four wheel driving, which may in part be due to the normalising of off-road transportation rather than a form of recreation. If there are established rules and norms about exploring the local environment these do not appear to have been communicated to the newer members of the community. On the surface, long-term residents appear to opt for the status quo, when they could play a crucial role in imparting local knowledge about sustainable recreational practices.

References

[1] K.B. Ghimire and M.P. Pilbert, "Social change and conservation: An overview of issues and concepts," *Social change and conservation*, K. B. Ghimire and M. P. Pilbert, eds., London: Earthscan Publications Pty Ltd, 1997.

[2] J.G. Cantrill, "The environmental self and a sense of place," *Journal of Applied Communication Research*, vol. 26, 1998, pp. 301-318.

[3] E.H. Zube and M.L. Busch, "People-Park Relationships: An International Review," *Landscape and Urban Planning*, vol. 19 1990, pp. 117-131.

[4] R. Buckley and N. King, "Visitor impact Data in

a Land Management Context," *Nature-based tourism, environment and land management*, R. Buckley, C. Pickering and W. B. Weaver, eds., Oxen, U.K.: CABI Publishing, 2003, pp. 197-208.

[5] R. Harris, J. Majer, C. Williams, A. Buckley and D. Stehlik, "Ravensthorpe Range and Overshot Hill - An Overview of Biodiversity Values, Threats and Conservation", Working Paper Series, Issue 12, Alcoa Research Centre for Stronger Communities and Department of Environmental Biology, Perth: Curtin University of Technology, 2008.

[6] Shire of Ravensthorpe, "Consolidated Annual Report 2006-2007," 2007; http://www.ravensthorpe.wa.gov.au/shire_publications/annual.

[7] Australian Bureau of Statistics, "2006 Census Community Profile Series: Ravensthorpe (S) (Local Government Area)," 2007; http://www.censusdata.abs.gov.au.

[8] K. Bradby, A Park in Perspective: A report on the past, present and future of Fitzgerald River National *Park*, Western Australia: Fitzgerald River National Park Association, 1989.

[9] D. Stehlik and A. Buckley, "Participative inquiry using a community-as-researcher approach: The Balingup Model", Working Paper Series, Issue 9, Alcoa Research Centre for Stronger Communities, Perth: Curtin University of Technology, 2008; http://strongercommunities.curtin.edu.au.

[10] C. Williams, A. Buckley, D. Stehlik, J. Maher and R. Harris, "Community Stakeholders Values and Resource Use Attitudes and Perceptions Study", Working Paper Series, Issue 13, Alcoa Research Centre for Stronger Communities and Department of Environmental Biology, Perth: Curtin University of Technology, 2008.

[11] M.J. Salganik and D.D. Heckathorn, "Sampling and Estimation in Hidden Populations Using Respondent-Driven Sampling," *Sociological Methodology* vol. 34 no. 1, 2004, pp. 193-240.

[12] Department of Environment and Heritage, Government of South Australia, *Phytophthora cinnamomi* causing dieback in plants, 2004; http://spatialinformationday.org.au

[13] R. Bushell, "Balancing Conservation and Visitation in Protected Areas," *Nature-based tourism, environment and land management*, R. Buckley, C. Pickering and W. B. Weaver, eds., Oxon, U.K.: CABI Publishing, 2003, pp. 197-208.

Amma Buckley holds a BSW with Hons. (JCU) and PhD (UQ), and has recently finished as an inaugural Conservation and Sustainability Fellow funded by the Alcoa International Foundation through Curtin University of Technology, Perth, Australia. Her fellowship research investigated local people's participation in the management of the Fitzgerald Biosphere Reserve on the south coast of Western Australia. This included two separate studies into communities on the eastern and western aspects of this biosphere. Her current project is located in the same region and investigates the social landscape of mining through a 'neighbour of choice' approach.

Economic effect of alternative tourism. Events and festivals

Liljana Elmazi, Klodiana Gorica

Abstract — The analyze of the tourism cities within Albania show that communities as emerged tourism destination offer culture, tradition and events, and also, show us that events and festivals have the capacity to celebrate community identity particularly in multi-cultural events and festivals. The involvement of local community in creating opportunities and furthermore, competitive advantages, is very important for management and marketing of events and festivals, especially in multi-cultural communities. The research investigates the different interpretations of community, the concept of communities and the role of events and festivals in articulating community identity within distinct localities. It is necessary the compilation of a strategic marketing plan which will involve the community in tourism events and festivals, which at last will follow up with sustainability. Drafting perfect marketing strategies is always one side of the management task that should not be underestimated. This task becomes extremely difficult since in many cases a direct conflict exists between the site managers who to keep restricted numbers of visitors for preservation reasons, local people who look the events as a way to generate revenues, and national governments who like to use its image as a marketing device. Heritage and Cultural Tourism is the most important part of the Albanian tourism product and successful element of the national economy. Albania is considered as a new cultural destination in the tourism marketplace, as a Balkan country of dramatic natural beauty, with a wealth of historic buildings and ancient archaeological sites that can compare, for interest and variety with any in the Mediterranean world.

Index Terms — Economic effects, alternative tourism, multicultural communities.

1 Introduction

The analyze of the tourism cities within the country that offer culture, tradition and events, show us that events and festivals have the capacity to celebrate community identity particularly in multi-cultural events and festivals.

We recommend that those cultural and traditional cites within Albania that really are well known and proved by national and international demand and have result successful by potential consumers, must apply some effective marketing communication. So, for example, cities as Gjirokastra, Vlora, Saranda, etc., must developed a centre piece events for the local economy each year, with local hotels, restaurants, taxis, public transports and small stall traders have planned their business activities around these events. Those cities have shown clearly the effectiveness of particular partnership working between local attendees and communities in creating a range of events and festivals.

Albania is exploring the emergence of a “new and important industry”. What should be done by Albanian managers and market-

F.A. Author is with the National Research Institute, Boulder, CO 80305. E-mail: author@boulder.nri.gov.
S.B. Author is with the Department of Physics, Colorado State University, Fort Collins, CO 80523. E-mail: author@colostate.edu.
T.C. Author is with the Electrical Engineering Department, University of Colorado, Boulder, CO 80309. On leave from the National Research Institute for Metals, Tsukuba, Japan E-mail: author@nrim.go.jp.

ers in “using” community based events as a tool for tourist promotion.

Insights from case studies of events and festivals within the sub-region of Gjirokastra, Vlora, Saranda, etc., highlight that the positive benefits of community collaboration with public and private organizations, is the promotion and enhancement of community identity. Historically, events and festivals were associated with key calendar moments, linked to particular seasons and heritage sites, but over the last decade they have changed dramatically and now there is a broad and diverse range of contemporary festivals and events taking place all over the world. In the light of these developments there has been a continuous development of community festivals in recent year.

A descriptive community refers to “a network of people who share a sense of belonging to or membership of, that network”, but that there are complex underlying interrelationships involved. For example, there are social and psychological components to the ‘descriptive community.’ The first is that of ‘territorial community,’ which refers to what people might have ‘in common’, as part of a psychological attachment to their geographical location, such as a town, village or neighborhoods.

There is a lack of studies in Albanian tourism business. Little is known about the roles of tourism, small business, communities and their relationship to Albanian economic development. In fact, we have to note that, there is an absence of studies on small tourism business, even though “the Albanian tourism and leisure industry tend to be dominated by a few large businesses operating alongside a large number of small, independent ones”, or even to much is going to promote by Albanian government. Until the 1990’s, small businesses were simply considered a miniature version of large firms, and differences in business objectives, management style, funding, and marketing were unnoticed. Or furthermore, the concept of marketing in Albanian small and medium businesses is involved both with internet after 1992.

The concept of community has complex social, psychological and geographical dimensions with divergent views as to what constitutes a community. Traditional views of ‘community,’ as defined by the parameters of geographical location, a sense of belonging to that locality and the mix of social and economic activities within that locality have been supplemented with greater dimensions of complexity by analysts. In particular, processes of globalization have undoubtedly led to the dissolution of spatial boundaries, with local and regional boundaries no longer retaining qualities of the distinct demarcation of communities that they perhaps once did.

Secondly, ‘interest communities’ rely not on the focus of place, but are anchored in other characteristics, such as ethnicity, occupation, religion etc. This dimension of community thrives on social networks and social/psychological attachment. Our country has always had some multicultural groups with diverse histories, beliefs and cultures have settled in Albania. This is very interesting! These multicultural communities know play important role in the enhancing the cultural diversity of Albanian‘s multicultural communities is spread all over the country.

2 FESTIVAL AND EVENTS TOURISM WILL HELP THE SUSTAINABILITY

The local resources is of an community in maintaining traditional events and festivals within Albania chronicle the range of community based events and festivals that have ancient origins and which continue to act as a catalyst for the expression of cultural and community sustainability in the future.

The cultural events and festivals in Albania should be considered as an important form of community cohesion and expression which are examined within the case studies in this paper.

Not only in theory, not only in developed countries, but also in Albania, it is noted that residents of some communities as Gjirokastra, Vlora, Saranda, etc., are often

encouraged to take greater control of their futures by becoming involved in community planning and thereby influencing decisions about tourist developments in their home areas and protecting desired community attributes.

3 Festivals and events: economic and community benefits

In addition to creating community cohesion, festivals potentially give greater economic life to host destinations, by developing employment, additional trade and business development, investment in infrastructure, long term promotional benefits, and tax revenues. Festivals not only generate significant economic benefits, they also provide host destinations with the opportunity to market themselves nationally and internationally bringing people from diverse backgrounds to the destination for the duration of the festival. As a result, they have the potential to provide host destinations with a high-status tourism profile. Some aspects of this role include festivals in Albania as:

- image makers,
- economic impact generators,
- overcoming seasonality,
- contributing to the development of local communities and businesses, and
- Supporting key industrial sectors.

The negative economic impacts can be:

- the inflation of price on goods and services to cash in on the influx of visitors,
- the event could also run at a loss meaning if it were funded by the local authority,
- The deficits would have to make up by local residents through a rise in taxes.

We recommend that:

- Each small tourism business in the country must be was examined in terms of the type of the business activity, type of business ownership, motivation of business ownership, financial success, projected growth, business geographical location, its customer base, and business' level of community involvement;
- The importance of the study is to support for tourism development leads to increased tourism activities and inevitably increased economic benefit to the community;
- Successful planning and management of tourism development benefits a community's residents, businesses, and visitors;
- Building community loyalty to attract more tourists into the community is imperative to the success of any initiative or grass-roots project.

4 Local residents orient the management of the festivals and other events in Albania

Small business and family-owned business are the key factor for events managements, as the festivals, exhibitions, etc. Why? Because they follow up the tradition, they know what special features they have on their proper events; they know how special their festivals are. So the management of festivals should be by both actors: local government and small business.

Small businesses share distinctive characteristics and functional weaknesses that affect the product, operation, and services that they offer identified six categories that distinguish small business firms from large business firms. These include planning, environmental reaction and strategy, business objectives, range of management skills, communication styles, and company performance measures. These features made a big difference between those two actors in knowing, managing the festivals and other traditional events within the community.

Lack of strategic planning, vision, and long-term goals has been identified as a major problem of the role that small business firms can play in events management. Small tourism businesses are notable for being 'product oriented' or 'family oriented' versus 'market oriented' and find it unavoidable to depend heavily on intermediaries. They orient the

tourists to their tradition, to their potential that they have so culture, festivals, events, special products, which at the end made special one community.

All this process needs a very detail marketing program, especially in those destinations which has a considerable tourism supply. Marketing mix serve to general management as a set of tools that may be manipulated to meet specific objectives and attract predefined target markets. It is easy to notice that the fundamental starting point for the creation for a successful marketing mix is to ensure that the target market is clearly defined. If the destinations or small and medium enterprises are successful with its marketing mix, then it has to develop a differential advantage which will distinguish the organization's product from that of the competition. In this way, it has built an advantage which bases upon quality, image and product concept.

5 IMPLEMENTING MARKETING STRATEGIES PART OF PROCESS OF EVENT'S MANAGEMENT

Evaluating the success of a destination which offers special festivals and events, involve not only the evaluating of potentials, the marketing mix, but also the implementing of those strategic marketing that sustain the process of festivals and events management.

Once the strategy is agreed, the next challenge is to implement it through the manipulation of the four Ps and the Marketing Mix. A last but not least criterion of ensuring a successful implementation of the strategy requires that it can be usually converted in short tactical marketing plans covering a shorter period of usually one year thus being easily adopted by those responsible for day to day marketing of the attractions.

These points (market and visitors) represent major sources of implications for management while implementing strategic models for festivals and events developed for tourism. The strategies are implemented through plans and these plans usually base on the manipulation of the marketing mix which in cases of festivals and other events includes more than four elements (tools). They extend these elements to seven Ps, which according to many scholars are more relevant for heritage attractions. While there are differences between manufactured and service products, the framework of four Ps is sufficient for planning purposes whereas physical evidence, people and processes are part of the category of product and its implementation.

Sustaining by the government and local public of festival and other typical events for the communities will help in doing authentic the Albania's tourism products, while meeting the general expectations of international tourists. International experience, knowledge and best practices generated by the developed of events and festivals, not only will improve the image of Albania in international countries, but should be sought aggressively to inform decisions and plans for the country. However, the products themselves must represent, to the maximum extent possible, an authentic Albanian approach. The most likely outcome will be the adoption and adaptation of strategies and mechanisms from a number of countries' best practices in different regions of the world.

The development of festivals and events as a very important part of whole Albanian tourism product will need substantial involvement of local governments in tourism planning, urban planning, infrastructure development, cultural preservation, environmental protection, among others. While there is considerable local capacity in the larger cities and identified cultural centers, many cities and towns will require substantial amounts of additional support from the central government, Tirana based institutions and international experts.

Albania will seek to position itself as an attractive destination for tourists seeking a unique experience featuring high quality cultural sites and nature destinations presented in a truly "authentic" way. Albania will specialize in attracting educated, independent travelers and specialized group travelers. The principal

target markets will be upper middle income individuals from Europe and North America. This segment represents the demographic segment with the highest willingness to pay for Albanian's unique products, and whose spending patterns will most contribute to advancing development goals.

References

[1] Ayres, R., "Tourism as a passport to development in small states: reflections on Cyprus", International Journal of Social Economics, Vol.27, No.2, 2000, pp 114-133.

[2] Buhalis, D., "Marketing the competitive destination of the future, Tourism Management, Vol.21, 2000.

[3] Tosun, C., Timothy, J.D., "Shortcomings in planning approaches to tourism development in developing countries: the case of Turkey", International Journal of Contemporary Hospitality Management, Vol.13, No.7, 2001.

[4] Keynak, E., Bllom, J., "Using the Delphi technique to predict future tourism potential", Marketing Intelligence & Planning, Vol. 12, No.7, 1998.

[5] Lei per, N., "Tourism Management, 2001.

[6] Ritchie B, Crouch, G.: The competitive destination: a sustainable perspective, Tourism Management, Vol.21, No.7, 2000.

[7] Bram well, B. and Sharman, A. (1995) 'Collaboration in local tourism policy-making', Annals of Tourism Research 26, 2: 392-415

[8] British Tourist Authority (BTA) 2001 [Internet] Available from<http://www.visitbritain.com Accessed on [20/02/06]

[9] Brown, J (2004) Managing the arts, culture and leisure experience: Event design and Management in Festival and Events Management, Yeoman, Robertson et al (Eds), McMahon-Beattie: London

[10] Carnegie, E (2002) Not the Edinburgh Festival: An exploration of community led exhibitions and events in the festival city. Working paper presented to the IFEA Conference, Bonn, and February 6.

Landscape preferences and perception in Mueritz National Park (Germany)

Gerd Lupp, Werner Konold

Abstract — In Mueritz National Park, Germany, landscape changes are ongoing due to wetland restoration, reduction of agricultural acticvities and abandonment of timber oriented forest management. This study assesses the perception of the landscape and landscape preferences of both local visitors and tourists. Passers-by were interviewed at five different places inside the park. Preferences and perception of landscapes were identified in three steps: general preferences, perception of the scenery at the interview site and by using pictures. The results were differentiated and compared according to residents, first time visitors and regular visitors as well as lifestyle groups. Lakes, traditionally maintained farmland and ancient lately unmanaged beech forests (*Fagus sylvatica*), containing deadwood, are preferred most. The results show that background knowledge about natural processes is essential for a positive perception of these landscape features.

Index Terms — Landscape preferences and perception, lifestyle groups, national park, user survey

1 Introduction

National Parks in Central Europe are often set aside to provide space for natural developments and to create "new wilderness". Mueritz National Park is one example for this type of national park in Central Europe. It is situated in the north east of Germany, half way between the cities of Berlin and Rostock and was established in 1990.

Gerd Lupp works at the Institute of Landscape Management at the Faculty for Forestry and Environmental Sciences, Albert-Ludwigs-University 79106 Freiburg, Germany E-mail: gerd.lupp@landespflege.uni-freiburg.de
Werner Konold is head of the Institute of Landscape Management at the Faculty for Forestry and Environmental Sciences, Albert-Ludwigs-University 79106 Freiburg, Germany E-mail: werner.konold@ landespflege.uni-freiburg.de

Like with many other national parks in Central Europe, only small parts of it represent natural forests. Large areas are still dominated by vast softwood forests shaped by intensive silviculture, agriculture and drained wetlands. The aims of the park authorities are to restore wetlands, to accelerate the change of tree species in artificially planted pine-forests (*Pinus sylvestris*) towards more natural broadleaf trees, to protect old forests in order to provide space for natural processes and developments, and to reduce farming. Changes in forests and of agricultural land, that both might happen in the next decades were analysed. Given these management plans, changes of the landscape are unavoidable in the upcoming years. However, the impact of these scenic changes on residents and visitors of the Mueritz National Park has not yet been analyzed in detail. Potential preferences concerning certain types of landscape also still need more research. Changes of scenic qualities might be perceived critically and lead to conflicts.

2 Method

2.1 Interview Design

An adapted method had to be developed to cope with the special needs of information in Mueritz National Park. A user-based survey was established. A quantitative approach allowed gaining a broader perspective on different park users. However, a range of open-ended questions concerning perception were implemented, which are more typical for a qualitative approach. In order to cover all types of park users such as day visitors, long term guests, and locals, interviews with passers-by at sites inside the park were considered the most efficient way to gain information. This type of interviews allowed to include "real" on-site sceneries for analyzing scenic preferences. Five different, well frequented sites inside the park were chosen. Each of the five locations selected represented a different landscape, typical for the Mueritz National Park. Locations chosen were an unmanaged beech-forest, a pine plantation, a natural forest regeneration on devastated land at a canoe route, a restored moor and traditional maintained meadows in the management zone.

Persons were asked for their reasons to visit the park as well as for their activities planned. In order to obtain information on different aspects of the scenery and to minimize possible faults that may occur in each step, landscape preferences were assessed in three different steps.

First, general questions on preferences for certain types of sceneries in the park region were posed. Persons were asked to rate on a 1 to 5 Lickert scale. However, for answering this question every interviewee always has her or his own "mental landscape" in mind when being asked.

Therefore, in a second step, the quality of the surrounding scenery was asked. Again, the scenic quality had to be ranked on the 1 to 5 Lickert scale. This way more information about the perception of these typical sites inside the park could be obtained. However, some aspects, which might be more dominant in the future, like forests with huge portions of deadwood, are not visible yet or existing places are not well frequented.

In a final step, scenic impressions were given in a picture set. Pictures had to be sorted according to a Q-Sort test method as described by [10]. From 16 pictures shown, the interviewee was asked to select 4 pictures with landscapes liked better than average and 4 pictures with landscapes liked less than average. From these pre-selections the interviewees selected one picture each with the type of landscape liked best, respectively the type of landscape liked least. The interviewees were then asked to explain their choice of best and least preferred type of landscape. Using this method a ranking of landscape preferences was achieved.

The interviews have been conducted between the beginning of May and the end of August 2005, since the park is mainly visited in summertime. Three interview-sessions were carried out at each place, one session in early, one in mid and one in late summer. In order to get a good random selection of passers-by, a weekday, Saturday and Sunday were selected. Questioning started at 9:00 am and ended at 5:00 pm. Passers-by were asked to participate in the survey by telling the purpose and the overall time of duration (approximately 20 – 30 minutes). After the interview was finished, the next person approaching was contacted.

2.2 Forming Different User Groups

To detect possible discrepancies between different users of the park, three sub-groups are classified: *First Time Visitors*, *Regular Visitors* and *Residents*. *First Time Visitors* are both 'first time visitors' and persons who had been in the park before but only for a few times. *Regular Visitors* are defined as persons visiting the park frequently at least over the last ten years. *Residents* or *Locals* are defined as persons living in national park villages and towns at the park entrances.

Additionally, all interviewees were sorted

into lifestyle groups, according to the concept of the German sociologist SCHULZE [9]. This lifestyle group concept assigns persons to general orientations and values, every day leisure-time activities and communication channels used.

For this query, it was of interest how many individuals of each of these groups visit Mueritz National Park. Also there might be different activities and landscape preferences for each of these groups. The concept defines five different groups, two groups younger than the age of 40, one correlated with a lower and one with a higher education level. Persons above 40 are sorted in three lifestyles. One group is correlated with a low, one with a middle and one with a high education background. Significance to differences in answers between lifestyle groups on one side and Locals, Regular and First Time Visitors on the other side was proved by ANOVA and by Chi-Square tests, using SPSS.

3 RESULTS

605 passers-by were interviewed. A look at the lifestyle distribution indicated a dominance of older persons and a higher educational background (around 36%). However, young people below 40 with a higher educational background appeared to be the second largest lifestyle group (22%). This suggested that the majority of park users lead lifestyles, which indicate a higher educational level. The young, better educated were extremely overrepresented at the interview site at the canoe route. Also persons assigned to this group preferred canoeing significantly, even compared to the same age-group with a lower education background.

In opend-ended questions, main motives for visiting were: “Area is very natural”, “Beautiful scenery”, “Possibilities to go biking”, “Quietness” and “Canoeing”. 3.6% of the visitors explicitly named “Visiting a National Park”. “Unspoiled/clean nature”, “Quietness”, “Loneliness” and “No noise” were the most frequent positive impressions for Mueritz National Park, followed by “Lakes” and “Forest”. Regular Visitors especially mentioned “Quietness”.

Lakes, traditional maintained farmland and old beech (*Fagus sylvatica*) forests containing deadwood were preferred most by all groups. However, lifestyles with lower educational background slightly tended to prefer more cultivated places.

Especially the young, better educated lifestyle group members frequently mentioned with overviews, avenues and fields “I do not know”, because the canoe-route has none of these features.

The appreciation for the restored moor was often based on information about it, which was vital for its positive perception. An interesting aspect of the survey is, that every fourth person quoted moors as “I do not know” or “I have not seen them yet”, although this type of landscape is a frequent impression inside the park and it was also the most frequented interview-site in the study.

Abandoned fields and fallow land were seen negative, when general impression was asked for. Especially Locals related it with the diminishing of agriculture and had a negative picture in mind. However, when blooming, it was often considered interesting and attractive, even by Locals. Most frequently pine stands and initial forest regeneration were voted the worst impression in comparison with other scenic impressions or in the picture set. However, at the real interview site, it got quite good grades, since other qualities than visible ones, especially “quietness”, were important.

4 DISCUSSION

This study shows that it is necessary to analyze landscape perception in more than one step. Each way of interviewing or only using a picture set is not adequate to cope with the complexity of landscape and its perception.

In Mueritz National Park, a majority of visitors are identified as members of lifestyle groups with a higher educational background.

This fits quite well with other studies, e.g., [8] or [3]. Lifestyle groups with lower education tended to prefer more cultivated places.

The old beech forests were considered very attractive, which supports the general impression that this kind of forest was liked by the visitors. Deadwood in these forests, at least to some extent, was seen as a positive feature. In other recent surveys deadwood in forests is also seen more positive [6]. However, background information was important. This was vital for judging whether a scenery is considered positive or negative, especially for not everyday impressions like the regenerating moor sceneries and its large portion of deadwood.

Some features of cultural landscape like avenues and viewpoints were liked as such. Meadows and open cultural landscape are important for aesthetics when providing views towards lakes, which were liked most. This fits to more general theories of landscape perception and preferences [1,5]. The impression of abandoned fields and fallow land was perceived negatively. Especially Locals related fallow land with diminishing agriculture and had a negative perception when being asked. However, blooming open land is often considered interesting and attractive, although the picture of an abandoned field had no other landscape structures in it. The ambivalent quality of fallow land was also reported from studies in alpine areas [4]. This result also demonstrates the negative connotation related to a term, which not is not necessarily related with a scenic impression in reality.

5 Conclusions

Judging of landscapes that might be more dominant in the future like deadwood, fallow land, but also pine forests dominating the park for the next decades, is based on background knowledge, values and positive experiences. According to a more general perception model [2], they are “personal” or “individual strategies”. Understanding the landscape perception of different groups and lifestyles, adequate communication and information concepts can be developed by the park authorities to raise acceptance for these features.

According to the lifestyle concept by [9], people with lower education tend to watch nature films on television frequently. However, these groups are often under-represented when participating in outdoor activities (e.g. [3, 7, 8]). Important reasons for this might be the lack of mobility or little money that can be spent for experiencing nature; but certainly they are not the only ones. Further research on this issue is necessary and fundamental, since these lifestyle groups represent a large group of society.

Using the lifestyle concept by [9], important communication and information channels with visitors can be for example high quality magazines, newspapers, radio and TV programs. National Park experiences may be combined with arts exhibitions, cultural events and theatre performances in the region. A large majority of park visitors is generally interested in this kind of offers.

6 Acknowledgements

The authors would like to thank the Jost Reinhold Foundation for their financial support.

References

[1] J. Appleton, *The Experience of Landscape*. New York, Wiley, 1975.

[2] S. C. Bourassa, *The Aesthetics of Landscape*. London, New York, Belhaven Press, 1991.

[3] A. Braun, *Wahrnehmung von Wald und Natur*. Opladen, Leske&Buderich, 1999.

[4] F. Hoechtl, S. Lehringer, W. Konold, *Kulturlandschaft oder Wildnis in den Alpen? Fallstudien im Val Grande-Nationalpark und im Stronatal (Piemont/Italien)*. Bern, Stuttgart, Wien Haupt, 2005.

[5] R. Kaplan and S. Kaplan, *The Experience of Nature: A psychological Experience*. Cambridge, Cambridge University Press, 1989.

[6] A. Lindhagen and L. Hoernstein, “Forest Recreation in 1977 and 1997 in Sweden: Changes in public preferences and behaviour”, *Forestry*, vol.

73, no. 2, p 143-53, 2000.
[7] R.E. Manning, *Studies in Outdoor Recreation*, Second Edition. Corvalis OR, Oregon State University Press, USA., 1999.
[8] A. Muhar, T. Schauppenlehner and C. Brandenburg, Trends in Alpine Tourism: The Monutaineers´ Perspective and Consequences for Tourism Strategies. *Exploring the Nature of Management. Proceedings of the Third International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas.* Siegrist, D. et al. eds. Rapperswil, University of Applied Sciences Rapperswil. pp 23-27, 2006.
[9] G. Schulze, *Die Erlebnisgesellschaft – Kultursoziologie der Gegenwart*. Frankfurt, New York, Campus, 1997.
[10] W. Stephenson, *The Study of Behavior: Q-Technique and Its Methodology*. Chicago, London, The University of Chicago Press, 1953.

Gerd Lupp Dr. rer. nat. (*1975) graduated in Forestry at the University of Freiburg in 2002. Internships at Hohe Tauern National Park and the Commission for Protection of the Alps (CIPRA) followed. From 2004 to 2008 he worked in a research project about landscape preferences, perception and landscape changes in Mueritz National Park in North-Eastern Germany. He obtained his doctorate degree in 2008. He has published four papers on his current research and several other publications in other fields like regional marketing, public relations for sustainable forestry as well as articles for popular sciences. His current research interests are: Landscape perception, lifestyle groups and nature, visitor flows, visitor management in protected areas, nature interpretation, nature conservation, changes in scenic qualities due to land use changes or adaptation to climate change, multiple-use forestry, marketing and public relations and renewable sources of energy. He is a member of IASNR.

Book: G. Lupp, Landschaftswahrnehmung von Anwohnern und Besuchern des Müritz-Nationalparks und Prognose zu erwartender Veränderungen im Landschaftsbild. Culterra, Schriftenreihe des Instituts für Landespflege

Werner Konold Prof. Dr. sc. agr. (*1950) is an agricultural scientist who obtained his doctorate degree on ecology of small running waters in 1983. He habilitated on the history, limnology and vegetation of ponds and lakes in the alpine foothills in 1988. Throughout this time, he engaged in general research activities including the history and ecology of cultural landscapes. Further research activities include the history and restoration of waters and floodplains, change of rural landscapes, sustainable rural development and nature conservation. Since 1997 he is the chair of the Institute for Landscape Management at the University of Freiburg (Germany).

National park visitors' attachment to a place, quality perceptions and visit intention

Marjo Neuvonen, Eija Pouta, and Tuija Sievänen

Abstract - National parks are often national icons and destinations for nature tourists. Park tourism is seen as a substantial cultural, social and economic phenomenon, which is going to be even more important with decreasing space and expanding human populations. Structural changes, such as decreasing primary production, in the economic base of rural communities, have forced communities to seek alternatives in order to maintain their economic viability. Park tourism is identified as an opportunity to strengthen the rural economy in regions that can provide natural amenity values and recreation services. The case study from three national parks in Finland, Seitseminen, Linnansaari and Repovesi National Park, analyses how park visitors relate to the park and surrounding rural area. The purpose of the study was to examine how the place attachment with intervening factors of quality of services and recreation environment explain the intention to visit the area again in the future. Data (N=736) was gathered by a mail questionnaire for park visitors. The majority, 64-71% of visitors planned to visit the park in next five years and 55-68% the area. About 10% of the visitors felt attached to the surrounding countryside of a national park. Structural equation modelling (SEM) was applied here to test how the hypothesized causal structure fits to observed data. The preliminary results showed that place attachment interacted positively and statistically significantly with the perceived quality of services and recreation environment. Those who were keen to a place are more satisfied to the services and recreation environment. Park visitors' attachment to a region and satisfaction with the local services and hospitality correlated positively with their intention to revisit the region.

Keywords — Outdoor recreation, nature-based tourism, place attachment, rural tourism

1 Introduction

Park tourism is in many policy documents identified as an opportunity to strengthen the rural economy in regions that can provide natural amenity values and recreation services. Park visitors are expected to bring the income flow to otherwise declining economies. The magnitude of the tourism impact depends on the number of visitors and their expenditure in local and regional services and products. For the rural communities around parks new visitors are without doubt important, but also the intention of the previous visitors to visit the park and region again is more and more important. The new visit to the region and park associates with the use of local services and via the services an income flow to the local region.

The visit intention can be explained with two type of factors: those that associate with the visitor herself and those that correlate with the services and their quality. In previous literature the number of visits to a national park have been explained with travel costs but also with inner social psychological factors like attachment to the place [1]. The attachment to

M. Neuvonen is with Finnish Forest Research Institute, Vantaa Research Centre, PL 18, 01301 Vantaa, Finland E-mail: marjo.neuvonen@ metla.fi
E. Poutar is with MTT Agrifood Research FInland, Economic Research, Luutnantintie 13, 00410 Helsinki, Finland E-mail: eija.pouta@:mtt.fi.
T. Sievänen is with Finnish Forest Research Institute, Vantaa Research Centre, PL 18, 01301 Vantaa, Finland E-mail: tuija.sievanen@ metla.fi

the place has found to be in connection to the visitors perception of service quality [2] and perceived social and environmental conditions [3]. However, the relative importance of these factors to visit intention is less studied issue.

From the park management perspective it is particularly important to know which recreation services affect the intention for future visit, and does the perceived quality of those services have an effect. When those services have been identified, a management policy and a plan to develop provision of recreation services and improve maintenance program is motivated. For decision making processes and financing it offers a knowledge based argumentation.

The aim of this study is to examine how the place attachment and perceived quality of tourism services and recreation environment explain the intention to revisit the area close to the national park. First goal is to identify whether there is any causal structure between these factors. It is expected that recreationists' level (strength) of attachment in the area, their experiences on the quality of services affect their intention to revisit the place. In addition, it is tested how place attachment interacts with service satisfaction and examined what is the relative importance of these two factors in explaining visit intention. An empirical model based on this structure is estimated to explain the intention to visit the area. Secondly, this structure is extended by including a variable of the travel costs and other socioeconomic variables into this scheme.

2 THEORETICAL FRAMEWORK

In this study we are particularly interested of place attachment and perceived service quality as predictors of visit intention. Place attachment means positive connection or bond between a person and a particular place and consists of two dimensions: place dependence and place identity. Concept of place dependence means more functional attachment to a place and reflects importance of place in providing features and conditions for activities where as place identity reflects more emotional bond an symbolic importance of a place [3] and [4], [5], [6], [7].

Higher supply and performance quality of facilities are likely to improve visitor satisfaction and effect on behavioral intentions like loyalty [8] or visitors' destination selection [9]. Measurement of reported satisfaction consist of several dimensions like satisfaction with facilities (shops, transportation, lodging, restaurants etc.), satisfaction with services (like personnel's friendliness and willingness to serve), satisfaction with information (e.g. information of local events), and satisfaction with recreation experience (e.g. opportunities to recreate without feeling crowded) [10], as well as landscape and environment. In this study we are particularly interested of the association between perceived quality in three components of services, environment and personnel. The hypothesized associations between these components are shown in fig. 1.

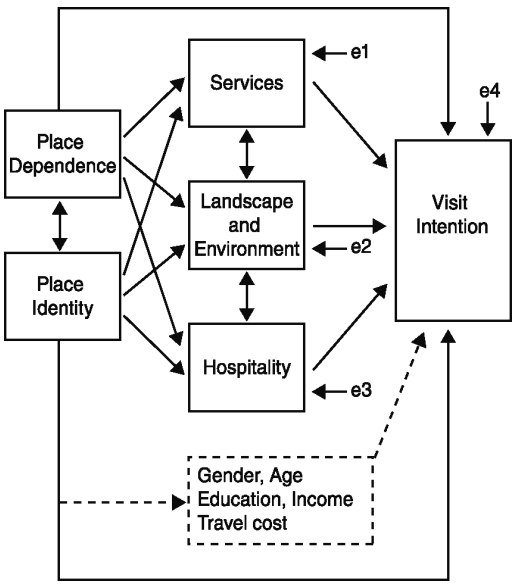


Fig. 1. The hypothesized model.

3 Data and methods

3.1 Study Area

The empirical data used here was collected from Seitseminen and Linnansaari national park in 2006 and in Repovesi in 2007. The sampling season was from the mid May to the beginning of October. Altogether 736 respondents returned the inquiry and response rate was 72% in Seitseminen, 63% in Linnansaari and 68% in Repovesi national park. The park area and the surrounding countryside was presented in the map that was distributed together with the questionnaire. The natural element characterizing Linnansaari and Repovesi National Parks is water and scenery [11]. The Linnansaari park is located in the middle of the bigger lake area in Eastern Finland and Repovesi is surrounded by several smaller lakes. In Seitseminen National Park the forest is the most typical natural element.

All the parks are located in Southern Finland. In 2007 there were 44 000 visits to Seitseminen National Park, 29 000 in Linnansaari and 70 000 visits to Repovesi National Park [12]. The parks were established in three decades Linnansaari in 1956, Seitseminen in 1982 and Repovesi is one the newest parks in Finland -established in 2003. Linnansaari and Seitseminen provide high level of services inside the park where as in Repovesi they are less developed. The area close to Linnansaari national park are more urbanised and providing more services for visitors than municipalities close to Seitseminen and Repovesi [11].

3.2 Variables

Place dependence (Cronbach's $\alpha = 0.73$) and place identity ($\alpha = 0.74$) were both measured with four items and the satisfaction attributes included 16 items. Perceived quality of services and recreation environment were divided into three groups based on the results of factor analysis. The first factor referred to satisfaction with facilities like shops, transportation, lodging, restaurants etc., second factor was for landscape and environment and third factor consisted of items referring to local hospitality. For the analyses variables were transferred to a sum variable.

3.3 Inferential analyses

Structural equations model is commonly described as combination of structural model and measurement model [13]. Firstly, hypothesized causal structure of the relationship between the variables was specified. Secondly, linear equations were written to transfer the structure into observational model. The third step was to define covariance between each pair of variables. Determining covariance are a way to expresses the path coefficients, variances and covariances that has to be estimated from the data. Fourth, free parameters were estimated by using ML-estimation. The data was analyzed with SAS proc calis procedure. Finally, the extent to which the covariances predicted by the model correspond to the observed covariances in the data were calculated by using χ^2-statistic. Because there were not strong prior information of the studied subject, several competing structures were hypothesized and tested. The model selection was based on the several goodness of fit measures. For the $pr > \chi^2$ the value > 0.05 indicates acceptable fit, for the comparative fit index (CFI), GFI Goodness of Fit Index, and Bentler and Bonett's normed fit index (NFI) values > 0.90 indicate acceptable fit and for the root mean square error (RMSEA) values < 0.08 indicate acceptable fit.

4. Results

Majority of respondents reported their willingness to revisit the surrounding rural area (64%) and park itself (69%). Visitors in Seitseminen national park were most willing to visit the rural area in the near future and their differed statistically significantly of the visitors of Repovesi National park who were least interested to revisit surrounding countryside.

TABLE 1

COMPARISON OF SEITSEMINEN, LINNANSAARI AND REPOVESI NATIONAL PARKS

	Park				Chi-square
Variable	**S**	**L**	**R**	**Total**	**Test (p-value)**
% of visitors intend to revisit the area	68 ^{A}	64 ^{AB}	55 ^{B}	64	8.422 (0.015)
% of visitors intend to revisit the park	71	64	70	69	2.504 (0.286)
	Mean				**F-Test (p-value)**
Index for place dependency	10.5 ^{A}	11.5 ^{B}	10.7 ^{AB}	10.8	6.435 (0.002)
Index for place identity	12.6	13.1	12.6	12.8	1.066 (0.345)
Index for satisfaction in local tourism services	16.0 ^{A}	20.2 ^{B}	14.7 ^{A}	16.9	17.021 (<0.001)
Index for satisfaction in landscape and environment	16.6	17.2	16.8	16.8	2.587 (0.076)
Index for satisfaction in local hospitality	6.0 ^{A}	7.6 ^{B}	6.2 ^{A}	6.5	18.173 (<0.001)
Distance to travelled, km	233 ^{A}	497 ^{B}	208 ^{A}	264	27.096 (<0.001)
Personal travel cost, €	90 ^{A}	223 ^{B}	91 ^{A}	113	23.775 (<0.001)

Different symbols A, B and C indicate that the parks differ statistically significantly of each other at $p<0.05$ (Tukey)

The variables by parks are reported in Table 1.

The structural model consisted of two place attachment variables, three satisfaction variables and visit intention. All model fitting parameters indicated that the selected structure had acceptable fit to data (Table 2). Place dependence interacted positively and statistically significantly with all three quality factors. The model indicates that the positive place attachment increased satisfaction to tourism services. This is a logical result; those who felt that a particular region satisfied their needs for services and provided good opportunities for their activities, were more satisfied with the local services, environment and hospitality. Positive place identity (personal identity in relation to the physical environment e.g. “I identify strongly with this area”) increased only satisfaction to local services. Place identity was not significantly related to environment or local hospitality. However, positive place attachment increased respondent’s intention to visit the area in the future.

The overall effect emphasizes those who were already attached to the region/park and who were satisfied to local tourism services and hospitality were also more likely to revisit the area. Among those visitors who were already attached to a place landscape and environment did not increase their intention the visit the region. The model indicates that place attachment with intervening factors of satisfaction to services most comprehensively explains (R^2=0.13) the respondents intention to visit the national park vicinity.

According to hypothesized model socio-economic variables and travel costs were also tested in the model, but the acceptable fit with the data was not found. Female gender, higher education and travel costs decreased the intention to revisit the area but the effect was not statistically significant. Respondents higher income and age had an opposite effect and increased the intention to revisit the area.

5 CONCLUSIONS

In this study, place attachment was found to be useful concept when explaining park visitors’ intention to revisit. It was shown that both inner social-psychological variables and perceived service satisfaction affected on visit intention. However, the

TABLE 2

Structural Equation Model

Predictor → Dependent variable	Standardised coefficient	T-value
Place dependence → Satisfaction in tourism services	0.2796	5.9480
Place dependence → Satisfaction in landscape and environment	0.1762	4.3955
Place dependence → Satisfaction in local hospitality	0.1963	4.9157
Place identity → Satisfaction in tourism services	0.1064	2.4042
Place dependence → Intention to visit	0.1313	2.6472
Place identity → Intention to visit	0.2095	4.3379
Satisfaction in tourism services → Intention to visit	0.0990	2.2374
Satisfaction in landscape and environment → Intention to visit	-0.0325	0.8020
Satisfaction in local hospitality → Intention to visit	0.0973	2.2428
Chi-Square		2.1125
df		2
Pr > Chi-Square		0.3478
CFI		0.9998
NFI		0.9970
GFI		0.9988
RMSEA		0.0097
N		604

T-values > 1.960 significant at p<0.05, T>2.576 significant at p<0.01 and T>3.291 significant at p<0.001

Squared multiple correlations: Intention to visit R^2=0.15, satisfaction in services R^2=0.13, satisfaction in landscape and environment R^2=0.031, and satisfaction in local hospitality R^2=0.039

Correlations among exogenous variables: dependence - identity R^2= 0.62, e1 - e2 R^2= 0.22, e1 - e3 R^2= 0.41, e2 - e3 R^2= 0.32

relative importance of perceived service quality was less important than place attachment. Place attachment together with items measuring satisfaction could be developed to serve as a tool to measure the intention to visit a region surrounding national park in a visitor survey.

References

[1] G. Hailu, P.C. Boxall, B.L. McFarlane. The influence of place attachment on recreation demand. *Journal of Economic Psychology* 26, 581 - 598, 2005.

[2] S.-N. Hwang, C. Lee, and H. -.J. Chen. The relationship among tourists' involvement, place attachment and interpretation satisfaction in Taiwan's national parks. *Tourism Management* 26, 143 - 156. 2005.

[3] G. Kyle, K. Bricker, A. Graefe, and T. Wickham. An Examination of Recreationist's Relationship with Activities and Settings. *Leisure Sciences* 26, 123 - 142. 2004 a.

[4] K.S. Bricker and D.L. Kerstetter. Level of Specialization and Place Attachment: An Exploratory Study of Whitewater Recreationists. *Leisure Sciences*, 22, 233 - 257. 2000.

[5] B.P. Kaltenborn and D.R. Williams. The meaning of place: attachments to Femundsmarka national park Norway, among tourists and locals. *Norwegian Journal of Geography* 56, 189 - 198. 2002.

[6] D.R. Williams and J.J. Vaske. The Measurement of Place Attachment: Validity and Generalizability of Psychometric Approach. *Forest Science* 49 (6), 830 - 840. 2002.

[7] G. Kyle, A. Graefe, R. Manning, and J. Bacon. Effect of activity involvement and place attachment on recreationists' perceptions of setting density. *Journal of Leisure Research*, 36 (2), 209 - 231. 2004.

[8] D.A. Baker and J.L. Crompton, Quality, satisfaction and behavioral intentions. Annals of Tourism Research 27 (2), 785 - 804. 2000.

[9] S. Tian-Cole, J.L. Crompton. A conceptualization of the relationships between service quality and visitor satisfaction, and their links to destination selection. *Leisure Studies* 22, 65-80. 2003.

[10] S. Hudson, P. Hudson, and G.A. Miller. The measurement of service quality in the tour operating sector: a methodological comparison. *Journal of Travel Research*, 42, 305 - 312. 2004.

[11] A. Selby, T. Sievänen, M. Neuvonen, L. Petäjistö, E. Pouta, and J. Puustinen. Kansallispuistojen matkailullinen luokittelu. *Working Papers of the Finnish Forest Research Institute* 61. Available at <http://www.metla.fi/julkaisut/workingpapers/2007/mwp061.htm>. 2007. In Finnish

[12] Metsähallitus. Käyntimäärät kansallispuistoissa yhteensä.Available at <http://www.metsa.fi/page.asp?Section=2847> 21.4.2008. In Finnish

[13] B. Shipley. Cause and correlation in biology. A user's guide to path analysis, structural equations and causal inference. 2nd edition. Cambridge university press, Cambridge, UK. pp. 317. 2002.

Mario Neuvonen is researcher and statistician and specialist in outdoor recreation and nature tourism studies.

Eija Pouta is a principal research scientist specialized in outdoor recreation, valuation of natural resources and environmental issues.

Tuija Sievänen is a senior scientist and the project leader of outdoor recreation and nature tourism studies.

Parks for whom? A Norwegian policy dilemma: recreation vs indigenous interests

Jan Å. Riseth

Abstract — As most countries, Norway has adopted the Yellowstone model for nature protection; limiting humans' role to be guests in nature. The country established its first national park in 1962. In 2008, 14.3 % of the mainland is formally protected; including 29 national parks, many established newly. Recent decades' growing concern of the insufficiency of this protection model includes the lack of seeing conservation as a social issue, not only a biological one, was confirmed by the Vth World Park Conference in 2003. The same year the Norwegian government advanced a new policy for increased use of national parks for commercial tourism, named the "*Mountain Text*". The fact not addressed is that 18 of 29 parks are situated in Sámi reindeer pasture areas. The contemporary policy has revealed an unexpected conflict of objectives. Whereas the *Mountain Text* strengthen the goal of recreation, affected Sámi herders fear that parks instead of protection for them will mean increased disturbance of vulnerable animals and areas and accordingly have changed their basic attitudes from being positive to becoming ambiguous towards new parks and park extensions. This is a problem both in equity as well as efficiency perspective and also a source of new conflicts. Norway currently reforms its conservation legislation to reinforce biodiversity protection. Though indigenous interests have not so far become a core issue in this process; this process and the international process under the Convention on Biological Diversity together create a window of opportunities for reconciling conflicting objectives. One of the relevant instruments is the IUCN Category VI, available from 1994, which juxtaposes biodiversity protection and sustainable use.

Index Terms — Commercial tourism, convention on biological diversity, indigenous interests, IUCN category VI Yellowstone model

1 Introduction

Long-term protection of nature for maintenance of biodiversity and as material basis for indigenous culture, have much in common. In line with this the establishment of the first generation of Norwegian national parks in the 1960s and 1970s did not create conspicuous conflicts with the Sámi reindeer industry though 10 of 13 parks were set up within the Area of Sámi Reindeer Management Entitlement.

Nevertheless, nature philosophies and management models differ much. Indigenous relations to nature are based on unity between use and protection; i.e. humans are necessary for effective protection. In contrast, the western tradition of protection of natural areas, with a history back to the establishment of the Yellowstone National Park in USA in 1872, is based on separation of nature and culture. Whereas millions of tourists and city dwellers have enjoyed the park outdoors; three tribes were made outlaws in their own lands [1]. In more than a century the Yellowstone model has been

J.Å.Riseth is with the Norut-Northern research institute P.O. Box 250, N-8504 Narvik, Norway. E-mail: janar@ norut.no.

replicated across the globe: While tourists are encouraged to enjoy national parks as visitors indigenous peoples are marginalised and dispossessed and their role as resource managers devalued or rendered invisible [2].

The apparent harmony in Norway which seem to have lasted at up to the 1980s can probably to a large extent be explained by a combination of relatively large outfield areas per inhabitant and modest promotion of parks as recreation areas, but the Sámi people's low societal position may also have caused under communication of their interests earlier.

Technological change within reindeer management, including use of all-terrain-vehicles (ATVs), created elements of tension between officials and reindeer herders in some parks from the 1980s [3]. During the implementation of a second generation national park plan from the mid-1990s on, and still going on, several cases of scepticism and resistance from Reindeer Pasture Districts (RPDs), other Sámi interests, and also the Sámi Parliament have emerged and developed [4]. While one protection process was stopped due to local Sámi resistance; the Sámi of one region boycotted the inauguration of two parks and the board of one of them [5]. A survey answered by 23 RPD leaders, affected by six parks, reveals that reindeer herding Sámi have become ambiguous towards the protection effect of parks for their interests [6].

The objectives of this paper are (1) to explore the reasons for the emerging conflict between the Norwegian park policy and Sámi reindeer management interests and (2) to point to possible solutions.

2 Factors of change

The obvious common interests between nature conservation and the reindeer industry seem to have been dominant from the 1960s on. As tensions and conflicts have emerged we need to inquire a how a bundle of factors have changed.

2.1 Modernized reindeer industry

The reindeer herding Sámi have become more integrated in the surrounding society, and their methods of management have been changed through a technological revolution, starting by the introduction of the snowmobile in the mid-1960s, where muscular power from animals and humans to a large extent have been exchanged by motor power, at all seasons [7]. ATVs cause manifest tracks and challenge the ideal of pristine nature.

2.2 Recreation society expansion

General societal trends, such as expansion of the road system, improved personal economy; more leisure time and the car becoming everybodys property have both made mountain areas more accessible for the general urban population and also doubled the number of secondary homes during three decades [8]. Besides direct encroachments the problem for the reindeer industry is avoidance effects; i.e. the more the animals are disturbed by people, the less grazing and the poorer economy for their owners [9].

2.3 Nature protection apparatus

Major events in the set up of an administrative apparatus of nature protection were:
1962- First National Park established
1964- First National Park Plan (green book)
1970- New Nature Protection Act (adopted)
1972- Ministry of Environment
1982- Regional Environmental Departments

The phases of the Second National Park Plan were: Green book 1986, white book 1992, adoption 1993, implementation from 1994 and set up of new parks from 2001-2006 (final fulfilment planned 2010).

The internal Norwegian development went on in parallel with international events as the World Commission of Environment and Development (1987) and major conferences, such as those of Stockholm (1972) and Rio (1992). In line with this Norway has

ratified a row of international conventions including the Convention on Biological Diversity (COB, 1993).

The nature conservancy apparatus has still limited resources and operates in a tension between challenges and possibilities. One inter-national challenge is the International Union for Conservation of Nature (IUCN) goal that all countries should protect 15 % of their land surface. In 2008 Norway has reached 14.3% [10], but a major part of the protected areas are remote mountain areas with relatively low biodiversity, while protection of areas of higher biodiversity that coincide with higher population and development pressure, e. g. along waterways and fiords, lag much compared to the need of protection [11]. As in other countries, protected areas in Norway tend be *residual lands*, areas not needed for other purposes [12], or maybe areas not having actors for other interests being strong enough to avoid protection.

2.4 indigenous interests

Under influence from Social Darwinism and the doctrine of *terra nullius*, reindeer management was from the late 19th century considered as no more than a tolerated use obliged to give way to better entitlements. Major events contributing to the improvement of the societal standing of the Sámi and the reindeer industry were:

1968-Supreme Court stating full land rights
1976-General Agreement-reindeer industry
1978-Act of Reindeer Management
1987- Constitution Amendments, Sámi Act
1989-Sámi Parliament
1990-Ratification of ILO Convention 169
2005-Land Reform starts. Consultation right
2007-Agreement on protection planning

The list of events makes evident that the reindeer herding Sámi during four recent decades have improved their formal standing considerably. Obviously their expectations of influence in societal processes including processes of park establishment are quite at another level than in the 1960s.

2.5 Contemporary policy

The total protection area of Norway has increased sevenfold since 1975, mainly as an outcome of the Second National Park Plan. Obviously this could not take place without tensions and conflicts. In accordance with the intentions of Agenda 21 the Parliament took initiatives to increase local involvement and influence in protection processes and park management. One of the outcomes was that the government in 2003 advanced a new policy for increased use of national parks for commercial tourism, named the "*Mountain Text*". The intention was to give something back to local communities, i.e. to provide new opportunities for activity and income in rural areas [13]. However, this change in policy has unintended consequences.

3 Conflict of objectives

Whereas the *Mountain Text* strengthen the goal of recreation, affected Sámi herders fear that parks instead of protection for them will mean increased disturbance of vulnerable animals and areas and accordingly have changed their basic attitudes from being positive to becoming ambiguous towards new parks and park extensions.

3.1 Policy basis

According to IUCN Category II national parks are "*protected areas managed mainly for ecosystem protection and recreation*". The expansion phase of the nature protection apparatus in Norway engraved the sector by a natural science basis and political concensus processes. Accordingly, the network of protection areas were selected in accordance with expert judgment of protection value while the concrete design of the park area and management regime were adjusted through cooptation processes [14] trying to achieve as far as possible a local/regional consensus around the final solution.

3.2 Changing objectives

Up to the 1980s public reports on nature management had little focus on the relation to reindeer management. The objects clauses for parks established in the 1960s throughout the 1980s do not mention protection of the natural base for reindeer management. It is remarkable that the often only land users completely dependent on sustainable use of the protected areas not are mentioned.

This changed by the Second National Park Plan implemented from the mid 1990s. For new parks the objects clauses have an addendum: "*Safeguarding the natural base … is important for Sámi culture and industry. The area can be used for reindeer management*" [15]. Despite this, recreation is still mentioned before reindeer management, and further; the position of recreation is reinforced through the new policy of the Mountain Text. The assessments of the situation for the reindeer industry are inquired by a survey to herder leaders representing the majority of herder households in Norway [6].

3.3 Survey outcome

The survey shows that the half of the asked leaders consider the advantages of a park within their district to be greater than the drawbacks. Those having achieved better protection of their winter land are most positive as this also reduce disturbance as recreation driving with snowmobiles. Those with a more negative attitude to parks tend to be districts with parks in their summer land. This can be connected with negative experiences or expectations of increased tourism in the parks.

There is also a comprehensive dissatisfaction with how the reindeer industry has been involved in park establishment and management. I.e. the survey confirms that the reindeer herding Sámi have ambiguous attitudes towards park establishments in their areas. Park establishment can be positive, but if a park means more encroachment and disturbance, more bureaucracy and reduced influence over traditional areas of the reindeer industry, a park can also be a negative phenomenon [6]. Accordingly, the question is how, and on which premises, can it be possible to bridge the opposing interests between the reindeer industry and parks?

4 Problem and possible solutions

Our review reveals a problem including as well equity as well as efficiency aspects. Not taking action will be an obvious source of new conflicts.

4.1 Problem to address

The equity side of the problem includes making the formal achievements of the Sámi and the reindeer industry real within the field of protection policy. As the government via the Mountain Text tried to practice Agenda 21 intentions for local people, these were clearly overlooked for *indigenous* people. Moreover, the protection processes in the Second National Park Plan were conducted without taking much attention to Sámi interests, even when protests were clear, unequivocal and principally based. In all park processes, except one, Sámi protests have been overruled [4], [6]. In reality, the first principal breakthrough did not take place before 2007 (see 2.4). Until then Sámi interests have been treated like one of many interests which the protection apparatus could or could not give weight in their case treatment. However, the agreement of 2007 provides Sámi interests a special access to the process at all levels, but no guarantees of influencing the outcome. We see this as a necessary but insufficient contribution to resolve the problem for the reindeer industry; that will require that protection of herding interests receives priority over recreation interests.

4.2 Possible solutions

Norway currently reforms its conservation legislation to reinforce biodiversity protection. Though indigenous interests have not so far become a core issue in this process; this process and the international process under the COB, demanding indigenous influence within 2010, together create a window of opportunities for reconciling conflicting objectives. One of the relevant instruments is the IUCN Category VI, available from 1994, which *juxtaposes biodiversity protection and sustain-able use*. Other international instruments, such as community conservation areas, are also available, but we consider Category VI as sufficient. Our main argument is that recreation and reindeer management are no way incompatible interest; what counts is who is to give the premises, i.e. *who is going to adapt to whom*. In line with the trends of the Vth World Park Congress in 2003 we underline that protection need to be a societal issue to be efficient [16]. Therefore the long-term main users should be given priority and other interest should adapt to the reindeer industry.

5 Conclusion

We recommend that IUCN Category VI become standard category for larger protection areas within the Area of Sámi Reindeer Management Entitlement as this will provide opportunities for solving the perceived problem both on equity and efficiency basis.

References

[1] K. Jacoby, *Crimes against Nature: Squatters, Poachers, Thieves, and the Hidden History of American Conservation*, Berkeley, Calif.: University of California Press, pp. 81-146, 2001.

[2] R. Poirier and D. Ostergren, "Evicting People from Nature: Indigenous Land Rights and National Parks in Australia, Russia and the United States. Natural Resources Journal 42, pp. 331-352, 2002.

[3] S. Guldseth and L.H. Kristiansen, "En vurdering av bruk og slitasje i Øvre Dividal Nasjonalpark [An Assessment of Use, Wear and Tear in Øvre Dividal National Park]," master thesis, Dept. of Nature Management and Biology Sciences, Agricultural University of Norway, Ås, 1992 (in Norwegian).

[4] NOU 2004:28 (Public report series) Naturmangfoldloven [Act of Biodiversity]. Oslo, Bergen, Stavanger, Tromsø: Universitetsforlaget (in Norwegian)

[5] J.Å. Riseth, "An Indigenous Perspective on National Parks and Sámi Reindeer Management in Norway. *Geographical Research,* vol. 45, no. 2, pp.177-185, June 2007 doi:10.1111/j.1745-5871.2007.00449.x.

[6] J.Å. Riseth and A. Holte, "Rennäring och naturskydd i Norge – ett ambivalent förhållande [Reindeer Industry and Nature Conservation in Norway]. *Omstridd natur. Trender och utmaningar i nordisk naturförvaltning* [Disputed Nature. Trends and Challenges in Nordic Nature Management], C. Sandström, S. Hovik and E. Falleth, eds., Stocholm: Borea, forthcoming fall 2008 (in Swedish).

[7] J.Å Riseth "Sámi reindeer herd managers: why do they stay in a low-profit business? " *The British Food Journal*, vol. 108, no. 7, pp. 541-559 (2006) doi:10.1108/00070700610676361.

[8] T. Arnesen, B. Ericsson and S. Flygind (2002), "Hytter og fritidsboliger. Fritidsboliger i Norge: Lokaliseringsmønster 1970 – 2002 [Cottages and second homes in Norway. Pattern of localization 1970-2002] *Utmark,* vol. 3, no. 3, available at *www.utmark.org*, 2002.

[9] I.I.Vistnes, "Impacts of Human Development and Activity on Reindeer and Caribou Habitat Use" Dr. Philos. Thesis. Norwegian University of Life Sciences, Dept. of Ecology and Natural Resource management. Ås, 2008.

[10] Directorate for Nature Management State of the Environment Norway: Protected areas, available at http://www.environment.no/Tema/Naturomrader/Vernet-natur/ 07.03.2008.

[11] T. Arnesen and J. Å. Riseth, "Protection and equity?: Local and indigenous encounters with the grand scheme of area protection in Norway", *Nordic Tourism: Issues and Cases.* M. Hall, D. Muller and J. Sarinen (eds.). Channelview, forthcoming fall 2008.

[12] M. Adams, "Beyond Yellowstone? Conservation and Indigenous Rights in Australia and Sweden", *Discourses and Silences: Indigenous Peoples, Risks and Resistance*, G.Cant, A. Goodall and J. Inns (eds). Dept. of Geography, University of Canterbury, Christchurch, 127-138, 2005.

[13] T. Arnesen and J. Å. Riseth, "Om konflikter och områderiktade naturskyddsprocesser i Norge.[On conflicts and territorial nature protection processes in Norway]" *Omstridd natur. Trender och utmaningar i nordisk naturförvaltning***.** [Disputed Nature. Trends and Challenges in Nordic Nature Management], C. Sandström, S. Hovik and E.

Falleth, eds., Stocholm: Borea, forthcoming fall 2008 (in Swedish).
[14] L. J., O'Toole, and K.J. Meier, "Desperately seeking Selznick: Cooptation and the dark side of managing networks." *Public Administration Review* 64(6): 681-693, 2004.
[15] www.lovdata.no
[16] G. Andrade, "Science and society at the World park Congress, *Conservation Biology*, Vol 19, no. 1, pp.4-5, 2005.

Jan Å. Riseth M. Sc. in Nature Management (1979) Ph. D. in Natural Resource Economics (2000); Directorate for Reindeer Management 1980-90. Municipality of Narvik 1990-92. Narvik University College 1992-2002. Norut- Northern Research institute 2002-. Sámi University College, Sámi Research Institute (part time) 2003-; *Research interests:* Nature management. Sámi Reindeer Management (climate change, traditional/indigenous knowledge, institutional economics, innovations).

National park visitors' interest to use tourism services in rural communities

Tuija Sievänen, Marjo Neuvonen and Eija Pouta

Abstract — National park visitation can have a considerable economic impact in rural areas. It is valuable to understand the factors, which explain the interest and use of tourism services in rural communities in the vicinity of national parks. The aim of this study were to analyse if there were visitor groups whose intention to use the services differed and what kinds of services were the most interesting for these visitor groups. The study focused on the association between the visitor segments based on service use intention, and background factors such as attitudes towards country-side in general, and visitors' socioeconomic background. Furthermore, the relation between visitor segments and visit intentions and satisfaction were studied. We examined these topics in two regions in Finland, where tourism industry is not a strong economic actor at the present. The data was collected in two national parks, Seitseminen and Linnansaari, in Central and Eastern Finland. The number of responses was 554, and the response rate was 68. Preliminary results show that national park visitors can be divided into two main groups considering the interest in using tourism services. First part of park visitors were outdoor recreation oriented and interested to use non-motorized or motorized outdoor activities such as fishing tours, nature studying excursions and snowmobile safaris. The other part of the park visitors was 'general tourists' who were interested mainly in tourism services such as accommodation and restaurants, etc. The visitor groups differed with respect their intention to visit the park and the region, countryside attitudes and socioeconomic background variables. The results of this study may help tourism enterprises in surrounding rural communities to find the right clientele for their services and products. For the park managers this information is valuable when planning the future management policies and actions. The understanding and recognition of visitors' overall needs, when visiting the park and the surrounding countryside, is also needed by actors such as municipality decision makers and inhabitants of rural communities.

Index Terms — Nature-based tourism, visitor, visitor segmentation.

1 Introduction

In many rural communities, where agriculture and forestry have experienced a remarkable reduction, and can not provide the principal livelihood, nature tourism is looked for as a new opportunity to offer economic alternatives for the community. The magnitude of the tourism impact on local economy depends on the number of visitors to the national park, their interest to use local tourism services, and their expenditure in local and regional services and products. In this study we focus visitors' intention to use services on the region of a national park in the future.

In Finland, half of the national parks are located in southern part of the country, where the majority of Finnish population lives. These parks are relatively small in area, and they locate in the most rural landscapes of their regions. For the majority of the popula-

T. Sievänen is with Finnish Forest Research Institute, Vantaa Research Centre, PL 18, 01301 Vantaa, Finland E-mail: tuija.sievanen@ metla.fi
M. Neuvonen is with Finnish Forest Research Institute, Vantaa Research Centre, PL 18, 01301 Vantaa, Finland E-mail: marjo.neuvonen@ metla.fi
E. Pouta is with MTT Agrifood Research Finland, Economic Research, Luutnantintie 13, 00410 Helsinki, Finland E-mail: eija.pouta@:mtt.fi.

tion, the parks are tourism destinations rather than close-to-home recreation areas. Many of these parks are fairly young, established during the last two decades. At the time of establishment, there has been often strong local objection for the park. However, today parks are more and more often seen as an opportunity for tourism service entrepreneurs than as an obstacle for primary production.

According to Metsähallitus [1] there were about 1.6 million visits to 35 Finnish national parks in 2007. Around 20% of Finns visit national parks or other state owned recreation areas at least once a year [2]. High education and employment status, participation in cross-country skiing, downhill skiing and camping increases the probability of visit the state protected areas [3].

Studies of characteristics of tourism destinations, attractions of nature-based tourism and nature tourism management alternatives discuss the choice of destination and factors related to it [4], [5], [6], [7]. A destination is a package of the attraction itself (national park) and tourism facilities and services available at the destination. It is composed of a number of attributes that together determine the attractiveness of the travel destination to a particular tourist [8]. It is important to look the national park tourism from the point of view of the 'holistic tourism experience' including the park visit and the visit to the region. The holistic perspective may help tourism enterprises in surrounding rural communities to assess their services and products to fulfil the park visitors' needs. Understanding and recognition of visitors' overall needs when visiting the park and the countryside is essential for all actors around a park: municipality decision makers, entrepreneurs and inhabitants of rural communities, as well as park managers.

The objective of this study is to get a better understanding how visitors to a national park intend to use the services provided in the park region in the future. We are interested to see are there visitor groups whose intention to use the services differs and what kinds of services are the most interesting for these visitor groups? The aim of this study was also to analyse if there is association between the visitor segments based on service use intention, and background factors such as attitudes towards country-side in general, and visitors' socioeconomic background. Furthermore, we were interested to see which visitor groups had highest intention to visit the park again, or the region again, and how satisfied they were to the visit in the park.

2 DATA AND METHODS

2.1 Study area

The study was conducted in two national parks in Southern Finland. The natural environment in Linnansaari is characterised by distinguished lake scenery [9] as the Linnansaari National Park is located in the middle of the large lake area in Eastern Finland. The natural landscape in Seitseminen National Park is forest dominated. Linnansaari was established in 1956, and Seitseminen in 1982. Linnansaari and Seitseminen parks provide a high standard of park services, e.g. visitor centres, trails and camping sites with fire rings. The communities close to Linnansaari national park are more urbanised and provide more tourism services for park visitors than municipalities close to Seitseminen [10]. In 2007 there were 44 000 visits to Seitseminen National Park, and 29 000 to Linnansaari National Park ([1]).

The empirical data used here was collected from Seitseminen and Linnansaari national parks in 2006. The sampling season was from the mid May to the beginning of October. Altogether 544 respondents returned the inquiry. Response rates were 72% in Seitseminen, and 63% in Linnansaari. Along the questionnaire the respondents were informed with a map about the boundaries of the park area and the boundaries of the surrounding countryside,

which was chosen to represent the local community in this study.

2.2. Variables

The key variables used were the interest to use different kinds of tourism services. The actual use and interest to use services were measured with a list of 37 items. The list of tourism services included guided excursions, equipment rentals, rentals for sauna, room for festivities, catering services, cafes and restaurants, renting different types of accommodation, possibilities to visit a farm and to participate in farm activities etc. Both the intentions to visit the park and the region again were measured. The satisfaction to services was measured using Likert-type scale (1-5). For the analysis we calculated an index variable where the single attribute of satisfaction were weighted with the importance of that service. From many other items concerning the visit to the park and the surrounding country-side we used here attitudes towards countryside and some socioeconomic background variables to profile the visitor groups.

2.3 Analyses

From statistical methods we first used factor analysis (Maximum likelihood extraction and Varimax rotation) to find service packages in which visitors' interests of using were mostly correlated. Based on these packages we used K-means clustering analysis to identify different visitor groups. To compare the visitor groups we used analysis of variance.

3 Results

Almost half of the visitors did come to the region only because of the national park, and more than half of the visitors informed that their contact to local people occurs only when using local services. Many visitors to Linnansaari and Seitseminen national parks had some regular contact to the region: relatives or friends lived in the region, or they had some other interest (a special outdoor or cultural activity, etc.), to visit the park, or they owned a recreation home close by.

The visitors were divided into six groups based on the results of factor and cluster analysis of the future interest of using the services provided in the region. The visitor groups were 1) visitors who were interested in guided excursions, labelled as 'guided'; 2) visitors how were interested mainly in services which support independent recreation in the park; labelled 'independent' ; 3) visitors who were interested in motorized safaris, labelled as 'safaris'; 4) visitors who were interested in activities and services related particularly to the rural life (farm life, farm products etc.), labelled as 'countryside'; 5) visitors who were interested in renting room for family festive events and catering services, labelled as 'fest services', and 6) visitors who were interested in renting accommodation and equipment, labelled as 'room and rentals'.

TABLE 1.

National park visitor groups based on their interest to use services in the park vicinity...

	Groups	%, of visitors
Outdoor recreation oriented	Guided	15
	Independent	14
	Safaris	27
Tourism oriented	Country-side	15
	Fest services	14
	Room & rentals	15

Respondents were fairly equally distributed in all these groups, only the group of "safaris" was bigger than others (Table 1). These groups could be titled as outdoor recreation oriented and tourism oriented based on the services they were interested.

The groups differed significantly with respect the background variables (table 2). Those visitors, who expressed the most positive attitude towards countryside, were

TABLE 2.

INTENTION TO VISIT THE PARK AGAIN, ATTITUDE TOWARDS COUNTRY SIDE, SATISFACTION TO PARK SERVICES AND SOCIOECONOMIC BACKGROUND VARIABLES IN DIFFERENT VISITOR GROUPS. VARIABLES IN BOLD ARE STATISTICALLY SIGNIFICANTLY DIFFERENT BETWEEN GROUPS.

Variables	Outdoor recreation oriented groups			Tourism oriented groups			
	Guided	**Inde-pen-dent**	**Safaris**	**'Coun-try-side**	**Fest ser-vices**	**Room & rent-als**	
			Mean				**F-statistic (p-value)**
ATTITUDE towards countryside, sum index	53	53	50	51	50	50	3.469 (0.004)
AGE, years	50	42	47	41	46	42	3.942 (0.002)
HOUSEHOLD INCOME group	6.6	6.3	6.7	5.1	6.3	6.4	3.306 (0.006)
			% of respondents				**Chi-square (p-value)**
SEX , female	52	39	42	61	48	50	8.140 (0.149)
Access to RECREATION HOME in region	19	20	27	30	27	6	13.644 (0.018)

TABLE 3.

GENERAL SATISFACTION AND INTENTION OF VISITOR GROUPS TO VISIT THE PARK AND REGION AGAIN.

Variables	Outdoor recreation oriented groups			Tourism oriented groups			
	Guided	**Inde-pen-dent**	**Safaris**	**'Coun-try-side**	**Fest ser-vices**	**Room & rent-als**	
			Mean				**F-statistic (p-value)**
Satisfaction to the quality of park services, sum index	49	49	47	51	50	50	0.747 (0.589)
Satisfaction to the quantity of park services, sum index	16	15	18	16	16	16	0.915 (0.472)
			% of respondents				**Chi-square (p-value)**
INTENTION to visit the PARK again	74	72	68	67	80	56	9.887 (0.079)
INTENTION to visit the REGION again	69	75	69	71	70	49	11.873 (0.037)

the two groups, who were interested in outdoor recreation services, either guided excursions or independently. The 'countryside' group had more often than others access to recreation home on the region. Guided excursions were in interest of older people, and motorized safaris among visitors with the highest household income.

Variables that measured the overall satisfaction for the park visit itself did not show any differences between the visitor groups, when the classification was made accord-

ing to the interest to use countryside tourism services (Table 3).

Intention to visit the park again as well as intention to visit the region again, differed between groups (Table 3). The visitor group 'room & rentals', which was the most 'tourist' type of visitors, as they expressed the most needs for accommodation, expressed least interest to visit again either the park or the region. Those visitors who expressed interest to use services related to organizing family events or festivals in the region, were the most interested to visit the park, and also the region again. These visitors had often also other contacts to region such as a recreation home. The two groups, who were interested in outdoor recreation services, either guided excursions or independently had also fairly high interest to visit the park and the region again, particularly the independent group. The 'countryside' group, who seemed to have a continuous interest to visit the region (access to recreation home), were among the three least interested groups to visit the park again.

4 Conclusions

These preliminary results of national parks visitors and their interest towards local tourism services in the countryside around a park showed that the park visitors are rather heterogeneous in what type of services they are interested in, and also, how the interest relates to the intention to visit the park itself and the region again. Those visitors who are outdoor recreation oriented and interested in renting equipment or buying guided excursions, were among those who were the most interested to visit the park again. Particularly those who expressed their interest for independent recreation, were also most interested to take another visit to the region. This result suggests that there is potential for entrepreneurs to reach national park visitors to use tourism services in the vicinity of the park, but obviously there is need to develop the provision of those services in order to appeal different types of visitors.

More research is needed to identify the multilevel interactions between the visit motivation to the national park and park communities, tourism service use and the intention to revisit the region.

References

[1] Metsähallitus. *Käyntimäärät kansallispuistoissa yhteensä*. 2008. <http://www.metsa.fi/page.asp?Section=2847>, 21.4.2008. In Finnish. ,

[2] E. Pouta and T. Sievänen, "Luonnon virkistyskäytön kysyntätutkimuksen tulokset - Kuinka suomalaiset ulkoilevat". *Luonnon virkistyskäyttö 2000.* T. Sievänen, ed., Metsäntutkimuslaitoksen tiedonantoja 802, pp.32-76, 2001

[3] E. Pouta, T. Sievänen and M. Neuvonen, "Profiling recreational users of national parks, national hiking areas and wilderness areas in Finland". *Policies, Methods and Tools for Visitor Management - Proceedings of the Second International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas*, T. Sievänen, J. Erkkonen, J. Jokimäki, J. Saarinen, S. Tuulentie and E.Virtanen, eds., June 16-20, 2004, Rovaniemi, Finland. Working Papers of the Finnish Forest Research Institute 2: 347-354, 2004.

[4] S.W. Boyd.and R.W. Butler, Managing ecotourism: an opportunity spectrum approach. Tourism Management, Vol. 17, no 8, pp 557-556, 1996

[5] J. Deng, B. King and T. Bauer, Evaluating natural attractions for tourism. *Annals of Tourism Research,* vol. 29, no 2, pp. 422-438, 2002.

[6] S. Formica. Measuring destination attractiveness: A Proposed Framework. *Journal of American Academy of Business*, Cambridge; Mar 2002,1,2.

[7] N. Leiper. Tourist attraction systems. *Annals of Tourism Research*, vol17,pp367-384,1990

[8] K. Hong-Bumm, Perceived attractivenessss of Korean destinations. *Annals of TourismResearch* vol.25, no2, pp340-361, 1998

[9] J. Puustinen, E. Pouta, M. Neuvonen, T, Sievänen. *Kansallispuistojen kävijämäärää selittävät tekijät*. In: L. Tyrväinen and S. Tuulentie (eds.). *Luontomatkailu, metsät ja hyvinvointi*. Working Papers of the Finnish Forest Research Institute 52. 227 pp. available at <http://www.metla.fi/julkaisut/workingpapers/2007/mwp052.htm> 2007. In Finnish.

[10] A. Selby, T. Sievänen, M. Neuvonen, L. Petäjistö, E. Pouta, and J. Puustinen. *Kansallispuistojen matkailullinen luokittelu.* Working Papers of the

Finnish Forest Research Institute 61. Available at <http://www.metla.fi/julkaisut/workingpapers/2007/mwp061.htm>. 2007. In Finnish.

Tuija Sievänen is a senior scientist and the project leader of outdoor recreation and nature tourism studies.

Marjo Neuvonen is researcher and statistician and specialised in outdoor recreation and nature tourism studies.

Eija Pouta is a principal research scientist specialised in outdoor recreation and valuation of natural resources and environmental effects.

MMV4 PROCEEDINGS
CONFLICTS

Silence – an article of short supply in outdoor recreation? Handling noise conflicts in Swedish planning

Rosemarie Ankre, Lena Petersson Forsberg and Lars Emmelin

Abstract — Outdoor recreation areas are exposed to several causes of conflict. Many interests, along with different types of recreation activities, are competing in the same area. In these areas, conflicts are handled by spatial planning and by the separation in space of different functions. One source of conflict is noise. The lack of noise-free areas in the Swedish coastal areas has become an amenity problem. Does this make noise an important problem to consider in planning?

An assumption is that the sound environment is relevant for the visitors' experience; spending time in nature is associated with peace and quiet, where one should not be disturbed. In this study, it will be investigated how silence and noise actually are considered in the Swedish municipal planning. "Silence" is one of the amenity categories reported in the Swedish tourism data base. Is there a discrepancy between the existing municipal planning and the visitors' opinions, attitudes and experiences?

Furthermore, there will be an analysis of how silence and noise could be handled in spatial planning. One possible method is zoning. By excluding certain outdoor recreation activities from some areas, zoning may handle, or at least reduce, the problem of conflicts. The biosphere reserve concept (where zoning is an important part) will for that reason be discussed as a potential tool. A case study of the Blekinge archipelago, Sweden is the foundation of the study, which data consist of planning documents and questionnaire surveys considering outdoor recreation and nature tourism.

Index Terms — Conflicts, noise, planning, outdoor recreation, zoning.

1 Introduction

The "soundscape" is receiving increased attention as an important factor in visitor experiences in outdoor recreation and nature tourism. Peace and quiet are not only sought-after, but difficult to experience in society of today [1]; [2]; [3]; [4]. The problem with noise has to be viewed comprehensively since the concept is subjective. Management of soundscapes needs to take both the positive and negative aspects of sound into account. Noise is an individual experience depending on, for example, one's expectations, the location, and the activities performed [5]. The lack of noise-free areas in the Swedish coastal areas has become an environmental problem.

The level of unwanted sounds is increasing while areas with sound environments of quality are diminishing [6].

Depending on the type of area standards

Rosemarie Ankre is a PhD candidate at Blekinge Institute of Technology, department of Spatial planning Karlskrona. She is situated at the European Tourism Research Institute and Mid-Sweden University Östersund, Sweden.
E-mail: rosemarie.ankre@etour.se
Lena Petersson Forsberg is a PhD candidate at Blekinge Institute of Technology, department of Spatial planning Karlskrona, Sweden.
E-mail: lena.peterssonforsberg@bth.se
Lars Emmelin is professor of Environmental impact assessment at Blekinge Institute of Technology, department of Spatial planning Karlskrona, Sweden.
E-mail: lars.emmelin@bth.se

for noise level and exposure vary. Noise classification exists for both urban and natural areas in Sweden [7]. In the summer of 2008, two "quiet areas" have been established in nature reserves in the Stockholm's archipelago because of the increasing noise and number of boats in the nature reserves. In these places, one should be able to experience peace and quiet. There is, however, no legislation. Instead people should show each other consideration built on respect and willingness [8].

2 Silence and noise

Silence and natural quiet (sounds of nature undisturbed by noise caused by human activity) are being recognized as an important and endangered resource [9]. Some sounds may be unwanted (for example, traffic, loud music, shouting), which is referred to as noise. In an area where individuals do not expect noise, even low sound-levels may be perceived as annoying in comparison to an area where noise is expected [10].

Nature experiences are normally associated with peace and quiet. Negative attitudes to motorized activities can be expected, especially if they are regarded as unnecessary [11]. If silence is viewed as important in a visitor's experience, it might cause recreational conflicts if the wishes for a certain experience are not fulfilled [12].

Noise in recreation areas is a concern to both managers and users [13]; [14]; [15]; [16]. An extensive usage of different motor-driven vehicles in areas where silence is considered as vital can cause conflicts between different stakeholders. Noise disturbs birds, animals and fauna, which cause conflicts with the interests of nature conservation [17].

3 Zoning

Zoning is a classic instrument in spatial planning and conservation for prioritization and resolving land use conflicts. One model for zoning which is now applied in the study areas is the "biosphere reserve" [1].

The *Recreation Opportunity Spectrum* (ROS) is a planning framework, with an approach of providing a range of recreational opportunities where zoning is applied on the landscape. The ROS has typically been applied at a regional level and supports a development of recreation experiences where areas are classified and divided after the environmental conditions and the recreational activities. The ROS is an organising or conceptual framework where management judgment is needed in the application [18]. The planning framework has been outlined in several publications [19]; [20]; [21]; [22].

However, implementing zoning of a biosphere reserve and applying the ROS-model may not be a simple matter. The Swedish coastal areas consist of inhomogeneous landscapes because of a variation of geography and nature, differences of accessibility, possibilities of different activities, blurred boundaries of rural and urban living, and mental perceptions of what an archipelago is. This together creates complicated arenas to plan and manage [23].

4 Method

This paper consists of the results of three independent surveys. A questionnaire was mailed to 1259 visitors and second home owners in the Blekinge archipelago, Sweden in 2007 and the response rate was 52%.

Another questionnaire was sent to a random sample of 800 local residents in Blekinge archipelago in 2007 and the response rate was 41%. The current Swedish municipal spatial comprehensive planning regarding outdoor recreation and nature tourism was examined by a web based survey sent to municipal planning officials in all 290 Swed-

[1] The biosphere reserves are appointed by the UNESCO. The main functions are to promote social and economic development, to protect biodiversity and to be the scene for research and education.

ish municipalities in 2007. The response rate was 64%.

5 RESULTS

Most municipalities in Sweden do not explicitly have quiet areas in their municipal spatial comprehensive planning documents. In only 38% of the documents, quiet areas were mentioned in text or indicated on the map (or both). 21% of these quiet areas were already protected as nature reserves, by detailed development plans or by guiding principles that are not legally binding in the comprehensive plans. Another small portion of quiet areas were said to be protected in the future. 5% of the planning officials thought that the issue of quiet areas was of no immediate importance in their municipality.

Many Swedish municipalities (67%) do not describe conflicts between different kinds of outdoor recreation in their municipal comprehensive planning documents. However, the most commonly described conflicts are the ones causing noise, as motorboats, jet skies and snowmobiles, versus those seeking peace and quiet.

In the survey with visitors and second home owners, the respondents stated what activities they had carried out during their stay. Rest and relaxation (77%) got the highest percentage. Answering what had influenced them to visit the area; a factor of *great importance* was the possibility of experiencing peace and quiet (49%).

Furthermore, noise as a conflict had been experienced *rather much* and *very much* by only 6% of the respondents. Reckless driving of motorboats and jet-skies were noted causes of noise. Speed limits for motorboats in the Blekinge archipelago (which also would mean less noise) was viewed as *very negative* by 3% and *negative* by 7%, while 34% were *positive* and 21% *very positive*.

A comparison was made between the respondents' attitudes towards noise-free zones through restrictions for all motor traffic (on land and water) in Sweden and their attitudes to noise-free zones in the Blekinge archipelago. 10% were *negative* or *very negative* towards this zoning in Sweden in general, while 16% had the same attitude towards noise-free zoning in the archipelago. There was also a difference between the respondents' attitudes when being *positive* or *very positive*; in Sweden in general a total of 49% and in Blekinge archipelago 33%.

Among the visitors and second home owners, 47% were *positive* or *very positive* towards noise-free zoning through restrictions on motorboats in Sweden, while 35% had the same positive attitude if applied to the Blekinge archipelago. 12% were *negative* or *very negative* to this type of zoning in Sweden, while 16% had this attitude if applied in the archipelago.

A majority of the local residents in Blekinge that answered the survey, 91%, had a positive attitude towards noise-free areas in general.

92% of residents in Blekinge considered noise originating from vehicles, industries etc as *negative* or *very negative* for their outdoor experience. Noise from outdoor activities such as motorboats, snowmobiles and music where considered *negative* or *very negative* by 65% of the Blekinge residents.

6 DISCUSSION

The experience of noise is subjective, which makes it important to gather information of who is disturbed and where, by what noise and in what situations in planning of coastal areas and for methods of handling conflicts of noise.

The number of fast and large motorboats continues to increase which leads to a clash with other users who wants peace and quiet. It is important to see that noise is an aspect of power; who has the right to decide how, where and when there should be silence? People want peace and quiet which makes silence an asset in outdoor recreation and nature tourism. Knowledge of the visitors' activities, number, needs and motivations is therefore essential. With better knowledge in

planning of noise from the visitors' perspective, silence could be better preserved.

Studies of coastal management practice tend to regard voluntary agreements for zoning and exclusion to be more likely to succeed than legal mechanisms [24].

The ROS-model could be further developed for use in planning and in handling conflicts in Swedish coastal areas, by including the opinions, attitudes and experiences of visitors (and non-visitors). So far, in the application of the ROS in Sweden, the focus has been on resolving the conflict between nature conservation and different forms of recreation development. The right of public access [2] creates a context for regulations of activities and admittance, which requires an adjustment of the ROS to Swedish, conditions [25].

7 Conclusion

A biosphere reserve is promoted as a model for public learning on sustainable development. Zoning is a practical means to apply ecological principles. However, the biosphere reserve zoning is not entirely functional today. If and how special "quiet areas" with restrictions on motorboats could be implemented in a potential biosphere reserve in the Blekinge archipelago is a discussion to carry further.

A majority of the Swedish municipalities do not express knowledge of quiet areas in their comprehensive planning documents. Even if the comprehensive plan is not legally binding it should act as a guide to more detailed development plans and building permits. Therefore it is important that the comprehensive plans provide policy guidelines on the issue how to handle quiet areas. It is likely that Swedish municipal planning officials and decision making politicians need more knowledge of the quiet areas as an amenity and important asset.

In planning and management of conflict and noise, various issues could be addressed. What sounds do the visitors find appropriate, what are their demands regarding silence, and what are the area's preconditions? Also, what is the cause of the sound (for example, mischief or necessity) and what is the area's mechanical development? The survey results of the municipalities might indicate that many of them do not know if and where quiet areas are located within their boundaries. Further research is also needed to determine whether the knowledge of quiet areas is used in the planning process even though it is not visible in the planning documents.

There may be differences between motorized and non-motorized recreation activities and differences in the motivations, goals, environmental values and behaviors of different recreation participants in the archipelagos. In Swedish municipal spatial planning several and often competing interests must be handled. Preserving quiet areas for recreation is only one of these interests.

References

[1] Kariel, H. (1990). Factors affecting response to noise in outdoor recreational environments. The Canadian Geographer, 34 (2), 142-149.

[2] Mace, B., Bell, P. & Loomis, R. (1999). Aesthetic, Affective, and Cognitive Effects of Noise on Natural Landscape Assessment. Society & Natural Resources, 12, 225-242.

[3] Cessford, G. (2000). Noise Impact Issues on the Great Walks of New Zealand. USDA Forest Service Proceedings RMRS-P-15, 4, 69-76.

[4] Hamilton, M. (2003). Aircraft activity and sound levels relative to recreation opportunity spectrum settings in the Great Barrier Reef Marine Park: A case study from Whitehaven Beach, Whitsunday Island. Research Publ.No. 75. Townsville: Great Barrier Reef Marine Park Authority.

[5] Naturvårdsverket. (2005). Ljudkvalitet i natur- och kulturmiljöer. Förslag till mått, mätetal och inventeringsmetod. Rapport 5439. Stockholm: Naturvårdsverket.

[6] Boverket. (2003). Buller delmål 3 – underlagsrapport till fördjupad utvärdering av miljömålsarbetet. Rapport God bebyggd miljö april 2003. Karlskrona: Boverket.

[7] Naturvårdsverket. (2005). Ljudkvalitet i natur- och kulturmiljöer. Förslag till mått, mätetal och

[2] The right of public access allows everyone to move freely across private land in the countryside within certain limits and without damaging nature.

inventeringsmetod. Rapport 5439. Stockholm: Naturvårdsverket.
[8] Länsstyrelsen i Stockholms län. (2008). Hänsynsområden i skärgården http://www.ab.lst.se/templates/InformationPage____11790.asp 10/07/08
[9] Newman, P., Manning, R., Pilcher, E., Trevino, K. & Savidge, M. (2006). Understanding and Managing Soundscapes in National Parks: Part 1 – Indicators of Quality. Exploring the Nature of Management. Proceedings of the Third Int. Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas. Switzerland 13-17 September 2006, 193-195.
[10] Banverket et al. (2002). Ljudkvalitet i natur- och kulturmiljöer. Förslag till mått, mätetal och inventeringsmetod. Stockholm: Bulleransvariga myndigheter, samverkansgruppen.
[11] SOU Statens offentliga utredningar. (1993). Naturupplevelser utan buller – en kvalitet att värna. 1993:51. Stockholm: Miljö- och naturresursdepartementet.
[12] Lindberg, K., Denstadli, J., Fredman, P., Heldt, T. & Vuorio, T. (2001). Skiers and snowmobilers in södra Jämtlandsfjällen: Are there recreation conflicts? Rapport 2001:12. Östersund: ETOUR Mid Sweden University.
[13] Harrison, R., Clark, R. & Stankey, G. (1980). Predicting Impact of Noise on Recreationists. San Dimas: Forest Service, U.S. Department of Agriculture.
[14] Ewert, A., Dieser, R. & Voight, A. (1999). Conflict and the Recreational Experience. In E. L. Jackson and T. Burton (Eds.), Leisure Studies. Prospects for the Twenty-first Century. Pennsylvania: Venture Publ., College State Pennsylvania.
[15] Gramann, J.H. (1999). The effect of mechanical noise and natural sound on visitor experience in units of the National Park System. Social Science Research Review, 1 (1).
[16] Cessford, G. (2000). Noise Impact Issues on the Great Walks of New Zealand. USDA Forest Service Proceedings RMRS-P-15, 4, 69-76.
[17] SOU Statens offentliga utredningar. (1993). Naturupplevelser utan buller – en kvalitet att värna. 1993:51. Stockholm: Miljö- och naturresursdepartementet.
[18] Manning, R. (1999). Studies in Outdoor Recreation. Search and Research for Satisfaction. 2nd ed. Corvallis: Oregon State University Press.
[19] Clark, R. & Stankey, G. (1979). The Recreation Opportunity Spectrum: A Framework for Planning, Management, and Research. U.S. Dep. of Agriculture Forest Service. Pacific Northwest Forest and Range Experiment Station, General Technical report PNW-98 December 1979.
[20] Driver, B.L. et al. (1987). The ROS Planning System: Evolution, Basic Concepts, and Research Needed. Leisure Sciences, 9 (3), 201-212.
[21] Manning, R. (1999). Studies in Outdoor Recreation. Search and Research for Satisfaction. 2nd ed. Corvallis: Oregon State University Press.
[22] Stankey, G., McCool, S., Clark, R. & Brown, P. (1999). Institutional and Organizational Challenges to Managing Natural resources for Recreation: A Social Learning Model. In E. Jackson and T. Burton (Eds.), Leisure Studies. Prospects for the Twenty-First Century. Pennsylvania: Venture Publishing, Inc.
[23] Ankre, R. (2007). Understanding the visitor. A prerequisite for coastal zone planning. 2007:09. Karlskrona. Blekinge Institute of Technology.
[24] Roe, M. & Benson, J. (2001). Planning for Conflict Resolution: Jet-Ski Use on the Northumberland Coast. Coastal Management, 29, 19-39.
[25] Emmelin, L., Fredman, P. & Sandell, K. (2005). Planering och förvaltning för friluftsliv – en forskningsöversikt. Rapport 5468. Stockholm: Naturvårdsverket.

Rosemarie Ankre is a PhD candidate with a LicTech in Spatial Planning.
Understanding the visitor. A prerequisite for coastal zone planning. 2007:09. Karlskrona: Blekinge Institute of Technology.

Lena Petersson Forsberg is MSc and PhD candidate in Spatial Planning.

Lars Emmelin is professor of environmental assessment in the Swedish School of Planning, Blekinge Institute of Technology, Karlskrona, Sweden and associate of the Swedish EIA-Centre, SLU, Uppsala. Lars Emmelin is the research director of the national programme “Tools for environmental assessment” financed by the Swedish Environment Protection Agency. He was formerly visiting professor and responsible for building up the research programme on nature tourism at ETOUR. He is the author on some 200 papers on environmental assessment, planning, conservation and management for outdoor recreation. He is at present engaged in writing for a textbook on planning and management of nature for outdoor recreation and tourism.

The dilemma of recreational use versus nature protection – Responses from National Park authorities in Austria, Germany and Switzerland

Dennis Kalisch and Axel Klaphake

Abstract — National Parks in Central Europe, which attract millions of visitors annually, are being threatened by a wide variety of negative impacts. In this highly populated region, we find numerous hazards caused by infrastructure, agriculture and tourism. For this reason, preserving the environment is the main goal of the National park authorities. As visitor numbers increase, there is a consequential increase in environmental impacts and conflicts between different visitor groups. In order to balance tourism and conservation and to reduce and minimize negative effects on the ecosystem, authorities implement visitor management strategies. These require specified knowledge about visitor flows, visitor numbers and the main activities undertaken by visitors. Over the past years most european National Parks have adopted periodical visitor monitoring, to gather data about visitor numbers and characteristics. There exists however differences in quality and extent of monitoring programs. With this in mind, we surveyed a number of National Park authorities to gauge their perception of recreation use level, different National Park activities and the application of management tools in the parks. Overall we asked 21 authorities in Austria, Germany and Switzerland to complete a questionnaire which includes questions about current and expected visitor numbers, monitoring of the current recreation use and impacts, measures to control the recreational use, conflicts between nature and tourism and cooperation with other stakeholders in the area. The result of the survey suggests that most of the authorities (81%) simply estimate the recreational use in national park. More than half of authorities anticipate an increase of visitor numbers (especially in National Parks founded in the late 1990s) and none expect that numbers will decrease. They report various suitable protective measures that are in operation and accepted by the National Park visitors. All in all, the authorities consider any negative environmental impacts of visitor activities to be moderate.

Index Terms — national park tourism, recreation management, visitor activities, monitoring

1 Introduction

Pristine nature is the basis for most recreational activities and also the main motive for people to visit National Parks. These areas contain natural and cultural resources of great importance to the national as well as international community. Protected areas such as national parks offer a great variety of opportunities for tourism and recreational use. Socio-demographic changes and new trends in outdoor tourism, especially in sport activities, are leading to an increasing and constantly changing demand for areas which are suitable for a wide range of recreational activities [1]. However large visitor numbers are also a cause of ecological degradation. Too many visitors can cause unacceptable impacts on fragile natural and cultural resources, and can also cause conges-

Dennis Kalisch. Author is with the Department of Landscape Economics, Institute for Landscape and Environmental Planning, Technical University Berlin, Germany. E-mail: dennis.kalisch@mailbox.tu-berlin.de.
Axel Klaphake. Author is with Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ), Germany. E-mail: axel.klaphake@gtz.de

tion and other social impacts that degrade the quality of the visitor experience [2]. In Central Europe, National Parks tend to be located close to areas of high population density and sophisticated management plans are vital to prevent their overuse.

The dilemma of natural and landscape protection versus recreational use in these areas is the subject of complex debate. Explicit research studies have evaluated concepts of visitor monitoring and management, from both a theoretical and practical viewpoint. Our study explores the problem of visitor management from a management point of view, in order to provide a comprehensive picture of the on-site situation in National Park management.

2 MATERIALS AND METHODOLOGY

2.1 National Parks in Europe

There are almost 400 [3] national parks in Europe, offering visitors a wide variety of scenery. These range from alpine landscape, karst formations, lakes, rivers, tidal areas, islands, forests, fenlands, grasslands, and steppes, from the North Cape in Norway to Sicily. The largest concentration of national parks (95 national parks) is located in Scandinavia, where the first European national park was founded in 1909 in Sweden (Sarek National Park). In Central Europe (Austria, Germany and Switzerland) 23 National Parks cover an area from the Wadden Sea in the north of Germany to the Alpine National Parks in Austria and Switzerland. Legislation in the parks highlight four main goals: nature conversation, environmental education, recreation and research. To fulfil their conservation and recreation objectives, managers of protected areas have an array of strategies to manage both social and ecological impacts. Manning [4] describes management approaches as basic conceptual strategies to management that relate to achievement of desirable objectives. Management actions can range from the indirect, such as visitor education to more direct measures, such as use limit strategies. In recreation literature, indirect management practices are favoured due to their feasibility [4]. On the other hand the adoption of direct or indirect management practices depend on the nature and extent of negative impact.

2.2 Visitor Monitoring

National Park authorities have to carefully identify those strategies and measures that are most beneficial and feasible, in order to balance the conservation of the protected areas with recreational use. Their judgment should be based on monitored data in order to produce appropriate and comprehensible management actions. Visitor monitoring should consist of systematic and periodical measuring of human activity, to identify violation of natural resources or social conditions. Data sampling should be repeatable and replicable in nature, to enable comparison over different time intervals [5]. Collected data could be used for proper recreation and visitor management, and for prognoses of future development and needs of tourism marketing. Several methods of visitor monitoring in recreation areas are currently in operation. Practiced methods vary from quantitative, such as video observation and counting devices to qualitative approaches, like visitor surveys [6], [7].

2.3 Survey

With this in mind, in 2006 we surveyed a number of National Park authorities to gauge their perception of recreation use level, different national park activities and the application of management tools in the parks. Overall, 22 authorities in Austria, Germany and Switzerland were asked to complete a questionnaire of which 21 responded. A set of 18 open and closed questions based five main subjects were posed:

1. Estimation of current and expected visitor numbers
2. Conflict potential between recreational activities and nature conversation
3. Adoption of measures to control recrea-

tional use
4. Cooperation with relevant stakeholders

The data obtained has been statistically evaluated and the results are interpreted in terms of management practice.

3 Study finfings

3.1 Current and expected visitor numbers

Most of the National Park authorities (17 out of 21) estimate visitor numbers ranging from 20.000 to 2.500.000 visitors. To some extent they just count participants of national park activities (i.e. guided walks) or visitors of park attractions. The quality of investigation is varied and is mainly based on direct observations. Almost half of the authorities expect an increase in visitor numbers and none of them expect a decrease. National Parks founded after 1999 assume an increase in recreational use, while the more established parks expect a continuation in current visitor numbers.

3.2 Conflict potential

The most relevant recreational activities undertaken in the National Parks are walking, hiking, nature observation, visiting nature attractions or information centres and cycling.

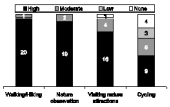


Fig. 1 Relevance of recreation activities (N=21)

Overall, the effect of these main activities on the environment is on a low or moderate level. Authorities rate the negative impacts of walking and hiking from low to moderate. It is in the area of outdoor sports that high conflict potentials between conservation and recreational activities exist. Popular recreational activities like canoeing and mountain biking, which are linked to a specific natural habitat are deemed to cause conflicts. Three authorities highlight mountain biking (performed in 17 NP) and canoeing (performed in 15 NP) as the main causes for interference with conservation goals.

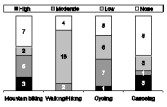


Fig. 2 Interference with conservation goals

Both activities have a high relevance in three protected areas only and are a specific problem in low mountain range and flood plain National Parks. The more popular activities of walking/hiking and cycling are rated as recreational activities with a low level of interference. Overall 13 authorities feel that the relationship between recreation and conservation will stay on the same conflict level. Two of them believe in a relaxation, but six administrations think that current conflict levels will increase. When asked for the reasons six arguments are mentioned: Increase in visitor numbers and nature sport activities, expansion of recreational use, development of infrastructure, loss of natural habitats, and decrease of environmental consciousness.

3.3 Adoption of measures

Various measures to control and manage recreational use are implemented in the National Parks of Central Europe. The most popular management tool is the adoption of visitor information systems, that inform visitors about the environment and regulations within the area. The majority of the parks focus on general management of visitor flows, employment of National Park Rangers and a ban on certain activities with obvious negative impacts on the environment. Very strict and highly controversial measures, like the limitation of visitor numbers are not very popular and only used by three National Park authorities. When asked about the effectiveness of applied measures to maintain the quality of

the environment in the protected areas, 16 authorities highlighted “National Park Rangers” as being of particular high importance while 12 identified the “Prohibition of access to sensitive areas”. Also the obligation to stay on designated trails, as well as visitor information systems, are evaluated as high to moderately effective.

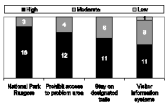


Fig. 3 Effectiveness of applied measures

3.4 Cooperation between stakeholders

Conflict resolution along with mistrust between local stakeholders and authorities, is a mayor challenge in long-term policy development. When asked about relevant stakeholders involvement in the development of visitor management strategies, tourism associations and nature conservation organisations are the most popular means of participation. Tourism companies, local authorities and other sector agencies were also mentioned. The surveyed authorities indicate common staff briefings, working groups, and periodic meetings of stakeholders as the main forms of cooperation. On the other hand less than half cooperate with sport associations and voluntary agreements exist in only seven of the parks that responded.

4 Discussion

As previously mentioned, visitor monitoring is one of the basic tasks of National Park authorities, particularly with regard to the assessment of visitor impacts on natural resources, the estimation of visitor numbers and future trends base on reliable data acquisition [8]. The results of our survey suggest a great uncertainty on the part of authorities, in appropriate observation strategies to estimate visitor numbers. Suitable methods for identifying visitor-use characteristics are in the minority. These include type and size of user groups and estimations of the total recreational use in an area. The result of the survey also shows that mechanical or electronical counting devices are not in use in most of the surveyed National Park, which is an explanation for the weak visitor numbers quoted. Most of the data collected is based on active visitors who participate activities organised by the National Park authorities or use visitor centres. The characteristics and use patterns of passive visitors are not examined. Hennig and Laube [9] established that monitoring of passive visitors simply not exists in most of the National Parks. Only six authorities believed that an increase in visitor numbers would be the cause of future detrimental environmental impacts. It is surprising that few authorities foresee an increase in visitor numbers having a detrimental effect on the natural resources of their areas.

On the other hand without reliable data authorities can only speculate on the impact level. If we divide national parks by age, it is obvious that more recently established National Parks (established after 1999) assume an increase of visitor numbers. Some of them (i.e. Thayatal in Austria and Kellerwald-Edersee in Germany) are not as generally well known and consequently less visited. Recreational use is not comparable with traditional recreation areas like the Wadden Sea, where tourism has been a fact of life for more than 100 years. Conflicts between recreation and conservation goals seem to be moderate to low. In general outdoor sports activities are widely spread in the National Parks but just some activities are rated as a reason for negative impacts on the environment. As is common to other studies, canoeing and mountain biking are mentioned as “problem activity”. The findings of our survey do not differ greatly from previous studies. Garbe et al. [10] identify improper behaviour and neglect of regulations as the main cause

for conflict. They surveyed more than 400 stakeholders in recreational areas in Germany to analyse conflicts between recreation and conservation goals of Natura-2000 areas. Both of them are also seen as a major problem by the National Park authorities surveyed. A complex monitoring of visitor flows and impacts fail in most National Parks , due to the multiplicity of entrances to the areas and the high costs of such programs. The irregular data collection reflect a low level of funding and insufficiencies in stuff numbers. Visitor management in Central Europe already includes many different measures, but evaluation of its effectiveness is rare. Cooperation and a strong partnership between wide ranges of stakeholders, is necessary to take both conservation and commercial interests into account. Integrated approaches help to solve traditional conflicts between both interests. In Central Europe we find several examples of successful cooperation between different stakeholders, like voluntary agreements between authorities and canoe associations in Germany [11].

5 Conclusion

The successful development of tourism in a region is bound by several factors. Increased visitor arrivals could generate economic benefits for local communities but also endanger natural resources and the quality of the visitor's experience. Ecological and social carrying capacities need to be considered when developing tourism strategies and objectives. National Park authorities in Central Europe are faced with high and ever increasing visitor use. Appropriate data collection can be helpful for both resource and visitor management. Based on our results, we recommend a systematic monitoring of recreational use and aswell as measures that both deemed to be suitable and effective.

References

[1] S., Bell, L. Tyväinen, T. Sievänen, U. Pröbstl, M. Simpson "Outdoor Recreation and Nature Tourism: A European Perspective",http://www.livingreviews.org/lrlr-2007-2, 2007

[2] J. Vaske, L. Shelby, "Crowding as a Descriptive Indicator and an Evaluative Standard: Results from 30 Years of Research. Leisure Sciences, vol. 30, pp. 111-126, 2008

[3] UNEP, "WCPA World Database on Protected Areas, http://sea.unep-wcmc.org/wdbpa, 2008

[4] R. E. Manning, *Studies in Outdoor Recreation*. Oregon State University Press, pp. 70-72, 1999

[5] D. Laven, R. , Manning, D. , Krymkowski, "The Relationship between Visitor-based Standards of Quality and existing Conditions in Parks and Outdoor Recreation. Leis. Sci., vol. 27. pp. 157-173, 2005

[6] A. Arnberger, "Internationale Entwicklungen im Besuchermonitoring – Ein Überblick, Biospärenreservat Vessertal, eds., Besuchermonitoring und ökonom. Effekte in Nat. Naturlandschaft., pp. 8-17, 2006

[7] A. Muhar, A. Arnberger, Ch. Brandenburger, "Methods for Visitor Monitoring in Recreation and Protected Areas: An Overview", *Proc. Inter. Conf. On Monitoring and Management of Visitor Flow in Recreat. Areas*, pp. 1-6, 2002

[8] G. Cressford, A. Muhar, "Monitoring Options for Visitor Numbers in National Parks and Natural Areas, Journal of Nat. Conserv., vol. 11, pp.240-250, 2003

[9] S. Hennig, M. Laube, Besuchermonitoring in Nationalparken: Eine Bestandsaufnahme in Deutschland, Österreich und der Schweiz, Zeitschrift für Angewandte Geographie, vol. 4, pp. 199-204, 2005

[10] C. Garbe, U. Pröbstl, M. Meyer, B. Räth, Natura 2000 und nachhaltiger Tourismus in sensiblen Gebieten, BfN, Skript 134, Bonn, 2005

[11] A. Wolf, E. Appel-Kummer, Freiwillige Vereinbarungen Naturschutz-Natursport – Ein Leitfaden, BfN, Skript 106, Bonn, 2004

Green and/or pleasant countryside? Possibilities and barriers of the mountain tourism in Transylvania, Romania

Enikő Veress

Abstract — One of the main changes in the mentality of both the local people and the representatives of the regional and central governments is that the economy of rural areas must not be exclusively based on agriculture. This has been a great gain for those marginal areas that did not have nor the economic nor the natural resources that could help them in developing a sustainable agriculture. Another change of the mentality came from the urban (and not only urban) people who started to appreciate the possibilities of recreation in the rural areas and especially in those ones where the landscape did not change significantly. In literature this change of mentality is most often connected to the postmodern conception of nature and environment. These two elements have led to the elaboration of projects in order to develop alternatives for sustainable rural development. As a consequence, tourism in the remote mountain areas has developed. But the old problem of poor infrastructure can still be considered as being a barrier in the evolution of this type of services. And this seriously affects the number (and quality) of tourists who would come by car or by bus. This attracts another type of tourists (usually younger ones and with less money) who are more attracted to the wilderness of the landscape. The paper intends to present the evolution of mountain tourism through a case-study from a mountain village (Zetea/Zetelaka) from the Eastern part of Transylvania.

Index Terms — Cultural and natural heritage, mountain tourism, representation of nature, Zetea/Zetelaka.

1 Introduction

The last 17 years in the history of Romania had been marked by an inconsistency in the top-bottom and also up bottom policies of sustainable rural and regional development. The post 1989 political and economical structural changes had many losers; most of them were the rural and mainly the peripheral rural areas. In most cases after 1989 the rural has played the role of the "social buffer", meaning that after 1989 the population in rural areas has not decreased and the people who have moved in lived before in the urban areas. This out-migration to villages was not due to counter-urbanisation, but was a forced step made by the new rural dwellers that could not pay the urban housing costs. The discussion of the complex causes and consequences of these phenomena would need a paper that deals only with them, so this is why I am mentioning them only tangentially for a better understanding of the premises of the development of rural tourism in Romania.

The positive aspect of this migration was that this afflux of former urban dwellers has led partly to an "infusion" of new mentalities, the popularisation of new social representations of the rural and the natural environment.

Enikő Veress is with the Faculty of Sociology and Social Work, Babes-Bolyai University, Cluj-Napoca, Romania, E-mail:eniveress@gmail.com

Even if there were problems of (re)integration in the first period, the "newcomers" (who were mostly people born in the village) came with new ideas, especially local enterprises which have used not only the economical resources, but mostly the alternative forms of capital(cultural and natural heritage), human and social capital.

This has been an impulse in the development of services, including tourism. This has given a chance of outburst from backwardness in more remote rural areas with little chances of re-vigoration after 1989.

The paper would like to present the success-story of a village from Eastern-Transylvania where the re-evaluation of natural resources as well as the cultural capital has been used as resources for a sustainable development strategy. The backwardness, that has intrinsically led to a more romantic, idyllic natural landscape has attracted tourists, so even if in the history of development of mountain tourism the poor infrastructure has been a barrier there is a specific social category (especially younger and well-educated urban people) mostly from abroad (mostly the Western societies) that is interested in experiencing exactly this type of services.

The village community of Zetea/Zetelaka has realised though that in order to have a sustainable form of tourism they should use not only the natural resource but other types as well, as the cultural heritage.

2 Conceptual Briefing

In the last twenty years the re-evaluation of the relation between society and nature has received several critics by academics as well as human (and rural) geographers. Nature has entered in the academic limelight; a whole body of literature has shown a growing interest in the study of this complex relationship between nature, society and rurality. H. Newby (1979) was the first author who has dedicated a larger space to the study of this new type of social representation of the natural landscape along the centuries, revealing the main attitudes towards nature. I consider his book on the social change in rural England as a basic one in the study of the new social representation of nature and its relation to society [1]. Post-modern society which negates modern society and its values has re-evaluated its connections to nature and has shown mainly a more positive attitude of "back-to-nature" (see the environmentalist or the "green" movement). It would take too much to make a thorough analysis of all the theoretical approaches within environmental sociology and geography regarding the position of nature within broader rural, social, cultural, economic and governance contexts.

So I will only mention the main idea expressed by all the theoretical approaches, that is the increased importance given to nature, the re-evaluation (in the sense of a greater importance given) of nature, landscape, environment and rurality.

Another concept I am using in the paper is that of the "culture economy". The concept was developed by Christopher Ray [2], and in my opinion it is very useful in a proper description of the way local (and in cases extra-local) actors can make use of the different cultural markers which can include from traditional foods through crafts and historical and prehistoric sites, landscape and the flora and fauna.

Even if some social scientists (especially economists) contest this concept which has been introduced in the literature it seems to be the most efficient in theorizing rural development which includes non-agricultural resources. An important source of the idea of culture economy is the EU rural development policy which has realised that in order to obtain a much more efficient use of the EU funds it has to make a shift from a sectoral (or horizontal) to a territorial (or vertical) approach. Of course, the industrial agriculture and forestry has been an important impediment in the way of restoring the idyllic landscape from the 18th and 19th century as the original landscape cannot be restored.

The remote rural areas in Romania can say that their gain in the competition for mod-

ernisation was actually the positioning as losers, the project of forced modernisation during the communist regime has not "touched" them, so in many places, especially in the mountain areas the natural landscape and the shape of community has remained fairly intact. But even if not totally, in the great bulk of mountain villages the original landscape has not changed.

3 TOURISM IN ZETEA/ZETELAKA

3.1 Presentation of the village

Zetea, Zetelaka is situated in the county of Hargita in the Eastern part of Transylvania, Romania. The municipality includes six villages (Subcetate/Zetevăralja, Ivó, Deság, Sikaszó and Poiana Târnavei/Küküllőmező) and can be considered as one of the large municipalities from the county of Harghita. Almost 60% of the surface of the county is covered by hills and mountains, and in the border of the village there is one of the most important points of attraction for the fans of mountain and winter sports. The highest mountain-peak in the county is the Harghita-Madarasi peak (1801 m.), situated at the outskirts of the village of Zetea. The municipality of Zetea lies on 206,76 sqkms with a population density of 27,82 inhabitants/sqkms. According to the last census in 2002 the municipality has a population of 5753 inhabitants [3].

The municipality is situated in the nearing of Odorheiu Secuiesc at 11 kilometres in the valley of the Tarnava Mare river. The village has an impressive history, its first documentary attestation dates from 1332, and has been constantly inhabited [4].

One of the specificities (or cultural markers) of the municipality is its confessional and ethnical structure. The last census has revealed that 93% of the population of the municipality is Hungarian and 95% is Roman-Catholic. Before 1920 Zetea as well as the whole of Transylvania belonged to the Austro-Hungarian Empire and this now constitutes an extra resource for the locals as the great bulk of tourists and visitors from abroad come from Hungary and Austria.

Zetea, as all the other villages has gone through the process of forced modernisation and urbanisation under the communist regime. For the rural area, this has meant a slow but steady process of annihilation of the rural specificity, the *couleur locale*, the plans of systematisation of the Romanian communist rule intended to wipe the specificity of the rural areas, the demolishing of the villages as it is well known has led to a great political contestation from the Western countries which have initiated then the project of salvation for the Romanian villages (*Operation villages roumaines*). Besides the humanitarian help, this connection between Romania and other Western countries has been of real help after 1989, as in most cases the networking was very important in the establishment of economical and social contacts with the "new world".

After 1989, Zetea as almost all the other Romanian villages has gone through the transitional period marked by the economical and political structural changes. The de-industrialisation as well as the de-collectivisation has led to an economic involution as the economy of Zetea was strongly related to that of the urban Odoreheiu Secuiesc, the village being in the attraction of the town. The period between 1990-97 can be considered a period of economic recession, followed by a massive out-migration of the younger active population, mainly to Hungary

The only industry which traditionally had existed in the region is that of forest industry. In the 17th century the village of Zetea had received privileges from the Transylvanian king of Bethlen Gábor because the locals were not only exploiting the forest, but also were carving wood and there were many good craftsmen at that time [5].

This industry has been revitalised after 1989, and the nearby forests have been industrially exploited. Besides the benefits for some people it seems that on long-term this has proved to have negative effects as those

tourists who traditionally came for the wilderness of the forests went to other villages.

3.2 Development of tourism in Zetea

As I have mentioned in the introduction I would like to present a success-story of a locally-based tourism service. As in every other market-based economic activity, we might speak about the supply and demand aspect. But before speaking of the development of that supply (the offered services "to be sold" by the locals) and the demand (the expectations of the potential tourists) side I will briefly speak about the Butler's curve [6] and the temporal distribution of this curve in Zetea. Butler has elaborated a theory of the way tourism develops along the time, starting with the:

1. *The spontaneous phase:*
   - In the first years (mainly in the early nineties) practising tourism was not a conscious choice for the rural people, it was more of a non-authorised (invisible) form of rural tourism(1991-97);
   - Target-groups and guests were in this period people with a lower income-status or those who staid only for a few nights
   - At policy level: lack of supporting institutions and financial measures
2. *The transitory phase:*
   The number of guests and hosts has grown, in the economic activity of the household/host the incomes from tourism begin to be more significant;
   - Hosts invest much more to increase of the quality of services and develop a specific strategy in attracting different types of tourists (marketing-phase has started before);
   - On policy level there is a growing interest in investing in the improvement of local infrastructure; favourable credits for rural tourism enterprisers;
   - For local and central authorities the development of rural tourism has turned into a priority of rural and regional development (1995-2000);
3. *Developed phase:*
   - From 2000 there is a more compact strategy where we can see institutions-the local and central associations for the rights and interests of enterprisers (the Romanian Agency for the Development of Rural Tourism) which have a greater influence in the tracing of economic and political measures;
   - This agency on a regular basis organises courses/training for those enterprisers who are in the business or want to start one;
   - Local hosts have associations which permit to make a common strategy-leaflets are redacted presenting all of the hosts: competition is replaced by cooperation;
   - Infrastructure and the quality of services is much better, there is a more specific supply regarding the demands of the target-groups (mainly lined out in the transitory phase).

What seems to be specific for the tourism in the village is the way the culture economy has developed. The local entrepreneurs who run a business in tourism have realised that they have to make supplies for all (or almost all) types of potential tourists and can exploit the "traditional" barriers and also possibilities in the "production of their services" [7].

So most of them have included in their offers the mountain tours in the remained or untouched forests, and in the villages of the municipality that are situated far away from the road they organise the transportation. Still there are tourists who mostly in summertime come and walk by foot sometimes 15 or more kilometres with their backpacks. This category can be labelled as the "low-benefit" tourists, mostly young people (students and young intellectuals) who come in groups and are not so pretentious but who are more interested in the maintenance of the original landscape. They do not consume too much but if we look on long-term they are the ones who make the less impact of the natural environment.

For the other categories the local entrepreneurs have made a more variate offer: besides

the lovely landscape they can enjoy the local foods and see the local craftsmen(some of them have re-learned crafts as blacksmiths, gate-carvers, etc.) working. The distribution of these tourists by categories and provinience is much more variate: they come from abroad (mainly from Hungary or from Western Europe) and they are the ones who are the "buyers" for higher quality of services(meaning the level of confort) and who spend more money during their stay.

There would be much to be said about the local network of entrepreneurs who are very well organised, but I would like to stop at the types of barriers and possibilities of tourism, even though the role of the local community in their development is crucial. I would like to enumerate the classical barriers which in the case of the locals is turned into a possibility, and this recalls especially to physical infrastructure. The poor quality of roads and communication networks might be a barrier to many tourists but as the last decades have shown, there is a category which is a "buyer" for those "idyllic", unchanged landscapes that have "escaped" modernisation.

4 Conclusion

The development of tourism and the distinction between the possible barriers and possibilities must be handled with care. What seems to be a barrier to some types of services (poor infrastructure) as was shown in the example of Zetea is a possibility for the more remote areas, where tourists come exactly to enjoy the unaltered rural landscape and the flora and fauna.

So when elaborating different development strategies for the upbringing of the mountain tourism we might handle carefully the categories of barriers and possibilities, because destroying the "classical barriers" by modernising the landscape and improving the quality of roads could also lead to a loss in the supply of the local tourism offers and what seems possibility for some categories as mentioned above can turn into barriers for others. A possible solution should be the inventory that should be made in the phase of production of local tourism services to be sold: what can be attractive to a type of category will not be agreed by other categories of tourists.

And as I have mentioned above, the last twenty years have shown that the social representation of nature has changed, and the complex relation between society and nature has been re-evaluated. So academics as well as the political actors should re-consider the way we relate to nature, meaning we should not try by all means to transform the natural environment purely because for some of us this would be more comfortable but try to maintain the unchanged landscape. And as the above example has shown this can also be a resource for development.

References

[1] H. Newby: *Green and Pleasant Land? Social Change in rural England,* London, Hutchinson, pp.201-230, 1979

[2] C. Ray: "Culture, intellectual property and territorial rural development", *Sociologia Ruralis*, Blackwell, Oxford, pp.3-21. 1998/1, vol.38

[3] Ferenc Deák: *Zetelaka,*:Miercurea Ciuc, 2000, vol.I.,pp.13-35

[4] Ibidem, pp.23-75

[5] Akos Egyed: *Falu, város, civilizáció,* Kriterion, Bucuresti, pp.13-54, 1984. Elissa, "An Overview of Decision Theory," unpublished. (Unpublished manuscript)

[6] Dezso Kovács: *"Falusi és vidéki turizmus értelmezések a nemzetközi irodalomban,* Falusi turizmus olvasókönyv,Pécs,pp.50-62, 2001

[7] Chr. Ray Culture, intellectual property and territorial rural development", *Sociologia Ruralis*, Blackwell, Oxford, pp.3-21. 1998/1, vol.38, pp.6-21

Enikö Veress BA in Philosophy 1989, Ph.D. student (elaborating final thesis), from 1991-sociologist at the Faculty of Sociology and Social Work of the BBU, Cluj-Napoca, Romania. She has participated in the last 17 years in several international and national social researches, has presented 15 papers at international congresses and conferences, with 7 articles in books and reviews, editor and co-author of one book. With no major scientific distinctions. Current research interests: community studies, gender and environment, rural and regional development, rural tourism. Member of the ESRS (European Society for Ru ral Sociology).

MMV4 PROCEEDINGS
SPACE'S ANALYSIS

A regional travel model for predicting the number of visitors in forests: application to the Walloon region

Vincent Colson, Philippe Lejeune

Abstract — The Walloon forests are visited by local people and tourists but the importance of forest recreation is very different from one part of the Region to another. As it was particularly difficult to obtain quantified information by counting, a model has been built by GIS and taking results from different surveys (telephone survey and face-to-face interviews) into account. This model makes the distinction between local visitors and one-day tourists coming from the neighbouring regions (in a buffer zone of 50 km). A decay curve based on travel time is used for predicting the number of visits throughout all Walloon forests from each departure point. An attraction function is added to the model to attribute each visit to a woodland and different scenarios have been tested to obtain a distribution of people by regions of provenance as similar as the results of surveys. At a regional level, this model is a good alternative for counting and gives a good overview of the forests for which recreation activities are more relevant and have to be taken into account in forest management plans.

Index Terms — decay curve, forest recreation, GIS, travel model, Wallonia

1 Introduction

Located close to urbanised and populated regions, the Walloon forests (540,000 ha; woodland rate: 32 %) are visited by local people and tourists. The importance of forest recreation is nevertheless very different from one forest to another, considering woodland rate, types of ownerships, road accessibility and proximity of urban and tourist centres.

The number of visits in all the Walloon woodlands is an important indicator to consider in a multi-purpose forest policy but it is particularly difficult to estimate it at a regional level by counting [Jacsman, 1991], Taking results from different surveys (telephone survey and face-to-face interviews) into account, a GIS has been elaborated and a model has been built to estimate the annual number of visits for each forest in Wallonia. The model of potential use [Skov-Petersen, 2001] makes the distinction between local visitors, one-day tourists coming from the neighbouring regions and tourists staying at least one night in the region.

The sub-model presented here deals with local visitors and one-day tourists.

2 Methodology

The steps in the elaboration of the model are:

- the determination of the population concerned by forest recreation and the estimation of the number of visits which will be spread from each departure point;
- the use of a drive time decay function to estimate the distribution of visits within

V.Colson, PHD student, Gembloux Agricultural University – Unit of Forest and Nature Management. E-mail: colson.v@fsagx.ac.be.
P. Lejeune, Professor, Gembloux Agricultural University – Unit of Forest and Nature Management. E-mail: lejeune.p@fsagx.ac.be

a series of *service area polygons* corresponding to different travel time classes;
- and the distribution of the visits among woodlands inside each *service area polygon*.

2.1 Number of visits and departure points

The number of visits from each centre of population (departure point) located in Wallonia and the neighbouring areas (in a buffer zone of 50 km) has been estimated considering frequencies of visits obtained by surveys. A telephone survey [Colson, 2006] has provided the proportion of local people visiting forests at least once a year. This proportion is correlated with the woodland cover. Another regional survey [Colson, 2007] which was carried out through face-to-face interviews (40 study areas all across the region; 4000 interviews collected at the end of the six successive periods) provided the frequency of the visits of people interviewed in forests. This second survey distinguishes local people and people coming from the neighbouring countries. This distinction enables to consider the differences of behaviour existing between local people and one-day foreign tourists.

With these data, the number of visits in forests has been calculated for all people living in the Walloon region or inside the territories located at less than 50 km from the border of the region (Flanders and the Brussels region, North-Eastern part of France, Grand-Duchy of Luxembourg, Western part of Germany and South of The Netherlands).

2.2 Travel

From each departure point (villages, cities), a decay curve [Ode and Fry, 2006] based on travel time has been applied to predict the number of visits through all Walloon forests. This curve has been obtained from the face-to-face interview survey and is the same for the visitors of all countries (Table 1).

TABLE 1:

Travel time decay curves by forest cover classes

Travel time classes		Forest Cover			
tmin	tmax	<20 %	20-39 %	40-59%	>60 %
0	15 min	31 %	50 %	57 %	48 %
15 min	30 min	33 %	34 %	30 %	40 %
30 min	45 min	14 %	8 %	8 %	7 %
45 min	60 min	9 %	4 %	3 %	4 %
60 min	75 min	5 %	3 %	1 %	1 %
75 min	90 min	5 %	1 %	1 %	0 %
90 min	120 min	3 %	0 %	0 %	0 %
120 min	180 min	0 %	0 %	0 %	0 %
Total:		100 %	100 %	100 %	100 %

Nevertheless, a travel time penalty has been considered for people coming from outside of Wallonia (which can be called a “crossing border effect”).

Another correction factor has been elaborated to consider only the visits that take place in the Walloon woodlands. This has been done by calculating the proportion of forest included in the *service area polygon* of each departure point that are respectively within and outside Wallonia. This differentiation was carried out using the CORINE landcover map [European Environment Agency, 2000].

As the number of access points in forests is particularly high, an intermediate level has been created: target points. Those points are located on road segments that cross woodlands in such a way that the minimum distance between 2 target points is not below 500 meters.

A second level is dealing with woodlands located around these target points.

A road network database was used to calculate the travel time from each departure point to each target point. These travel times have been computed by using specific network analysis tools: *Cost matrix function* from ArcGIS 9.2 and *Route calculate* method available in the routine library of Microsoft MapPoint 2004. The output takes the form of an Origin Destination matrix in which the travel time of each combination “departure point / target point” is stored.

2.3 Distribution of visits throughout the Walloon woodlands

As the travel time is not the only factor which influences the target selection, an attraction function [De Vries et al, 2004] has been added to the model.

The attraction function is based on:

- the afforestation rate: we consider that people who visit forests take into account the wooded character of the region and thus the afforestation rate;
- the urbanisation rate around each target point: we make the hypothesis that, for high travel time classes, a high urbanisation rate decreases the attraction of surrounding forests;
- the capacity of accommodation for tourists around the target points: with the hypothesis that the importance of accommodation for tourists around the target points reflects the attractiveness for all types of public visiting a wooded area;
- the density of access roads around and inside the woodlands: we make the hypothesis that the number of entrance points of a woodland has a big influence on its accessibility and thus on its annual number of visits;
- and a forest recreation level obtained by a qualitative survey: a regional map has been obtained from a qualitative survey [Colson et al., 2008]. Managers of the Walloon forest service were interviewed and they evaluated the level of visiting of each Walloon woodland with a four-level-qualitative scale. This survey brought to identifying forest recreation hotspots throughout the Region. This regional map was used in the attraction function.

A computer simulator has been developed to integrate all the parts of this model. It enables to test different scenarios with different sets of values for the attraction function and the correction factors. This simulator is built in Visual Basic for Application language in Microsoft Excel environment. All the data (input data and results) are stored in specific ESRI Personnal Geodatabases.

A serie of 50 scenarios has been tested, all the parameters values being fixed manually. Those scenarios have been compared considering the repartition of the total number of visits within the 3 main categories of recreationists: (i) from Wallonia, (ii) from the rest of Belgium, (iii) and from abroad. This comparison is made on the 40 study areas for which the simulated repartition can be compared to the repartition observed during the regional survey.

3 Results

The list of departure points contains a total of 11,926 villages and towns corresponding to 17,300,000 inhabitants. The distribution of this population by region or countries is the following: Wallonia 19 %, other parts of Belgium 40 %, France 22%, Germany 11 %, Netherlands 5 % and Grand-Duchy of Luxembourg 3 %.

A total of 5,857 target points have been identified for 5,179 woodlands (mean area: 104 ha, stdev: 290 ha).

One of the *best* tested scenarios is presented below.

The total annual number of visits spread through all the Walloon woodlands is 90,700,000.

The scenario gives a distribution of visits by public provenance quite similar to the one coming from the regional survey (table 2).

Table 2:

Comparison of distribution by provenance obtained by survey and by simulation

Population	Regional survey	Model
Walloon Region	83.4 %	83.6 %
Flanders and Brussels	10.0 %	11.0 %
Neighbouring countries	6.7 %	5.4 %
Total	100 %	100 %

The spatial distribution of the visits produced by the model for this scenario shows

that about 40 % of the Walloon forest is concerned by a annual number of visits less than 50 per hectare.

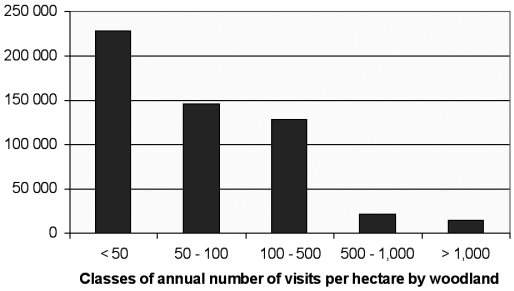


Figure 1: Distribution of the Walloon forest by classes of annual number of visits per hectare by woodland

The map obtained with this scenario shows that the highest annual number of visits per hectare concerns mainly the woodlands located in the north of the region. The southern part is in fact less populated and more concerned by tourists which aren't considered in the sub-model presented in this paper.

4 Conclusion

Considering the difficulties to provide effective counting of the annual number of visitors for the whole Walloon forest, a simulation model appears to be an interesting approach to give a good overview of the forests for which recreation activities are more relevant and have to be taken into account in forest management plans.

This model also provides data particularly interesting for calculating the regional value of forest recreation using, for example, the Travel Cost Method.

Nevertheless, difficulties encountered in the estimation of the parameters of the attraction function show the complexity of the problem due to, in particular, the mixing between local population and one-day tourists and the heterogeneity of forest recreation at regional level.

This problem could be solved by a calibration phase of the parameters of the attraction function. This could be done by using some appropriate optimization techniques [Doherty and Johnston, 2003].

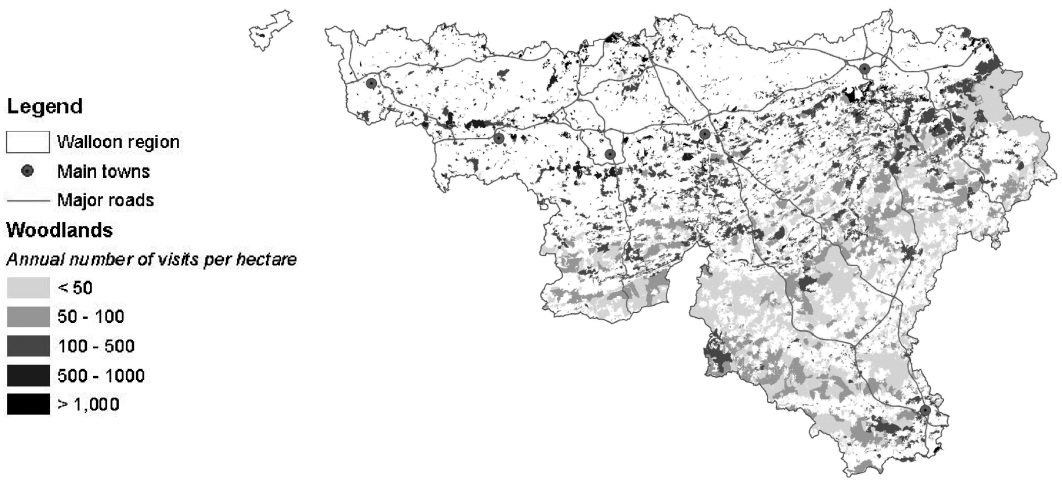


Figure 2. Annual number of visits by woodland in the Walloon forest

References

[1] J. Jacsman [1991]. Methodische Ansättze zur Ermittlung der Belastung von Wald und Landschaft durch die Erholungsnutzung. *Schweiz. Z. Forstwes.,* **142**(1991) 2: 85-108.

[2] H. Skov-Petersen [2001]. Estimation of distance-decay parameters – GIS-based indicators or recreational accessibility. *Paper published for The 8th Scandinavian Research Conference on Geographical Information Science.* Ås, Norway, 25th-27th June 2001. [http://www.umb.no/conf/scangis2001/papers/22.pdf, 3/07/2008].

[3] V. Colson [2006]. La fréquentation des massifs forestiers à des fins récréatives et de détente par la population wallonne et bruxelloise. *Forêt wallonne* **81**, 26-38 (in French).

[4] V. Colson [2007]. La fréquentation des massifs forestiers wallons : le public, ses activités et sa perception de la forêt. *Forêt wallonne* **87**, 20-35. (in French).

[5] A. Ode, G. Fry [2006]. A model for quantifying and predicting urban pressure on woodland. *Landscape and Urban Planning* 77(2006) 17-27.

[6] European Environment Agency [2000]. CORINE lancover map [http://www.eea.europa.eu]. Copenhagen

[7] S. De Vries, A. Jellema, and M. Goossen [2004]. FORVISITS: modelling visitor flows at a regional level. *Working paper of the Finnish Forest Research Institute* 2, 78-84.

[8] V. Colson, S. Garcia, J. Rondeux, and P. Lejeune [2008]. Map and determinants of forest visiting in Wallonia IN Sipilä M., Tyrväinen L., Virtanen E, *Forest Recreation and Tourism serving Urbanised Societies. Abstracts of the presentations of the Joint Final Conference of Forest for Recreation and Tourism (COST E33) and 11th European Forum on Urban Forestry (EFUF).* 28.-31.5.2008, Hämeenlinna Finland. 58.

[9] J. Doherty, J.M. Johnston [2003]. Methodologies for calibration and predictive analysis of a watershed model. *Journal of the American Water Resources Association. Paper 02004*. 251-265.

V. Colson has a master degree in forest engeneering (2001) and is currently PhD student at the Gembloux Agricultural University in Belgium. His research topic deals with the valuation of forest recreation in the Walloon region. He was one of the Belgian delegates in the COST E33 (2004-2008) dealing with Forests for Recreation and Nature Tourism.

P. Lejeune is Professor at the Gembloux Agricultural University (department of Forestry) and in charge of the GIS Laboratory.

Recognizing patterns of movements in visitor flows in nature areas

Arend Ligtenberg, Ramona van Marwijk, Bart Moelans, Bart Kuijpers

Abstract — This paper presents some approaches for geo-spatial analysis of movement behavior of visitors of recreational areas. The approaches are bases on the use of moving object databases containing Temporary Annotated Sequences (TAS). The TAS result from the use of GPS or mobile phones for tracking visitors. Two examples are presented for a case study carried out in the Dutch National Park Dwingelderveld. About 461 visitors were tracked using a GPS device. Based on these GPS recordings their trajectories have been reconstructed. The relation between the type of landscape in terms of openness and the speed of movement have been analyzed. Additionally a similarity analyses based on Fréchet analysis shows clusters of movements.

Index Terms — GIS, Movement Behavior, Spatial Temporal Analyses

1 Introduction

It is well known that large numbers of visitors in nature area increased the burden on the management of these areas. Quality of these areas might be affected in several ways. Besides effects on the ecological quality of the area through disturbance by people also the recreational quality might be affected by crowdedness, noise, and differences in recreation behavior as found for example in situations where mountain bikers or horse riders meet walkers. Crucial to understanding the effects of visitor behavior on both ecological and recreational qualities is knowledge about the movement behavior of visitors and the relation with its current socio-spatial environment. Although established frameworks exist explaining these relations [1-3] aspect like behavior of individuals in relation with their physical environment, interaction amongst individuals and differences in behavior as a consequence of intention and activity are still difficult to measure and analyze.

The use of easily available GPS systems and positioning based on mobile phones enable for additional methods to analyze movement behavior compared to the more traditional methods applied in recreation research (predominantly surveys). The research presented here aims to explore the additional value of using the “moving objects data” resulting from tracking people with GPS or other location aware devices such as mobile phones.

As already pointed out by [4] the movement behavior of people is strongly influence by the various constraints imposed by their environment and their capabilities. Reconstructing movement behavior from moving objects i.e. spatial temporal recordings might provide additional information to recreation researchers as well as policy makers. Currently research efforts in this field are directed

Arend Ligtenberg is with the Centre for Geo-information of Wageningen University. the Netherlands. E-mail arend.ligtenberg@wur.nl
R. van Marwijk is with the Socio-Spatial Analysis and Forest & Nature Conservation Policy groups at Wageningen University, the Netherlands. E-mail: ramona.vanmarwijk@wur.nl
Bart Moulans is with the theoretical computer science group at Hasselt University, Belgium. E-mail: bart.moelans@uhasselt.be
Bart Kuijper is with the theoretical computer science group at Hasselt University, Belgium, E-mail: bart.kuijpers@uhasselt.be

to visual analytics i.e. the exploration of visual (graphical) representations of data using interactive visualization tools [5] and Geographical Knowledge Discovery [6]

2 Theory

2.1 Temporary Annotated Sequences (TAS)

Movements of objects trough space generally are recorded using TAS. In general a TAS consist of the minimum tuple: <id, x, y, t>. The id is an unique identifier, x, and y are spatial coordinates in some coordinate system and t is the data timestamp of the recording [7] resulting from objects (visitors) moving through a geographical space. These visitors might either broadcast their Space Time (ST) positions (mobile phones), store their ST positions (GPS, navigation devices), or allowing their ST position to be monitored (for example RFID).

2.2 Trajectories

Based on TAS the paths followed by the visitors can be reconstructed. Such a reconstruction of followed paths is generally referred to as geo-spatial lifelines or trajectories [8].

A trajectory by definition is a subset of the total recordings describing a visitor's movement. Each trajectory knows a begin and end and mostly a number of stops (and starts). The definition of a stop mainly depends on the scale of analyses. The question if a temporary non-movement is the begin or end of a trajectory or just a stop depends on the goal of the analysis and the related spatial and temporal resolutions. Same counts for the question if a TAS is just a ST-point in the geo-spatial lifeline or a stop. For example the question if waiting for a crossing or a traffic light a stop or just a part of the trajectory can only be answered in the context of a crisp defined goal of analysis.

2.3 Characteristics of trajectories

Once trajectories have been constructed various characteristics of the movements of visitors can be analysed. Trajectory characteristics can be divided into characteristics based on a single trajectory and characteristics based on multiple trajectories. Single trajectory characteristic are, speed, acceleration, shape, number of stops and stop duration. Multiple trajectory characteristics are, amongst others: density in space and or time i.e. how many trajectories are within a certain time interval within a certain distance of each other, and interactions; how many trajectories interact in space and time. Interactions are for example crossing or convergent, divergent or parallel movements of trajectories within the same period and area.

3 Dwingelerveld case

To demonstrate the use of TAS and trajectories a number of analyses have been carried out using a GPS-tracking dataset of visitors of the Dwingelderveld National Park (DNP). This Dutch nature area – containing 3700 ha and situated in Drenthe, a province in north eastern Netherlands – was chosen because of its recreational attractiveness and ecological quality. The area is ecologically important as it is the largest wet heath land area in Northwest Europe (1550 ha). The heath land area is bordered by forest (2000 ha). The DNP is also a Natura2000 area, which means it is part of a European network of important nature conservation areas. The DNP receives at least 1.6 million visitors yearly. It is a typical Dutch nature recreation area with an extensive recreational network for both short strolls (60 km marked trails that are each less than 7 km in length) and long walks, for cycling ("normal", racing, mountain biking) and for horse riding. During a study amongst 399 visitors of the DNP in August 2006 detailed tracks where recorded using

Garmin GPS devices. Fig. 1 shows a small excerpt of the complete dataset of the total survey consisting of about 142000 TAS. Fig. 1 shows also some errors in the data due to false GPS recordings. Especially under forest or near tall buildings GPS positioning is rather inaccurate and non-stable due to poor satellite reception and multipath reflectance. Of the 399 collected GPS tracks only 311 (78%) were complete. Additionally GPS outliers were removed by only considering recording within 25 m at each side of the paths in the path network.

Fig 1: Part of the Dwingelderveld dataset showing the TAS en constructed trajectories

4 Analyses

To demonstrate how the mentioned trajectory characteristics might help getting insight in the movement behaviour of visitors the following are calculated:

1. Walking speed in relation with the openness the type of landscape
2. Similarities amongst various trajectories.

   All analyses are carried out using the standard ESRI ArcGis 9.2 software. For reconstructing trajectories from the TAS an additional plug-in (HawthTools) was used for reasons of convenience

4.1 Walking speed

As most of the visitors (65%) tracks in DNP follow marked trails, we expect specific landscape preferences of minor influence. However, interesting to know would be the influence of the type of landscape on the visitors' movement behavior (in this case the walking speed). To be able to analyze this a dataset have been prepared showing for all walking paths in the DNP the visibility of landscape for each paths segment (Fig2) [9]. These visibility was classified in 4 landscape types: closed, open, boundary and mixed. Based on the trajectories the speed between each TAS was calculated and combined with the classified paths network using GIS based procedures. The resulting dataset provides a detailed insight into the speed at all segments of the path network (see Fig. 3)

Fig 2: Part of the dataset showing the openness of the landscape based on the visible areas (m2) from a path (calculated at a 50 mtr. Interval)

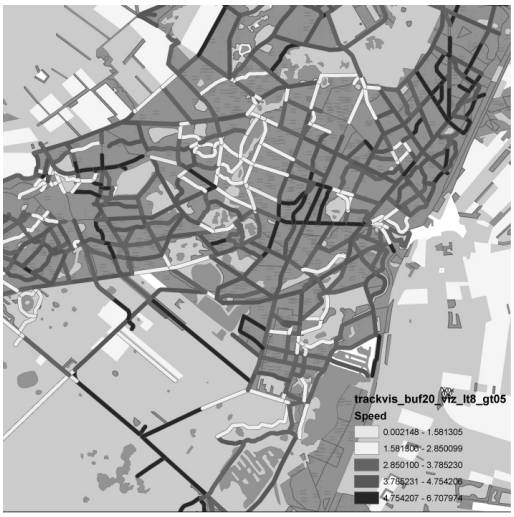


Fig 3: Part of the dataset showing the average speed at the followed paths

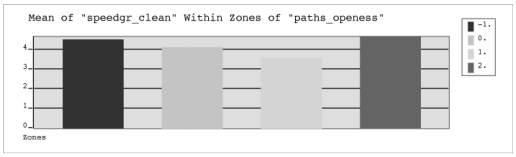


Fig 4: average speed on the paths for each landscape type (-1 = closed, 0 is boundary, 1 = open, and 2 = mixed). Stand. dev. respectively 1.64, 1.74, 1.93, 1.82

Next, using these two datasets the average speed for each path class was calculated showing the effect of the landscape difference upon the movement speed of the visitors (Fig. 4). Although the differences are not very high and the observed standard deviations rather high this type of analyses might provide insight in the effects of landscape upon movement behavior. At this moment the topographical map was used to generated the landscape typology. A more targeted analyses and validation of the dataset, with respect to the openess would probably lead to a better results. Additionally the used GPS device performed rather poor under forest cover leading to fluctuation in speed as a result of inaccurate positioning. Especially walking speeds as in this case this leads to relative high deviations.

4.2 Datamining

A second type of analyses demonstrated here that allows for insight into the movement behavior of visitors is finding patterns in data using data mining techniques. Fig. 5 shows the result of a cluster analyses based on the Fréchet distance, a distance measure that accounts for the continuity of the trajectories.[10]. For the clustering we used k-medoids algorithm [11] with as similarity

measure the discrete Fréchet distance. Many applications consider the Fréchet distance for curves as a good measure for similarity between polylines (i.e., traces of trajectories). Because of the high computational cost of this distance measure the ``less correct" derivate for polylines, called the discrete Fréchet distance is used.

Clustering based on similarities can reveal various modes of use of an area in terms of frequently followed routes, and recreational pressure on certain parts of an area. The 4 clusters shown in Fig. 5 are based on visitors who stated not to follow a predefined route (browsers).

The clusters show links with the parking areas that define in most cases the begin en ends of the trajectories. This type of similarity analysis seems to be especially relevant for discovering patterns in movements of free moving visitors or movements over dense or large networks of paths.

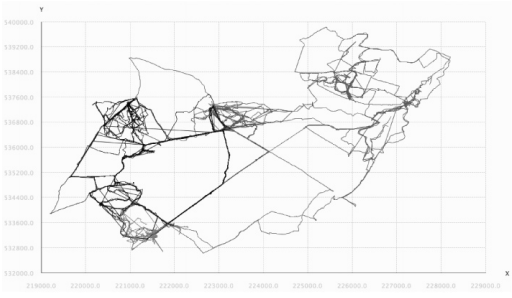


Fig 5: results of the discrete Fréchet similarity analysis (4 clusters) for routes followed by browsers (entire study area)

5 Discussion

The techniques shown in this paper are an illustration to show the use of moving object data for additional analyses of visitors behavior. It provides techniques to explicitly include environmental characteristics into analyses of movement behavior. There is however, the need to test and validate these type of analyzes for their practical applicability in recreation research. A complicating aspect at this moment seems to be the quality of current GPS recordings. They often are unstable, hampering the tracking of the subtle differences in movement behavior in individual trajectories. They easily get blurred in the noise caused by inaccurate measurement of GPS. The launch of the Galileo network (expected around 2011) will probably offer a better accuracy combined with a better performance in forest areas.

Data mining techniques like similarity matching and clustering offer additional insight in the general spatial and/or temporal patterns of movements cause by visitors. Managers and policy makers can use these patterns to increase their insight in the use of an area in different periods. However, before these techniques successfully can be applied additional research is needed into the relation between movement, environment and resulting patterns. There is a strong need for the development of concepts and methods that relate data-oriented models commonly applied in data-mining, the spatial modeling of geo-science and social models used in recreation research.

References

1. Hartig, T., *Nature experience in transactional perspective.* Landscape an Urban Planning, 1993. **25**: p. 17-36.
2. Marwijk van, R., B.H.M. Elands, and J. Lengeek, *Experiencing nature: the recognition of the symbolic environment within researchnd management of visitors flows.* For. Snow Landsc. Rex, 2007. **81**(1/2): p. 59-79.
3. Lengkeek, J., J.W. Te Kloeze, and R. Brouwer, *The multiple realities of the rural environment. The significance of tourist images for the countryside*, in *Images and realities of rural life. Wageningen perspectives on rural transformations*, H. De Haan and N. Long, Editors. 1997, Van gorcum: Assen.
4. Hägerstrand, T., *What about people in regional science?* Papers of the Regional Science Association, 1970. **24**: p. 7-21.
5. Andrienko, G., et al., *Visual Analystics Methods for Movement Data*, in *Mobility, Data Mining and Privancy*, F. Giannotti and D. Pedreschi, Editors. 2008, Springer: Berlin Heidelberg. p. 375-408.
6. Wachowicz, M., et al., *Characterising the Next Generation of Mobile Applications through a Privacy-Aware Geographic Knowledge Discovery Process*, in *Mobility, Data Mining and Privacy*, F. Giannotti and D. Pedreschi, Editors. 2008, Springer: Berlin Heidelberg. p. 39-70.
7. Hornsby, K. and M.J. Egenhofer, *Modeling moving objects over multiple granularities.* Annals of Mathematics and Artificial Intelligence, 2002. **36**: p. 177-194.
8. Laube, P., S. Imfeld, and R. Weibel, *Discovering relative motion patterns in groups of moving point objects.* International Journal of Geographical Information Science, 2005. **19**(6): p. 639 - 668.
9. Weitkamp, G., et al. *Three Sampling Methods for Visibility Measures of Landscape Perception*. in *COSIT 2007*. 2007. Melbourne, Australia: Springer-Verlag.
10. Kuijpers, B., B. Moelans, and W.v.d. N. *Qualitative Polyline Similarity Testing with Applications to QuerybySketch, Indexing and Classification*. in *ACMGIS 06*. 2006. Arlington, Virginia AMC.
11. Tan, P.N., M. Steinbach, and V. V Kumar, *K-medoids: Introduction to Data Mining*. 2005, Boston, MA, USA: Addison-Wesley Longman Publishing Co.

A. Ligtenberg is an Ass. Prof. at the Centre for Geo-information of Wageningen university. He holds a BSc as an irrigation engineer and a MSc in environmental planning and design from Wageningen University majoring in spatial planning and GIS. In 2006 he obtained his PhD on research on the use of multi-agent simulation for interactive multi-actor spatial planning. His current research interests include geo-visualization, complex spatial systems, and agent based spatial modelling.

R. van Marwijk holds a BSc in Rural Development Studies (2000) and a MSc in Land Use Planning (Recreation & Tourism, 2003). She started as junior researcher at Socio Spatial Analysis Group, Wageningen University until end 2004 and then started her PhD at Forest and Nature Conservation Policy Group, Wageningen University. Her MSc-thesis ("A small contribution? Small tourism entrepreneurs and

sustainable development in Malindi, Kenya") received the Ed van Thijn Thesis Award in 2004. In 2006 her joint poster with Karolina Taczanowska ("Types of Typologies – From Recreationists & Tourists to Artificial Agents") was rated as best Poster at MMV3 and she received the Storm vd Chijs award (promising female PhD student of Wageningen University). Her current research interests are nature based recreation and tourism, sustainable tourism development, recreation quality, leisure experiences, place attachment and meaning, tourist types.

B. Moelans is a member of the theoretical computer science group at Hasselt University.
He holds a MSc in computer science from the Transnational University Limburg majoring in operations research.
His area of research are spatial databases, spatio-temporal databases and GIS.

B. Kuijpers is Prof. at the theoretical computer science group at Hasselt University.
In 1998 he obtained his PhD on topological properties of spatial databases in the polynomial constraint model, which was awarded with the IBM-Belgium Prize.
His area of research are spatio-temporal and constraint databases, GIS, database theory and logic .

Acknowledgments:
This work is funded by the Dutch Space for Geo-information program (RGI) and the EU Geopkdd project for funding this research. Special thanks to Gerd Weitkamp of the Centre for Geo-Information of Wageningen UR for carrying out the visibility analyses.

Where Dutch recreationists walk: path design, physical features and walker usage

Ramona van Marwijk, David G. Pitt

Abstract — A comprehensive understanding of visitor use is fundamental for effective park management. This paper explores recreational spatial behaviour in a protected nature area with a focus on the physical environment. The current research is carried out in Dwingelderveld National Park in the north-eastern part of the Netherlands with approximately 2 million visitors a year. A total of 400 walkers carried a GPS to record their movements. We related spatial patterns to the (visible) physical environment. We characterized the physical environment in (1) the path network and (2) the surrounding environment. The environment is defined by use, experience, and narrative value variables. Hierarchical regression analyses show the importance of the use value variables signage and placement of parking areas as predictors for spatial behaviour. Experience and narrative value variables are less important. For recreational quality purposes, managers should clearly communicate recreational opportunities for each parking area to the public.

Index Terms — environmental values, outdoor recreation, spatial behaviour, physical environment

1 Introduction

Insight and understanding of visitor use, including temporal and spatial distributions, is necessary for sustainable recreational use and effective park management. The Netherlands is the third most densely populated country in the world (after Vatican City and Bangladesh) with consequently high recreation needs. The 20 National Parks in The Netherlands are facing increasing visitor numbers every year and expect this trend to continue. Together they form the core areas basis of the Dutch national ecological network.

R. van Marwijk is with the Socio-Spatial Analysis and Forest & Nature Conservation Policy groups at Wageningen University, the Netherlands. E-mail: ramona.vanmarwijk@wur.nl.

D.G. Pitt is with the Department of Landscape Architecture, University of Minnesota, Minneapolis MN 55455. E-mail: pittx001@umn.edu.

Although the exact negative impacts of recreational visitation are difficult to monitor, the general notion is that recreation negatively impacts ecological values. However, the objectives of Dutch national parks focus not only on the protection and development of nature and the landscape, but also on outdoor recreation.

Nature managers can influence recreationists' spatial behaviour by several 'steering measures'. Those measures differ from one another on two dimensions: the impact on the recreationist's sense of freedom and the character (social or physical) of the measure. In this paper we focus on the physical environment, including physical measures such as the marking and the placements of concentration points. Although in recent decades the role of the physical environment (or context) in influencing individuals' behaviour has gained a lot of attention among researchers, most of this research is from a phenomenological perspective [1]. The limited number of published studies on the influence of the

physical environment on physical activity focus mainly on urban environments (e.g. [2], [3]) and health issues [4], [5].

The aim of this paper is to explore the importance of physical features in a protected natural environment for recreational walking[1]. We will begin with a presentation of four environmental values that help categorize physical features. Next we will describe the method of collecting and computing data for our study area, Dwingelderveld National Park, in the north east of the Netherlands. We will conclude with an analysis of important landscape features for hikers that are relevant for protected nature area design and management.

2 THEORETICAL CONTEXT

Lengkeek *et al.* [6] introduced four concepts to analyse human-environment relationships:

- Use value: instrumental or economic value, this value refers to human function and use of environment;
- Experience value: this value refers to stimuli for the perception of the environment and its evaluation in terms of beautiful or ugly, hilly or flat, etc.;
- Narrative value: this value refers to the specific stories and interesting facts about an area or elements in an area; and
- Appropriation value: the intensity of being mentally attached to the environment.

While the first three values can be linked to elements in the physical environment, the appropriation value is a strong (personal) emotional bond – also known as place attachment [7]. As a result we focus in this paper on the use, perception and narrative values only that may be ascribed to a protected nature area.

[1] This paper is part of the PhD project of Ramona van Marwijk that aims to theoretically and empirically ground relationships between the value of landscape characteristics and patterns of visitor use, in order to improve a management tool for effective ecosystem management (2005-2009).

3 METHODS

3.1 Study area

Dwingelderveld National Park (DNP) is a nature area in the north eastern part of the Netherlands. It contains 3,700 ha and consists of wet heath land (1550 ha) and a mixture of native deciduous and pine forests (2000 ha). The DNP receives 2 mln day visitors yearly. It is a typical Dutch nature recreation area with an extensive recreational network for both short strolls (60 km marked trails that are each less than 7 km in length) and long walks, for cycling ('normal', racing, ATB) and for horse riding. Visitors to DNP are obliged to confine their hikes to only designated paths. A follower of a 'marked trail' is one whose visit takes place on a trail that is identified and designated by managers. We use the term 'browsers' for people who explicitly state that they did not follow marked trails.

3.2 Data collection[2]

A survey was carried out to investigate re creational use in DNP. The survey consisted of two instruments: (1) a questionnaire to explore visitor characteristics and (2) a geographical position system (GPS) device that was carried by the visitors during their visit. The GPS registered their spatial behaviour. The survey population was targeted at hikers as they form the largest part of visitors to Dutch National Parks.

Visitors have been asked to participate in the research at five different entrances in the park: two main entrances close to a visitor or information centre, and three smaller ones. The survey was carried out during 7 days (weekend and working days) in spring and summer in 2006. The total research sample consists of 461 hikers, including as many men as women (age 17-85 years). The re-

[2] see [8] for detailed description of data collection

sponse rate of the survey is 63%. A total of 65% of the visitors walk a marked trail (so 35% are browsers).

3.3 Variables

Table 1 lists the set of use, experience and narrative value variables in this study. A spatial database was compiled to describe the physical environment if DNP. The data structure was based on the path network available for use by visitors. The variables were measured objectively.

Based on several resources [9], [10], [11] we decided to divide the environment next to the path segments in a fore- middle- and background. The foreground is the area between 0-50 meters off the path, the middle ground is from 50-1200 meters and the background is further than 1200 from the path.

3.4 Data analysis

We analyzed the data using SPSS. Without knowing a priori which landscape variables have a significant influence, we aim to construct a model which minimizes redundancies between them. Consequently, we applied stepwise regression which minimizes colinearities between explanatory variables. Moreover, we applied a hierarchical multiple regression in which the order of entry is based on logical and theoretical considerations. Visitor density on each path segment was treated as a dependent variable. As independent measures, we entered the use value variables first (without them recreation is not possible), second the experience value variables (that are supposed to cater for a general pleasurable experience), and third the narrative value variables (for an extra experience).

We devised several hierarchical regression models for different subgroups of visitors. In order to compare the groups, we calculated standard z-scores to describe the distribution of standardized regression coefficients within a regression model. This permits mutual comparison between the groups.

TABLE 1

Independent variables used in the study

	Mode of measurement	Scale
	Use value variables	
Connectivity	To how many other paths does this path connect?	Total N
Path density	Path segment length /adjacent area	m/m2
Pole path	Is the path part of a designated pole route?	1-no; 2-yes
Leaflet path	Is the path part of a designated leaflet route?	1-no; 2-yes
Surface	Is the path unpaved or paved?	0=unpaved, 1=paved
Length	Path segment length	Meters
Bench/picnica	Total number of benches/picnic	Total N
Signposta	Number of signs	Total N
Distance to parking	Network distance to nearest parking area	Meters
	Experience value variables	
Sinuosity	Path segment length /Euclidean distance between start & end points	m/m
Width	What is the width of the path?	0 <2m 1= >2m
Slope[a]	% area slope >12%	Percentage
Facilities[a]	Total number visitor facilities	Total N
Water[a]	% area water	Percentage
Forestv	% area all forest	Percentage
Heath[a]	% area heath	Percentage
Old forest[a]	% area forest >80yrs	Percentage
Young forest[a]	% area forest <40yrs	Percentage
Open foreground	Foreground % area in open cover	Percentage
Open middleground[b]	Middleground % area in open cover	Percentage
Open background[c]	Background % area in open cover	Percentage
Expressway [d]	Distance to expressway	Meters
Regional Hwy [d]	Euclidian distance to regional highway	Meters
Cateringe	Distance to catering	Meters
	Narrative value variables	
Radiotelescope[e]	Distance to radio telescope	Meters
Sheep farm north[e]	Distance to sheep farm North	Meters
Davidsplassen[e]	Distance to Davidsplassen	Meters
House Benderse Berg[e]	Distance to House Benderse Berg	Meters
Lookout holtveen[e]	Distance to Lookout Holtveen	Meters
Sheep farm south[e]	Distance to Sheep farm South	Meters
VC south[e]	Distance to visitor center south	Meters
VC north[e]	Distance to visitor center north	Meters

[a] In near path environment (<50m) (=foreground)
[b] from 50-1200 meters from path (=middleground)
[c] Further than 1200 meters from path (=background)
[d] Measured in Euclidian distance (the Euclidian distances to expressway and regional highway are added because they are expected to form a disturbance factor)
[e] Measured in network distance

4 RESULTS

From the questionnaire we learned that 65% of the walkers walk a marked trail. Therefore, we expected pole paths (coloured poles mark the route) are important variables.

TABLE 2

STANDARD Z SCORES OF VISITOR DENSITY REGRESSED ON USE, EXPERIENCE & NARRATIVE VALUE VARIABLES FOR ALL VISITORS & BROWSERS

	All visitors	Browsers
r^2	**0.53**	**0.29**
Use value variables		
Pole path	2.75	1.03
Distance to parking	-1.47	-1.78
Leaflet path	0.47	0.46
Bench/picnic[a]	.29	1.05
Experience value variables		
Facilities	0.45	0.79
Background open	-0.79	-
Dist reg hwy	0.43	0.70
Narrative value variables		
Benderse berg	-	0.55
Lookout Holtveen	-.75	-
Sheepfarm south	-	-2.48
VC south	-1.15	-

Table 2 shows that indeed pole path is the most important variable in forecasting visitor density on paths (z-score of 2.75). However, pole paths are less important for browsers. A second strong variable is the network distance to the parking. The negative number indicates that people tend to stay in the relative vicinity of the parking. The same accounts for the sheepfarm for the browsers and the visitor centre for all visitors. To a lesser extent the vicinity of facilities is an important variable for both groups.

Table 3 shows the two most important variables for regression models. Pole paths are most important at the first parking area. They are less important for the parking area 2 (Fig. 1 and 2), where a large part of the visitors only visit the sheep farm and do not follow a marked trail. Moreover, visitors tend to stay more in the vicinity of parking area 2 than area 1.

TABLE 3

STANDARD Z SCORES OF VISITOR DENSITY REGRESSED ON TWO MOST IMPORTANT VARIABLES FOR FIVE PARKINGS

Parking	1	2	3	4	5
r^2	0.33	0.33	0.28	0.21	0.19
Pole path	2.46	0.96	1.50	0.93	1.05
Parking	-1.33	-2.32	-2.02	-2.06	-2.17

[1] Large parking, very accessible (along highway)
[2] Large parking, less accessible, close to visitor centre and sheep farm
[3] small parking, no facilities close by
[4] small parking,
[5] small parking, small parking,

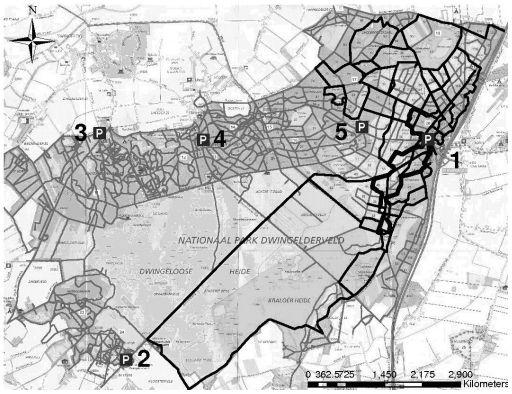


Fig. 1. Visitor distribution from parking 1 (large, very accessible)

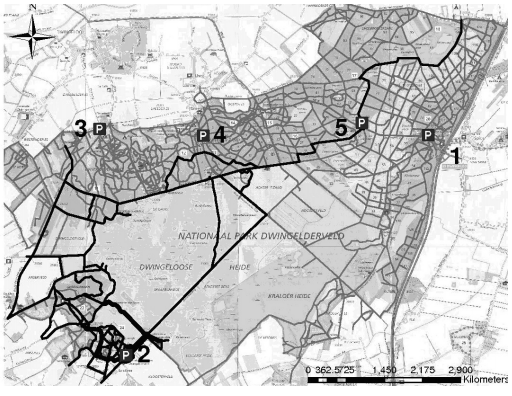


Fig. 2. Visitor distribution from parking 2 (large, less accessible)

5 Discussion and conclusion

The regression models showed the importance of the use value variables 'pole path' and 'distance to parking'. However, the explicative power of the model for browsers is less than that of the model for all visitors (which includes marked trail followers). Experience and narrative value variables tend to be less predictive of visitor density . People tend to visit whatever is in their reach. These findings are important for nature managers and researchers. First, nature managers should clearly communicate the recreational possibilities for each parking area to the public. Second, simulation modelers should be aware if the low importance of spatial goals (such as specific facilities) in predicting behaviour. Marked trail and the placement of parkings are the major influences.

References

[1] R. Kumar, P.M. O'Malley and L.D. Johnston "Association Between Physical Environment of Secondary Schools and Student Problem Behavior: A National Study, 2000-2003," *Environment & Behavior,* vol. 40(4), pp. 455-486, 2008.

[2] J.-C Foltête and A. Piombini, "Urban layout, landscape features and pedestrian usage," *Landscape and Urban Planning,* vol. 81, pp. 225-234, 2007.

[3] S. Handy, "Methodologies for Exploring the Link between Urban Form and Travel Behaviour," Transp. Res.Pard D 1 (2), pp151-165, 1996.

[4] B. Giles-Corti and R.J. Donovan. "The Relative Influence of Individual, Social and Physical Environment Determinants of Physical Activity," *Social Science & Medicine,* vol. 54, pp. 1793-1812, 2002.

[5] A.D.A.M Kemperman and H.J.P. Timmermans "Influence of Socio-Demographics and Residential Environment on Leisure Activity Participation," *Leisure Sciences,* vol. 30(4), pp. 306-324, 2008

[6] J. Lengkeek, J.W. te Kloeze and R. Brouwer "The Multiple Realities of the Rural Environment: The significance of tourist images for the countryside" . In H. de Haan & N. Long (Eds.), *Images and realities of rural life, Wageningen perspectives on rural transformations*. Assen: Van Gorcum, 1997.

[7] Davenport, M. D., & Anderson, D. H. "Getting from sense of place to place-based management: an interpretive investigation of place meanings and perceptions of landscape change," *Society and Natural Resources, 18*(7), pp. 625-641, 2005

[8] R. van Marwijk, B.H.M. Elands and J. Lengkeek, "Experiencing nature: The recognition of the symbolic environment within research and management of visitor flows," *Forest Snow and Landscape Research, 81*(1/2), 59-76, 2007.

[9] J.G. Granö, "Pure Goegraphy. Londen, The Johns Hopkins University Press. 1997.

[10] M.J. Vroom, "The perception of dimensions of space and levels of infrastructure and its application in landscape planning," *Landscape Planning* Vol. 12, pp. 337–352, 1986.

Ramona van Marwijk holds a BSc in Rural Development Studies (2000) and a MSc in Land Use Planning (Recreation & Tourism, 2003). She started as junior researcher at Socio Spatial Analysis Group, Wageningen University until end 2004 and then started her PhD at Forest and Nature Conservation Policy Group, Wageningen University. Her MSc-thesis ("A small contribution? Small tourism entrepreneurs and sustainable development in Malindi, Kenya") received the Ed van Thijn Thesis Award in 2004. In 2006 she received the Storm vd Chijs award (promising female PhD student of Wageningen University). Her current research interests are nature based recreation and tourism, sustainable tourism development, recreation quality, leisure experiences, place attachment and meaning, tourist types.

David G. Pitt has a BA in Geography, an MLA in landscape planning and a PhD in Renewable Natural Resources Studies. He is a professor of landscape architecture at the University of Minnesota and was a guest researcher at Wageningen University in 2007. He has published numerous research papers in various journals and presented papers at several research symposia. His research interests focus on: a) spatial modelling of perceived landscape values; and b) decision support systems for landscape planning.

How does topography influence the use of the mobile guide WebPark^{SNP} in the Swiss National Park?

Antonia Eisenhut, Ruedi Haller, Jonathan Raper

Abstract — Since 2005, the Swiss National Park offers a mobile information system called WebPark^{SNP} which provides content about the users surroundings using smart phone services and GPS. Up to now, little is known about the use of Location Based Services (LBS) by visitors of remote and protected areas and about the contents they are interested in. WebPark^{SNP} logs time, location and content of each action the user conducts. Contents are not only pushed but can be accessed from every location. With the consent of 419 users, WebPark^{SNP}'s log files of the summer season 2007 have been analysed in order to compare the user's actions with the topography of the Park. Topography is composed of specific places (vegetation classes, aspect, and slope of the trail), facilities (resting areas, huts) and viewpoints. The results show that clustering of access occurs on steeper slopes, within facilities, and on viewpoints on certain routes. The content accessed differs between facilities and other places. Nevertheless, these patterns are not only determined by topography but also by behavioural aspects; the use of the guide depends on the daytime and on the distance from the starting point of the walk as well. These results allow the evaluation and improvement of LBS concerning content and locations. In addition, conclusions can be drawn about the development and improvement of other offers in the Park. Further analysis and the integration of other visitor surveys like census and questionnaires will show the potential for more general insights into visitor behaviour in protected areas.

Index Terms — Location based services, Swiss National Park, Visitor management, Visitor monitoring

1 Introduction

WebParkSNP has been developed during the European Union research project "WebPark – Geographically relevant information for mobile users in protected areas" (2001-2004) [1]. It is a Location Based Service (LBS) application known as mobile guide according to Raper et al. [2] providing broad information about the Swiss National Park. Additionally to more than 400 Points of interest (POI), WebParkSNP offers different search functions like the location-based "what's around me" or the search by terms functions, interactive maps and self-updating elevation profiles indicating the user's position and calculating time and distance to the end of the hike, keys for flowers, birds, butterflies and grasshoppers, a bookmark function, a wildfire nature trail and further content [3].

Since 2005, the WebPark^{SNP} mobile guide is installed on PDAs and can be rented in the National Park's Information Centre. The actions taken by the users have been written anonymously to log files, which allow the analysis of the user's requests and the extraction of most visited sites, all fields with a high research need [4]. This paper aims to give a first overview of how user behaviour relates to the topography of the Swiss National hik-

Antonia Eisenhut is with the Swiss National Park, CH-7530 Zernez. E-mail: antonia.eisenhut@gmx.ch.
Ruedi Haller is with the Swiss National Park, CH-7530 Zernez. E-mail: rhaller@nationalpark.ch.
Jonathan Raper is with the Department of Information Science, School of Informatics, City University, London EC1V OHB. E-mail: raper@soi.city.ac.uk.

ing trail network, on the facilities on offer and on the distance to the start point of the hike.

2 Methods

2.1 Study area

The Swiss National Park (SNP) occupies an area of 170 km^2 between the Müstair Valley and the Engadine at the Eastern edge of Switzerland. Classified as IUCN level 1 [5], visitors are only allowed to enter the Park on 21 marked hiking trails of alpine and high alpine character with a total length of 80 km.

2.2 Data logging and analysis

Each action that a user performed (n actions = 78'348) on a device during the summer season 2007 was logged and written in a text file. The coded values were then written into a database and analysed with ArcGIS and SPSS.

Specific places are defined by the vegetation class, the aspect and the slope of the hiking trail. A digital elevation model (4m resolution) was used to extract aspect and slope. Vegetation classes were derived from the HABITALP-Project [6]. National Park facilities include junctions, huts, parking lots, resting areas and the information centre. Viewpoints include the official viewpoints as indicated in the park's map and other points which have been defined as viewpoints with the park rangers.

In order to compare the user's actions with the trail network of the park, a reference file has been created, containing one hypothetical action each 20m along the trail network showing the expected conditions of the hiking trail network. In the following, equ will refer to this reference file (Fig. 2, Fig. 3 and Fig. 4)

3 Results

3.1 General distribution

WebPark^{SNP} has been rented 419 times between June and November 2007. Fig. 1 shows the diurnal distribution of the recorded actions. The most popular time of use was the hour before noon (mean 11:21).

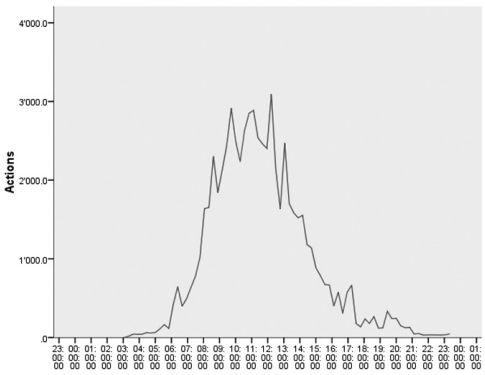


Fig. 1. Diurnal distribution of the actions during summer season 2007.

The 21 trails in the SNP differ concerning length, difficulty and topographic factors. The most popular trails (Fig. 2) for the use of WebPark^{SNP} are Margunet (17), Chamanna Cluozza (7), Murter (8) and Val Trupchun (1).

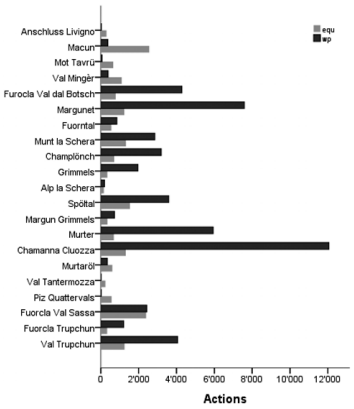


Fig. 2. Comparison of the actions performed (wp) and the expected conditions (equ – one hypothetical action each 20m).

3.2 Specific places

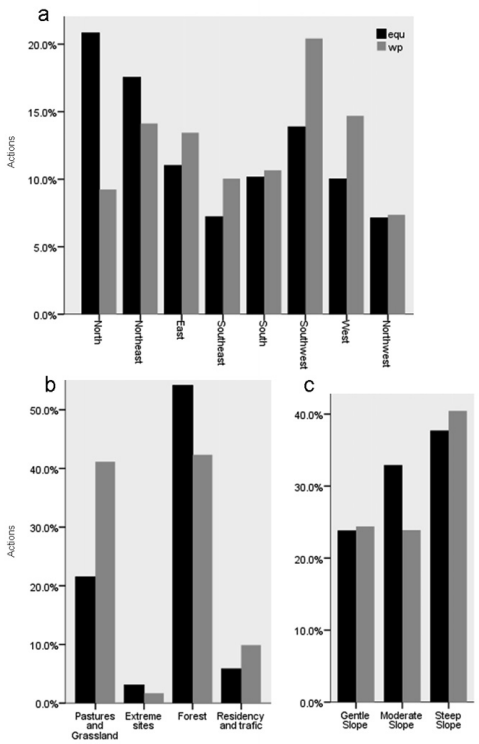


Fig. 3. Frequency analysis of a.) aspect, b.) vegetation classes and c.) slope of routes 1, 7, 8 and 17 (equ: expected conditions with a hypothetical action each 20m; wp: actions performed).

Topographic factors like aspect, vegetation class and slope have a considerable influence on the use of WebPark^{SNP} in the field (Fig. 3). Since topographic factors are distinctive between trails, only the most popular routes (see 4.1) are included in order to avoid information overload.

The user clearly prefers the southern and western aspects to the northern ones, despite the fact that they are less numerous (Fig. 3a).

54.1% of the chosen trails run in the forest, whereas only 42.3% of the actions were realised between trees. On the other hand, pastures and grassland are present on 21.5% of the trails where 41.1% of the actions were realised (Fig. 3b).

Concerning the influence of slope, the user prefers to use the device either in nearly flat (< 2.33°; 24.4%) or steep terrain (> 5.12°; 40.45%); moderate slope is relatively under represented (Fig. 3c).

3.3 Facilities and viewpoints

The use of WebPark^{SNP} depends as well upon human created infrastructure and perception of the landscape (Fig. 4). 96.1% of all the trails are not part of a park facility (i.e. trail forks, parking, resting areas, huts), but 30.5% of all the logged actions were realized around these facilities (Fig. 4a). The viewpoints show a similar pattern: Only 3.5% of the trail net has been defined as viewpoints, on which 8% of all the logged actions have been realized (Fig. 4b).

It is remarkable that specifically location based information (e.g. the wildfire nature trail), is not only accessed at the corresponding point on the path, but also within other park facilities.

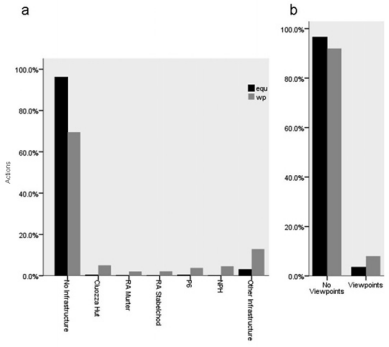


Fig. 4: Frequency analysis of a.) the facilities (with RA = Resting Area, P = Parking and NPH = National Park House) and b.) Viewpoints (equ: expected conditions with a hypothetical action each 20m; wp: actions performed).

3.4 Distance

Not only topographical and infrastructural factors influence the user behaviour, but also the distance from the starting point. Along Margunet trail, a sub-sample of 30 individual logs was analysed (Fig. 5).

Since all these users moved in the same direction, a clear pattern can be seen: The use of the device is less attractive towards the end of the hike.

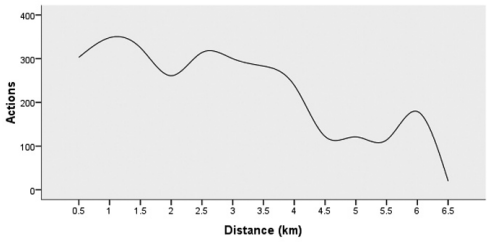


Fig. 5: Number of actions at places along Margunet trail, measured in km from the starting point (Parking 9).

3.5 Accessed content

Content differs depending on the place the action is realized. As shown in Table 1, the difference between facility and non-facility access is striking: At facility locations, where people sit down to rest, map functions play a less significant role. Away from such places, almost 50% of the logged actions are related to the map.

TABLE 1

CONTENT ACCESSED AT PARK FACILITIES AND OTHER PLACES

Content	Park facilities	Other Places
Main Page	17.44%	13.46%
Show Map (from Main Page)	3.30%	5.71%
Route Information	4.64%	5.23%
Route vertical Profile	4.25%	5.03%
Route Map	5.52%	8.44%
Around me	8.63%	10.58%
Get Map IFOI List	9.26%	13.35%
Get Top 20	7.03%	6.23%
Content: Vegetation	4.42%	3.40%
Content: Birds	3.35%	1.90%
Content: IFOI	6.87%	6.70%
Bookmarks	3.57%	3.12%
Others	21.70%	16.85%
Map Functions	**35.60%**	**48.34%**

Table 1: Content accessed at park facilities and other places. Grey shading marks map functions.

Content access is also related to the slope: The steeper the trails, the more the vertical profile has been checked and the more “What’s around me”-searches were performed.

4 CONCLUSION

The 2007 log files of the WebPark^{SNP} application have shown that the use of a LBS in a protected area depends on the topography of the study area, the park facilities, the perception of landscape and the distance to the trail starting point. The user prefers the sunnier aspects to the shadow and is much more active above the tree line. Concerning the slope, the device is especially used in flat and steep trails, less in trail segments with a moderate slope. Even though facilities are limited in the SNP, the visitor welcomes it in order to consult the application; this is also valid for points with an especially beautiful view. During the hike, the number of logged actions decreases towards the end of the hike.

The content that is accessed differs between facilities where the user wants general information about the park and its habitants, and other places (i.e. regular trail sectors), where the user is more interested in his own position.

These results allow the improvement of existing LBS in protected areas by adapting the content to the topography and can be useful during the development of new applications. Further investigation will be needed to define the nature of places within the park more precisely, to learn about user preferences and about the adaptation of the content to these places.

REFERENCES

[1] D. Burghardt, A. Edwardes and R. Weibel, “WebPark - Entwicklung eines mobilen Informationssystems für Erholungs- und Naturschutzgebiete,” *Kartographische Nachrichten*, vol. 53, no. 2, pp. 58-64, 2003.

[2] J. Raper, G. Gartner, H. Karimi and C. Rizos, “Applications of Location-based Services: a se-

lected Review," *Journal of Location Based Services*, vol. 1, no. 2, pp. 89-111, 2007.
[3] R. Haller and A. Eisenhut, "Was fragen Wanderer den digitalen Wanderführer im WebPark?," *Proc. Auf den Pfaden von Natur und Kultur*, pp. 49-52, 2008.
[4] J. Raper, G. Gartner, H. Karimi and C. Rizos, "A critical Evaluation of Location based Services and their Potential," *Journal of Location Based Services*, vol. 1, no. 1, pp. 5 – 45, 2007,
[5] EUROPARC and IUCN, *Richtlinien für Managementkategorien von Schutzgebieten - Interpretation und Anwendung der Management Kategorien in Europa*, EUROPARC and WCPA, p. 48, 2000.
[6] A. Lotz, *Alpine Habitat Diversity - HABITALP - Project Report 2002-2006*, EU Community Initiative INTERREG IIIB Alpine Space Programme, Nationalpark Bechtesgaden, 2006.

Antonia Eisenhut is Geographer working at the Department of Geoinformation of the Swiss National Park.

Ruedi Haller is Head of the Department of Geoinformation of the Swiss National Park. His main research interest focuses on visitor needs and content related questions on LBS.

Jonathan Raper is Professor of Geographic Information Science at City University, London and the Editor in Chief of the Journal of Location based Services.

MMV4 PROCEEDINGS
SPACIAL KNOWLEDGE

Methodological considerations for using remote cameras to monitor the ecological effects of trails users: lessons from research in Western Canada

Danah Duke, Michael Quinn

Abstract — The Livingstone River Area in southwestern Alberta, Canada is an ecologically significant area of public land that provides an important connection between adjacent protected areas. Most of the area is zoned for multiple use; which means the area is available for resource extraction and recreational activity. Recreational use in this area consists primarily of off-highway vehicle (OHV) use, random access camping and fly fishing. Recreational use is largely unmanaged and increasing. The proliferation of trails and campsites has become extensive in the past decade. Furthermore, much of this activity is concentrated along critical riparian movement corridors and in sensitive montane, subalpine and alpine environments. Human use and associated linear disturbance is recognized as among the most significant habitat fragmentation factor limiting sensitive wildlife (especially large carnivores) in the region. We have developed a sampling method that employs remote digital infrared cameras on known human trails and wildlife trails. The cameras have proven to be very effective for monitoring all trail use. We provide a review of our methods, report on the effectiveness of the cameras and provide some guidance on the use of cameras based on the lessons we have learned.

Index Terms — Remote cameras, access management, monitoring methods, wildlife.

1 Introduction

Monitoring the spatial and temporal patterns of human use in wildland settings is essential to developing adaptive land-use management plans. Interactions between individual recreationists and user groups as well as between people and environment are complex and multi-faceted. Researchers and managers would benefit from non-invasive methods that provide unbiased, accurate and timely data to provide quantitative information on visitor use patterns and the response of the environment. In this paper we focus on a method to monitor and explore the relationships between the flows of visitors and wildlife in a multiple use landscape using remote cameras.

Human use of linear features results in direct and indirect effects to wildlife. The nature and significance of the effects are a function of the type, timing, intensity, predictability and spatial distribution of the activities. In addition, the responses are highly variable across wildlife species and it is difficult to identify sta-

Danah Duke is with the Miistakis Institute and Faculty of Environmental Design, University of Calgary, 2500 University Drive N.W. Calgary, ABT2N1N4
E-mail: danah@rockies.ca
Michael Quinn is with the Miistakis Institute and Faculty of Environmental Design, University of Calgary, 2500 University Drive N.W. Calgary

tistically significant causal relationships due to confounding variables. Increasing human use, especially motorized off highway vehicle (OHV) use, can result in loss of habitat connectivity at local and regional scales, habitat fragmentation and habitat alienation [1], [2], [3], [4], [5], resulting in reduced population viability, increased edge effects and loss of genetic variability [1], [6], [7], [8], [9]. These factors can also result in negative effects on wildlife movement patterns and could make important habitat patches and their associated uses such as breeding, denning, feeding and rearing grounds, inaccessible [4], [5], [10], [11]. Disturbance by human use may also alter the availability of prey for the large and meso-carnivores that inhabit the region.

The Livingstone Range is located in the Crown of the Continent, an international ecosystem spanning the shared Rocky Mountain region of British Columbia, Alberta and Montana. The 1200km^2 area provides a critical linkage between the protected area complexes of Waterton-Glacier and Kananaskis-Banff. The study area encompasses four natural sub-regions defined primarily by elevation including the foothills parkland, montane, subalpine and alpine regions. The diversity of habitats results in high native biodiversity and the original floral and faunal assemblage remains largely intact.

Landscape disturbance associated with recreational and industrial trail use in the Livingstone Range is significant and continues to intensify with regional population growth. The area is entirely comprised of public land and supports a variety of industrial activities including petroleum exploration and development, forestry, and mining which have resulted in a proliferation of access roads and trails. In addition, the landscape provides a wide range of opportunities for “unmanaged” recreational activities such as OHV use, equestrian use, fishing, hunting, camping and hiking. Much of this activity is concentrated along critical riparian zones and in sensitive montane, subalpine and alpine environments. In recent years, OHV recreational use has been increasing significantly in the province of Alberta with sales of off-highway recreational vehicles increasing over 120% in the past 7 years.

2 Remote Camera Methods

The use of digital infrared cameras is becoming a common technique for examining the spatial and temporal responses of wildlife to recreational disturbances [12], [13], [14]. Remote sensing cameras provide effective, accurate, appropriate and non-biased data [14], [15], [16], [17]. In order to examine the spatial and temporal relationships between wildlife and human activity we developed a sampling method that employs remote cameras on known human trails and wildlife trails. Cameras were deployed from the middle of May to September in each of 2004, 2005, 2006 and 2007. The study area was stratified into 8 sampling units to ensure representational coverage. Within each of the 8 sampling areas, a series of random locations was generated from a spatial algorithm within a GIS. Each randomly generated sample focal area consisted of a camera on each human (OHV) trail and 2 cameras on adjacent wildlife trails. From each randomly generated point, a perpendicular line was drawn on a map to the nearest human trail. At this point a digital infrared camera was attached to a suitable tree to photograph all people and wildlife passing the point (day and night). A 500m transect perpendicular to the direction of the human trail was established from each of these camera points. Along this transect a wildlife trail was identified within 0-250m and another within 250-500m. Remote cameras were placed on each of these identified wildlife trails. Sites were sampled for 2 weeks and then the cameras were moved to a new location using the same process described above. Each of the 8 sampling areas had 2 of the 3-camera set-ups, resulting in a total of 48 cameras within an area of approximately 1000 km^2.

The technology available for remote cameras has changed dramatically over the past

decade. Infrared sensors have long been used for counting human and wildlife use on trails and sometimes these were coupled with cameras. However, this technology was often cumbersome, difficult to power and unreliable. The development of more effective units was largely driven by the hunting industry and today there are dozens of commercially available remote cameras that are suitable for use in monitoring visitor flows and wildlife. We tested three types of remote sensing cameras over the four seasons of field research.

The three types included GameVue, Deercams (www.deercam.com) and Reconyx (www.reconyx.com). All three types require a combination of both movement and a change in heat for the sensor to be triggered and an image to be captured. Both the GameVue and Reconyx cameras are digital cameras with infrared flashes that allow them to capture images at night with only minor visual disturbance. The Deercam camera employs a standard 35mm 'point-and-shoot' camera attached to sensors with a conventional flash that allows for nighttime images at the expense of an obvious visual disturbance. All of the units are encased in rugged, weatherproof housings and can easily be attached to trees or posts.

The GameVue cameras had built-in digital memory with a capacity of 60 images. The Reconyx cameras use a compact flash cards and are capable of holding up to 5000 images on a 256 Mb card. The Deercam cameras run standard 400 ISO 24 or 36 exposure 35mm film.

DeerCam cameras were used on wildlife trails only and were used for 28% of the sample sites (1066 total). GameVu cameras were used on human use trails only and were used on 8% of the sample sites. Reconyx cameras were used on both human use trails and wildlife trails and were used at 64% of the sample sites.

During each two-week sampling period cameras were checked to ensure they were operating correctly. GameVue and Deercam cameras were checked every 4-5 days or two times during each two-week period. Reconyx cameras were able to run the entire 2-week period without being checked. Cameras were attached to suitable trees with a minimum 6-inch diameter (to prevent false image triggers due to wind shaking the tree). Cameras were mounted at approximately chest height and were tilted slightly down, at a 45-degree angle to the trail, to maximize the amount of time a subject could be detected. Cameras were set to take a picture every three seconds if the sensor was triggered. Date, time and temperature were recorded on each image.

3 RESULTS

Four field seasons have resulted in 1066, 14 day sampling periods including over 424,000 hours of camera operation. Preliminary results include over 6572 unique large mammal events, including 484 large carnivore detections. Large mammals include grizzly bear, black bear, cougar, wolf, bobcat, badger, lynx, wolverine, coyote, moose, elk, mule deer, white-tailed deer and big horn sheep. Mule-deer and undetermined deer species were the most frequently detected large mammal (50.2%), followed by elk (13.3%), coyote (12.1%), moose (8.7%), and white-tailed deer (7.5%). Of the large carnivore detections, grizzly bear were most common (35.3% followed by black bear (18.6%), undetermined bear (14.0%), wolf (10.3%), lynx (9.3%), cougar (6.8%) and bobcat (5.4%).

Cameras detected 10473 human events on recreational trails with 9083 (86.7%) of these events included motorized use followed by hikers (7.3%), equestrian use (4.5%) and cyclists (1.4%). Human use on recreation trails peaked between the hours of 1100 and 1700 while large mammal activity peaked on recreation and wildlife trails between 0500 and 0900 and also between 1900 and 2300 with the least amount of activity between 1100 and 1800. Human activity was greatest on recreation trails on Saturdays and Sundays while there was no difference between

the daily use of recreation and wildlife trails for large mammals.

4 Lesson Learned

The use of remote cameras for monitoring the flows of people and wildlife has proven to be very effective in our context. The camera technology has improved significantly since we initiated our research in 2004. In particular, the advancement of infrared illumination, digital image capture and memory capacity have all resulted in substantial improvement to commercially available cameras. In addition, the newer units draw a relatively small amount of power and can be operated for a month or more on a single set of batteries. The Reconyx cameras performed very well in our field conditions and we recommend their use. However, there are many suitable units now available commercially.

The selection of cameras depends on the type of data required, but some considerations for model selection include: size of infrared illuminator, field of detection, size and flexibility of digital memory, image quality/resolution, speed of camera to detect a target and acquire an image, and quality of the camera housing. The newest models now include an option for colour images during daylight and black-and-white during dark. Although we did not test any, there are now units available to capture digital video. Remote cameras have emerged as a highly effective means of non-invasive monitoring.

Although the use of cameras does not result in a significant direct disturbance to wildlife or visitors, their deployment raises ethical issues and has the potential affects the quality of visitor experience. Visitors need to be informed that their activities may be monitored by camera. In addition, the anonymity of visitors should be protected and identifiable images of users should be managed carefully. We recommend the development of strict policies for the use and storage of images that is clearly communicated to users. Cameras may capture illegal human behaviour and researchers/mangers need to make *a priori* decisions about how such data will be used. Vandalism and theft of cameras may be an issue in remote settings. Communication with visitors about how and why the cameras are being used is essential to managing loss and damage.

The use of remote cameras for monitoring has the potential to result in a huge volume of data. Depending on the levels of use and the sensitivity of the cameras (e.g., false triggers caused by vegetation movement in wind), each unit may capture thousands of images per week. The process of downloading, viewing, classifying, storing and managing images is currently tedious and labour intensive. Effective use of cameras in a monitoring program requires an adequate budget to perform these tasks and analyze the data. The potential for automated classification of images using change detection software and artificial intelligence is in its infancy, but has the potential to greatly improve the efficiency of managing camera data. The authors are currently exploring automated methods to help in the process of image classification.

The use of remote cameras requires carefully methodological consideration to the spatial and temporal distribution of sampling. Quantitative comparison of results between areas or between different time periods requires the acquisition of viable sample sizes over adequate periods of time. We recommend that researchers work closely with statisticians to ensure that the sampling design is providing the type of data that is needed.

5 Conclusion

The use of remote cameras to monitor visitors and wildlife has emerged as a highly effective approach for park and wildland researchers/managers. New technology allows for the capture of high quality images, virtually unlimited digital storage and efficient operation on battery power. The deployment of cameras requires careful consideration of

ethical and sampling issues. The methods are largely non-invasive and provide a means of collecting a large amount of data on both visitors and the environment. As with all monitoring methods, a commitment to long-term and adequate sampling is required to provide managers with defensible, quantitative data for decision support.

REFERENCES

[1] B. Wilcox and D. Murphy, "Conservation strategy: the effects of fragmentation on extinction," *American Naturalist,* 125, pp. 879-887. 1985.

[2] D.N. Cole and P.B. Landres, "Threats to wilderness ecosystems: impacts and research needs," *Ecological Applications*, 6(1), pp. 168-184, 1996.

[3] R.A. Reed, J. Johnson-Barnard and W.L. Baker, "Contribution of roads to forest fragmentation in the Rocky Mountains," *Conservation Biology*, 10(4), pp. 1098-1106, 1996.

[4] D.S. Ouren, C. Hass, C.P. Melcher, S.C. Stewart, P.D. Ponds, N.R. Sexton, L. Burris, T. Fancher, and Z.H. Bowen. "Environmental effects of off-highway vehicles on Bureau of Land Management lands: A literature synthesis, annotated bibliographies, extensive bibliographies, and internet resources". Open-File Report 2007-1353. : U.S. Geological Survey. 250 pp.

[5] T.A. Switalski and A. Jones, "A guide for designing and managing off road vehicle routes," Wildlands CPR, Missoula, Montana. 2008.

[6] O.E. Sala, F.S. Chapin, III, J.J. Armesto, E. Berlow, J. Bloomfield, R. Dirzo, E. Huber-Sanwald, L.F. Huenneke, R.B. Jackson, A. Kinzig, R. Leemans, D. M. Lodge, H. A. Mooney, M. Oesterheld, N. LeRoy Poff, M.T. Sykes, B.H. Walker, M. Walker, and D.H. Wall, "Global biodiversity scenarios for the year 2100," *Science*, 287, 1770-1774, 2000.

[7] J.A. Foley, R. DeFries, G.P. Asner, C. Barford, G. Bonan, S.R. Carpenter, F.S. Chapin, M.T. Coe, G.C. Daily, H.K. Gibbs, J.H. Helkowski, T.Holloway, E.A. Howard, C.J. Kucharik, C. Monfreda, J.A. Patz, I.C.Prentice, N.Ramankutty, and P.K. Snyder, "Global consequences of land use," *Science*, 309, 570-574, 2005.

[8] J. Fisher and D.B. Lindenmayer, "Landscape modification and habitat fragmentation: a synthesis," *Global Ecology and Biogeography*, 16, pp. 265-280, 2007.

[9] D. Lindenmayer, R.J. Hobbs, R. Montague-Drake, J. Alexandra, A. Bennett, M. Burgman, P. Cale, A. Calhoun, V. Cramer, P. Cullen, D. Driscoll, L. Fahrig, J. Fischer, J. Franklin, Y. Haila, M. Hunter, P. Gibbons, S. Lake, G. Luck, C. MacGregor, S. McIntyre, R. MacNally, A. Manning, J. Miller, H. Mooney, R. Noss, H. Possingham, D. Saunders, F. Schmiegelow, M. Scott, D. Simberloff, T. Sisk, G. Tabor, B. Walker, J. Wiens, J. Woinarski and E. Zavaleta, "A checklist for ecological management of landscapes for conservation," *Ecology Letters*, 11, pp. 78-91, 2008.

[10] K.L. Jope, "Implications of grizzly bear habituation to hikers," *Wildlife Society Bulletin*, 13, pp. 32-37, 1985.

[11] B.N. McLellan and D.M. Shackleton, "Immediate reactions of grizzly bears to human activities," *Wildlife Society Bulletin*, 17, pp. 269-274, 1989.

[12] S. L. George and K.R. Crooks, "Recreation and large mammal activity in an urban nature reserve," *Biological Conservation,* 133, pp. 107-117, 2006.

[13] J.A. Hilty, C. Brooks, E. Heaton, and A.M. Merenlender, "Forecasting the effect of land-use change on native and non-native mammalian predator distributions," *Biodiversity and Conservation,* 15, pp. 2853-2871. 2006.

[14] T. L. Moruzzi, T.K. Fuller, R.M. DeGraaf, R.T. Brooks and W. Li, "Assessing remotely triggered cameras for surveying carnivore distribution," *Wildlife Society Bulletin,* 30(2), pp. 380-386, 2002.

[15] R. D. Heilbrun, N.J. Silvy, M.E. Tewes, M.J. Peterson, "Using automatically triggered cameras to individually identify bobcats," *Wildlife Society Bulletin,* 31(3), pp. 748-755, 2003.

[16] L. Silveira, A. Jacomo and J.A.F. Diniz-Filho, "Camera trap, line transect census and track surveys: a comparative evaluation," *Biological Conservation,* 114, pp. 351–355, 2003.

[17] T. L. Cutler and D.E. Swann, "Using remote photography in wildlife ecology: a review," *Wildlife Society Bulletin,* 27(3), pp. 571-581, 1999.

Danah Duke. B.Sc. M.Sc. Currently the Executive Director of the Miistakis Institute, a non-profit research institute affiliated with the University of Calgary.

Michael Quinn. B.Sc., M.Sc., PhD. Currently an Associate Professor of Environmental Science and Planning in the Faculty of Environmental Design, University of Calgary and the Director of Liaison and Research for the Miistakis Institute.

Kvintus.org - a choice based agent-based simulation model integrated with Google Maps

Hans Skov-Petersen, Pimin Kefaloukos and Bernhard Snizek

Abstract — Kvintus.org is a new agent-based simulation tool especially constructed to model recreational behavior integrated with models of animal behavior. The entire model which is available as 'open source' is based on the generic software package REPAST [4]. Model configuration – in terms of base parameters, entry points, timetables, agent types and state/transitions – are established, manipulated, loaded and saved via XML-files which enables a high degree of flexibility and user interaction. At run time, agents can be displayed in Google Maps [1]. This way models can be applied in most regions of the World without access to base maps, aerial photos etc. Further – which is probably even more important – using a standard Internet platform like Google Maps it is possible to enable non-expert users to 'play with' the models and this way focus more on communicative and participatory aspects.

Index Terms — Agent-based simulation, choices, Google Map, recreation.

1 Introduction

Kvintus.org is an agent-based simulation system for modeling the impacts of recreation activities on ecological and socially related phenomena. An agent-based system – or Agent Based Model (ABM) - has the individual person or animal as its basic unit. 'Agents' have goals, abilities and preferences, and can perceive and comprehend their surrounding environment and accordingly make decisions about which action to take. Decisions include movement patterns, mood changes or modification to behavior. ABM's are executed in discrete time steps in real world time units (for instance one step per 30 seconds). In each step, all agents present in the model will perceive, comprehend and take action according to the environment, other agents, goals, abilities and preferences.

Further at each time step it is checked if the model has expired its endTime, if new agents should be created and if exiting agents has met their obligation and therefore has to be removed from the model. See fig. 1.

ABM's are in particular advantageous in situations where the behavior of individuals is assumed to be known and it is the overall performance of the 'system' that is of interest. We might know where a certain group of visitors would like to go. For instance we might know how many entries there are during a day, but we do not know where in the area problems related to congestion might occur, and we do not know what will happen if access points are added or changed, or what happens if the level of visitation is increased.

Further ABM's due to their resemblance with computer games are expected to be

Hans Skov-Petersen is with Forest and Landscape Denmark, University of Copenhagen. E-mail: hsp@life.ku.dk.
Pimin Kefaloukos is with the Institute of Computer Science, University of Copenhagen. E-Mail: skipperkongen@gmail.com
Bernhard Snizek is with Metacsapes.org. E-mail: bs@metascapes.org

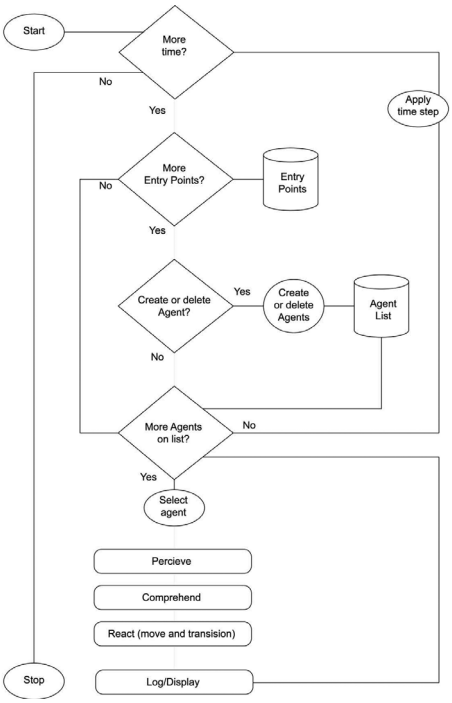


Fig. 1: Flow chart of the model.

more appealing to end users than other types of models and information systems. Accordingly it is expected that ABM's can be applied effectively in participatory planning and management processes [3].

2 Background

The Danish nature is a popular site for recreational activities. Is has been estimated that an annual average of 75 Mill. visits tales place in the nature [2] a level of visitation that is increasing. Accordingly there is a need for assessment of the distribution of recreational disturbance – both socially and in relation to biodiversity. The development of Kvintus.org was initiated by the Danish Forest and Nature agency (based on the revenue from game licenses) to facility such an assessment.

As a point of departure the model is applied in two Danish forests: Rude Skov north of Copenhagen and Hestehaven in the easternmost part of Jutland.

3 Kvintus.org

Kvintus.org is to some extent based on the generic package REPAST [4]. In its present form the main purpose of Kvintus.org is to simulate recreational behavior in natural environments and to a lesser extent the behavior of selected animal species. The simulation of visitor behavior is (in the models' present version) based on movement along the path network of the areas analyzed. Animal movement and associated behavior (at present only applied to roe deer) takes place freely across the landscape.

The model is programmed as a finite state machine. I.e. the behavior of the agents of the system is defined by a discrete number of possible states (types of behavior). An agent can only be in one state at a time. Each state defines the actual behavior and the transition rules that can make the agent change to another state. In Kvintus.org *transitions can also be issued as a function of time* (which is, strictly speaking, external to the state it self). For instance an agent type can be defined by three states: 'walk away from the car into the forest', 'walk around in the forest' and 'get back to the car'. Further transitions can also be *'tricked' by events* e.g. encountering a nice spot for mushroom picking or being scared by a dog. In relation to animal behavior, the temporal transition rules can include the periods an entire day spend on sleeping/resting/ruminating/sleeping and eating/foraging.

At each time step – as indicated in fig. 1 – agents are going through three behavioral stages: Perception, comprehension and action (PCA). During perception the agent senses its surroundings (type of network edges ahead, whether or not a choice has to be made, can other agents bee seen etc.). The sensory information is merged with the abilities and preferences of the agent in the comprehension stage, which leads to a decision of which action to take. An action will typically be movement to a new location, but can also include changes in mood or transition to a new state.

Simulation outputs can be produced in a number of ways including; statistics on the number of agents that has traversed individual network edges (most useful when modeling visitor behavior), the number of agents that have been 'locations' represented by cells of a predefined size (especially useful when modeling animal behavior), a comprehensive log where each agent's locations and mood is recorded for each time step. The comprehensive log can be used when the preset aggregations are not considered sufficient or replaying simulations that already have been executed.

4 Human agents (network)

Individual visitor-agents can either be directed towards a given point of interest (waypoints) or make their way according to choices made at every junction (node) of the network. An agent performing *waypoint behavior* is guided towards a given location in the network. At junctions choices are made between those of the optional edges that enable reaching the way point within the shortest possible path multiplied by a 'strayfactor'. I.e. alternatives to the single shortest path can be applied. During *choice-based behavior*, decisions are made at junctions based on a set of weighted parameters. Which parameters are included and how their present values are evaluated is part of the state a given agent. An example of such a choice parameter is the slope of the edges leading away from the actual node in which the decision is to be made. Different agent, in different states, will have different attitudes to the magnitude of the slope: Elderly people might prefer gentle slopes or flat terrain, whereas mountain bikers are expected to like the adventure and exercise of steeper path segments. In the present version of the system the parameters in table 1 are included. As can be seen some parameters are coded directly as (static) attributes on the edges of the network, whereas some (dynamic) parameters has to be gained from the model at run time.

5 Roe deer agents (raster)

Animals are guided by a set of polygon representing 'ranges' for different states – i.e. types of activities (e.g. eating or ruminating) and a set of selection criteria for land cover preferences. As for the choice parameter applied to choices made at network nodes, preferences (and accordingly choice parameters) are declared as part of the state definition. An event-driven transition rule is applied to the roe deer agent. When a roe deer 'observes' a visitor, it runs a specified distance directly away from the person it sees. After feeing (and hiding) it will regain the state dictated by the temporal transition schema.

6 Model configuration

The model is constituted by a range of components. Including:

- ❑ base settings and administration,
- ❑ logging, output and display environment,
- ❑ geographical environment,
- ❑ timetables and entry points,
- ❑ a set of agent types, and
- ❑ a set of stages (types behavior).

All components of a model are stated by the user in XML-format. This means that a model – including new locations, entry points, agent types, and states - can be set up without recoding.

6.1 Base setting

The base settings include the name of the model, start- and end- time and date of the simulation, the duration of the time steps, and configuration of the output/logging environment. In the present version the output is provided in three files: Gross statistics, Edge statistics, Location statistics and Comprehensive logging.

Gross statistics is the number and distribution of agent types over bands of time (e.g. hourly). Further also distribution of agent types over moods can be generated.

In edge statistics the number of agents that have traversed each edge of the network is written to a file. The information in the file can be joined to the network (in a GIS system) to visualize the load of the network during the simulation. In location statistics the number of agents that have been in cell-locations (cell size will be equal to the size of the land cover grid). Location-based statistics is in particular useful when non-network agents (for instance animals) are active. If comprehensive logging is activated type, mood, edge-id (if in network mode), and xy-coordinate will be logged for all agents, at all time steps. This file will obviously be very large if the duration of the simulation is long, the number of agents is high and the time step is short.

6.2 Environment

The environment is defined by a *network*, a *land cover grid* and a *digital elevation model* (DEM). The files representing the environment are stated in the model XML-file.The network is loaded from a file in ESRI Shape-format. The network topology (edge-node) will be generated at loading. Nodes will be snapped according to a used defined snap tolerance. All edge attributes are loaded with the shapes. The generated nodes (including statistics of use) are stored in separate files with the remainder output. The DEM and the land cover are loaded from ESRI ascii grid files. It is assumed that all environmental data are present in the same projection and datum. Overlap (if the data sets represent the same area) will be checked at loading.

6.3 Timetables and entry points

Entry points are identified by a name and XY-coordinates (which will be 'snapped' to the closest node of the network). Further – to control the order and amount agent creation – entry points are coupled to time tables (providing the average number of new agents in two hour intervals) and a list of agent types and their relative distribution.

6.4 Agent types and states

An agent type is defined by name and – in the case of visitor agents - the time available to the visit. Further an agent is defined by an ordered series of states it will traverse during its' 'life'. The distribution of time, relative to the time available to the entire visit, will be given too.
A state is defining activity either on or off the network. At present the only off-network activities enabled are those related to animal behavior. A state is defined by a speed of movement, an optional waypoint (for network activities) and/or a set of choice parameters. When a waypoint is provided a 'stray factor' is given. The stray factor expresses how much longer than the shortest possible a route to the way point can be.
For network states choices are made every time an agent passes a node in the network. Choices are made between the edges that connect to the present node. The choice is based on weights put the possible values that characterizes the options (i.e. the edges). Characteristics can be both attributes to the edges (precoded before loading the network into the model) and values obtained by specified choice functions. Edge attributes can for instance be pavement type or aesthetic beauty along the edge. An example of a specified choice function can be the number of agent that can be seen or the Cartesian angle of the edge compared to the angle to the point of departure of the visit.

7 KVINTUS.ORG ON THE INTERNET

Goggle Maps [1] is selected for displaying the movement of the agents at run time. While the simulation-engine itself will (and can) run off-line on a standalone PC, Mac or other type of workstation, displaying the agents' movement requires Internet access. As an alternative to the workstation mode, the entire system is planned to be operational entirely from a web-browser, as a 'thin' client.

Figure 2: Screenshot of Kvintus.org at Google Maps.

While displaying the normal Google Maps functions of zooming, panning and changing background maps and aerial photos are enabled. Further a set of basic model parameters (the present model time, the number of active agents etc.) are displayed.

At run time agents can be 'tagged' and 'dragged' to a panel next to the map, so that their present information (including agent type, age, remaining time, stage, and mood) is displayed. Changes in mood are visualized as changes in color of the individual agent. Information about the agent (type, 'age' and mood) can be displayed by clicking the agent symbol.

In most cases the simulation itself will run much too fast to be displayed. Therefore the model has to be slowed down if displaying Is required. This is done interactively by a 'skater' in the GUI. Accordingly and because display itself is a time consuming process most model run will efficiently be performed without display. Never the less display is a very effective mean of debugging and model performance control. Further it could be expected that run-time display will help attracting the attention of lay persons and other non-scientific stake holders to the phenomena addressed by the simulation.

References

[1] Google Maps. (http://www.google.map.com/). Last visited Aug. 2008.

[2] Jensen, F.S. and Koch, N.E. 2004. Twnety-five years of Forest Recreation Research in Denmark and its Influence on Forest Policy. Scandinavian J. of Forest Research. 19 (Suppl. 4): 93-102.

[3] Pröbstl, U, Visschedijk, P. and Skov-Petersen, H. 2008. . Agent-based Modelling – views from the management perspective. In Gimblett, R.H. and Skov-Petersen, H. eds. Monitoring, Simulation and Management of Visitor Landscapes. The University of Arizona Press.

[4] Repast. (http://repast.sourceforge.net/). Last visited Aug. 2008.

Hans Skov-Petersen Ph.D. Geography (2002), M.Sc. Horticulture (1989). County of Funen (1989-1990), CADPOINT inc. (1990-1992), Land Use Planning Project, Bhutan (1992-1995), Forest and Landscape Denmark (1995-date). Editor in charge: Perspektiv (Danish GIS-Magazine). 23 international papers (14 with review). Books: Visitor monitoring in nature areas – a manual based on experiences from the Nordic and Baltic countries (2007). Forest recreation monitoring – a European perspective (2008). Monitoring, Simulation and Management of Visitor Landscapes (2008). Interests: GIS, Spatial/temporal analysis, recreational monitoring and modeling. Email: hsp@life.ku.dk

Pimin Kefaloukos B.Sc. Computer Science (2006). Present employment: Grontmij | Carl Bro

Bernhard Snizek M.Sc. Landscape Architecture (2003). Present employment: KÖNIG/SNIZEK, www.koenigsnizek.org.

Potential and limitations of GPS tracking for monitoring spatial and temporal aspects of visitor behaviour in recreational areas

Karolina Taczanowska, Andreas Muhar, Christiane Brandenburg

Abstract — The application of satellite based navigation systems such as the Global Positioning System (GPS) to record spatial/temporal aspects of visitor behaviour has received more attention in recent years. The aim of this paper is to discuss the potentials and the limitations of GPS-tracking, based on empirical data collected in the Danube Floodplains National Park in Austria (Nationalpark Donau-Auen). A total amount of 485 hiking itineraries were collected in the field using Garmin e-Trex devices. After returning the GPS receiver visitors were interviewed and additionally asked to draw their route on the map. 372 complete records (GPS tracks plus map sketches) were thereby obtained for further analysis. The highly detailed spatial resolution of the data allowed deriving more exact route characteristics compared to traditional data collection methods such as trip diaries. GPS-tracking was more accurate than map sketches in areas with poorly defined trail network. Some respondents were not able to report the exact route, due to insufficient map reading skills or orientation problems in the outdoor environment. In such cases, in particular, the GPS approach proved its intrinsic advantages. Nevertheless, some limitations of the GPS use have also been identified. In particular, problems with the quality of the satellite signal in areas covered by dense deciduous forest turned out to be a major limiting factor for GPS-tracking in the presented National Park setting.

Index Terms — GPS, GPS tracking, spatial behaviour, monitoring methods, visitor flows, recreation

1 Introduction

Satellite based navigation such as the Global Positioning System (GPS) can be used to capture and to register spatial-temporal features of visitor behaviour in recreational areas [1], [2], [3]. The intensive development of GPS navigation and tracking technologies in the last decade led to reduced hardware costs and improved quality of the analysis software [4].

This paper explores the potentials and the limitations of GPS-tracking for visitor monitoring, illustrated by practical examples from a case study carried out in the Danube Floodplains National Park in Austria. (Nationalpark Donau-Auen)

Karolina Taczanowska, BOKU University of Natural Resources and Applied Life Sciences, Vienna, Austria. E-mail: karolina.taczanowska@boku.ac.at
Andreas Muhar, BOKU University of Natural Resources and Applied Life Sciences, Vienna, Austria. E-mail: andreas.muhar@boku.ac.at
Christiane Brandenburg, BOKU University of Natural Resources and Applied Life Sciences, Vienna, Austria. E-mail: christiane.brandenburg@boku.ac.at

2 Methods

The results presented in this paper are based upon empirical data collected from the Lobau – the westernmost part of the Danube Floodplains National Park in Austria that lies inside

the city limits of Vienna. This study only focused on hikers. A total amount of 485 personal hiking routes were collected in the field using 55 Garmin e-Trex devices (SiRF II). After returning the GPS device visitors were interviewed and asked to draw on a map the hiking route that they took on that particular day. The complete sample size (GPS track combined with survey data) was 372. Each of the collected GPS tracks contained spatial and temporal information about a hiker's itinerary, stored as a set of trackpoints. The location of a visitor defined by geographic coordinates of the WGS84 reference system was recorded in a constant interval of four second. The primary data were pre-processed in order to eliminate the outliers from the dataset. The analysis itself focused on the comparison of the distribution of the trackpoints and the routes sketched on the paper map by the interviewees.

3 SELECTED RESULTS

3.1 Individual routes

The following route characteristics were derived from the GPS data: route length and trip duration, direction of movement, walking speeds, as well as the overall number and duration of stops. At the same time several route characteristics were generated based on the survey form and the sketched routes. In this case the route length and the duration of visit were taken into account. Table 1 presents several examples of route attributes, with distinction of the data collection technique.

The paths of travel reported by visitors differed in some cases from the GPS records. Currently, we shall examine several quantitative and qualitative methods that analyze the similarities between the respective routes. One of the methods considered in this study consists of calculating the GPS trackpoints that overlap with the reported routes. Another possible solution is application of the map matching technique to assign the recorded track to the trail network and analyzing the corresponding sequences of the reported path segments. Figure 3 illustrates an example of a GPS track and a corresponding trip sketch. In this case, there is a visible spatial difference between the two data collection methods.

TABLE 1

SELECTED ROUTE CHARACTERISTICS

	Min.	Mean	Max.
Survey & Map Sketch			
Route length (m)	1129	5226	21283
Trip duration (min)	27	108	420
GPS Tracking			
Route length (m)	896	5281	22978
Trip duration (min)	30	98	367
Number of stops	1	5	24
Duration of stops (min)	2	23	152
Average speed (km/h)	1,0	3,3	5,6
Average speed in motion (km/h)	1,4	4,1	8,23

Length N = 227, Duration N = 226, Stops & Speed N = 200

3.2 Visitor distribution

GPS data might be also used for analyses at an aggregate level to investigate the distribution of visitor flows in an area of a nature reserve. Figure 4 shows an output of

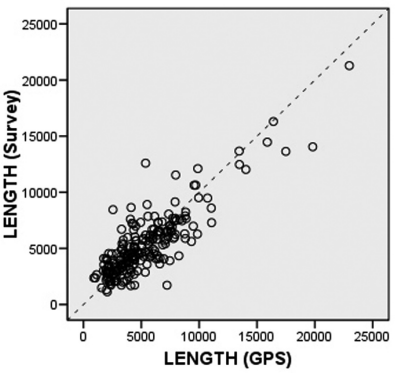


Fig. 1. Scatter plot of the route lengths recorded by GPS vs. calculated basing on the route sketches. The correlation coefficient r = 0.850, p < 0.01

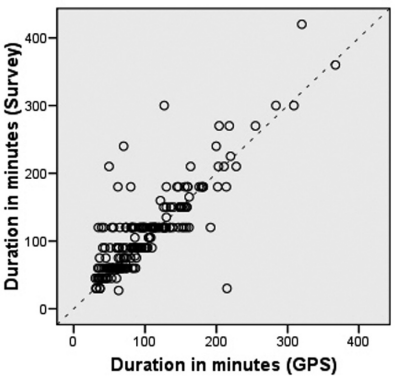


Fig. 2. Scatter plot of the trip durations recorded by GPS vs. reported by visitors. The correlation coefficient r = 0.843, p < 0.01

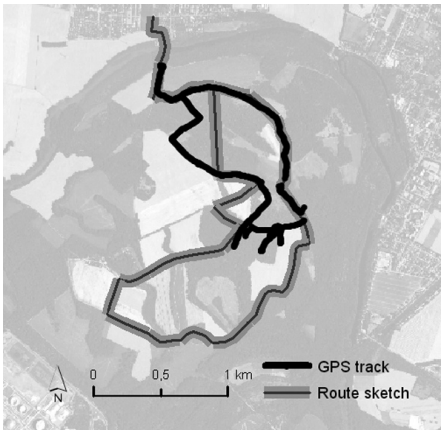


Fig. 3. An example of a recorded track (GPS) and the route reported by the same visitor.

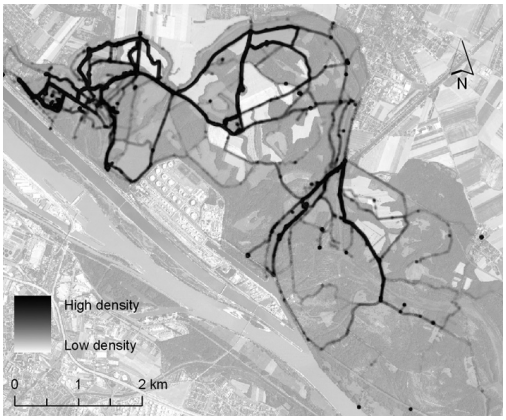


Fig. 4. Spatial distribution of visitor flows in the Lobau - result of a density analysis, based on a dataset of 416646 trackpoints.

the density analysis, based on the dataset of GPS trackpoints. Dark colours indicate high intensity of public use. The majority of hikers used the existing trail network. However, the use of unauthorized shortcuts and wild paths was identified during the analyses of data recorded by GPS devices (see figure 5).

Several spatial-temporal aspects can be analyzed at a more regional level, for instance temporal changes of public use during the course of a day or the localization of places where park visitors tended to take rest. Figure 6 depicts the prevalent resting places of the study respondents and the duration of their rest- time.

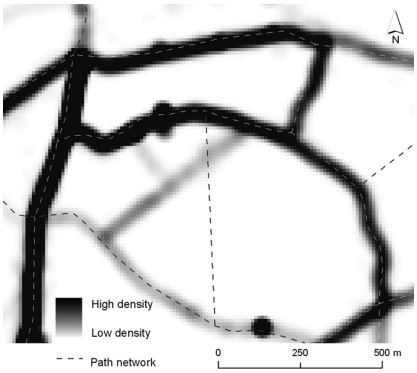


Fig. 5. Spatial distribution of visitors in the Lobau. Density analysis based on GPS data revealed the presence of several non-documented shortcuts and wild paths in the area. The dashed lines indicate the trail network based on the topographic map 1:25.000.

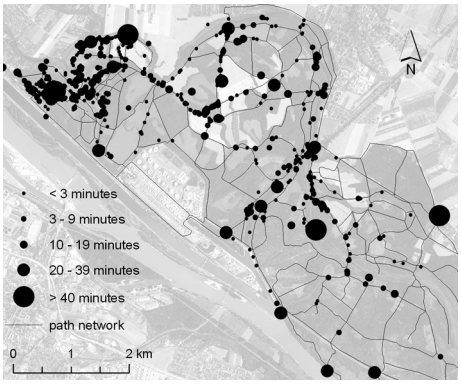


Fig. 6. The map of places where the respondents stopped during their hike in the Lobau. The size of a symbol indicates the duration of stop.

4 Discussion

4.1 Potential of GPS tracking

The presented research showed several practical applications of GPS tracking for monitoring spatial-temporal aspects of visitor behaviour in rural and/ or wilderness settings. The major benefit of this data collection method is the high resolution of data documenting human behaviour measured in space and time. Such information offers new dimensions for analyses involving the spatial-temporal trajectories [5]. Besides the information that can be gathered using traditional data collection methods, such as route lengths and trip itineraries taken from map sketches or analogue trip diaries, several new characteristics of recreational activities can be acquired using this technology. Documenting the speed of movement, duration of stops and location of resting places, as well as identifying off-trail use can only be reliably gathered due to the use of GPS tracking. The route attributes presented in this paper are similar to other studies employing GPS technology to track people's motion [1], [3], [6]. The traditional monitoring methods can be confirmed and enhanced by the corresponding digital records of visitor behaviour [2].

Several studies reveal the ability of GPS to record a track much more accurately than the respondents were able. [7]. In the presented study there were several examples supporting this thesis. However, the definite conclusions have not yet been drawn.

4.2 Limitations of GPS tracking

Although GPS tracking demonstrates quite a number of advantages as a tool for collecting data pertaining to individual visitors, there are also some limiting factors that inhibit the use of this method in outdoor settings. The major problem encountered in this case study was related to the quality of data. Several cases of data loss were observed, usually caused by signal disturbance due to dense forest cover. Only 59 % (N = 286) of the tracks had sufficient quality to fully derive individual route attributes. Another limiting factor experienced during the course of fieldwork were the logistics of data collection that favored the 'loop' type of hiking itineraries. This was due to the fact that the visitors, which had indicated their wish to exit the Lobau at different gates than those staffed by interviewers, could not be equipped with GPS devices.

Only a few visitors refused to take part in the project, mostly due to ethical reasons. They considered this kind of research as disturbing their privacy during their leisure time. However, the large majority of hikers had a positive attitude towards the study. It can be assumed that visitors accepting to carry a GPS are more likely to adhere to visitation rules (such as not hiking off the marked trails), or vice versa, visitors not adhering to the rules will most probably refuse to participate in such a study, thus causing an intrinsic bias in the data set.

5 Conclusions & outlook

GPS-tracking is an increasingly promising data collection method, gaining in importance in the fields of transportation, urban planning and architecture. It also has potential as a tool used for monitoring recreational use in outdoor environments. The intensive development of new technologies gradually overcomes the major limitations discussed in this paper. A higher level of accuracy is already guaranteed by the 'new generation' GPS devices equipped with the SiRF III chips. The technology becomes cheaper and ever more accessible, which duly encourages its more widespread use. There are several examples of matching data collection processes and tourist services using the Location Based Services (LBS) technology, for instance the WebPark system in the Swiss National Park [8] or the BALANCE system [9] being developed for the Lobau area in the Danube Floodplains National Park in Austria. There is a need for further development of

data processing, analyses and visualization methods, which can inspire formulating new research questions and innovative management solutions.

6 ACKNOWLEDGEMENTS

The presented results are part of the research project BALANCE within the framework of the Austrian Space Programme (ASAP). The authors wish to thank the project contributors from Arsenal Research, Vienna, AT involved in this research: Markus Ray, Helmut Schrom-Feiertag and Dietmar Bauer, Univ. Doz. Dr. as well as the Municipal Department 49 of the City of Vienna (Forestry Office and Urban Agriculture) for their advice and support. We also wish to acknowledge and thank Ramona van Marvijk and Rene Jochem (Wageningen University, Netherlands) for providing the GPS-devices used in this study.

REFERENCES

[1] C. Arrowsmith, D. Zanon, and P. Chheteri, Monitoring Visitor Patterns of Use in Natural Tourist Destinations, in Taking Tourism to the Limits: Issues, Concepts and Managerial Perspectives, C. Ryan, S. Page, and M. Aicken, eds., Elsevier: The Netherlands. pp. 33-52, 2005.

[2] J.C. Hallo, et al. A Case Study Comparison of Visitor Self-reported and GPS Recorded Routes. in Northeastern Recreation Research Symposium, Gen. Tech. Rep. NE-326. Newtown Square: U.S. Department of Agriculture, Forest Service, Northeastern Research Station, 2004.

[3] R. van Marvijk and B. Elands, Experiencing nature: The recognition of the symbolic environment within research and management of visitor flows. Forest Snow and Landscape Research. 81: pp. 59-76, 2007.

[4] N. Shoval and M. Isaacson, Tracking Tourists in the Digital Age. Annals of Tourism Research. 34(1): pp. 141-159, 2007.

[5] R. Gimblett and H. Skov-Petersen, Monitoring, Simulation, and Management of Visitor Landscapes. Tucson: The University of Arizona Press, 2008.

[6] A. Millionig, Routennetze für mobile Fußgänger-Navigationsanwendungen: ein neuer Ansatz für die Optimierung auf Basis von quantitativen Bewegungsdaten. in CORP 2006 & Geomultimedia06. Vienna, 2006.

[7] J. van Schaick and S. van der Spek. Application of Tracking Technologies in Spatial Planning Processes: An Exploration of Possibilities. in 12th International Conference on Urban Planning, Regional Development and Information Society (CORP). Vienna, 2007.

[8] R. Haller and A. Eisenhut. Was fragen Wanderer den digitalen Wanderführer im Webpark? In: Auf den Pfaden von Natur und Kultur. R. Eder and A. Arnberger, eds., Vienna, Institute of Landscape Development, Recreation and Conservation Planning, BOKU - University of Natural Resources and Applied Life Sciences, 2008.

[9] Austrian Space Programme. Projects - 3th and 4th Call for Proposals, Federal Ministry for Transport, Innovation and Technology, Austria. [www.ffg.at/getdownload.php?id=2658] 2008.

Karolina Taczanowska is a research assistant and PhD candidate at the Institute of Landscape Development, Recreation and Conservation Planning at the BOKU University in Vienna, AT. For further information please see: http://www.rali.boku.ac.at/6671.html

Andreas Muhar, ao.Univ.Prof. Dr.nat.techn. Dipl.-Ing is the Head of the Institute of Landscape Development, Recreation and Conservation Planning at the BOKU University in Vienna, AT. For further information please see: http://www.rali.boku.ac.at/6214.html

Christiane Brandenburg, ao.Univ.Prof. Dr.nat.techn. Dipl.-Ing is Associate Professor at the Institute of Landscape Development, Recreation and Conservation Planning at the BOKU University in Vienna, AT. For further information please see: http://www.rali.boku.ac.at/6656.html

The spatial knowledge representation of players movement in mobile outdoor gaming

Monica Wachowicz, Daniel Orellana, Chiara Renso,
Estefania Muñoz Moraga and Javier Parada

Abstract — This paper describes an innovative approach for developing a spatial knowledge representation based on the existence of multi tier spaces as a mental construction of human movement. The three "spaces" paradigm has been proposed to support the reasoning process in terms of sensing, symbolic, and social spaces. The spatial knowledge representation was implemented as a computational ontology in Protégé, and it has been applied to provide new insight about the actual behavioural patterns of players within a recreation site, accordingly to checkpoints and similar players´ interactions. This first experiment consisted of an educational game in Amsterdam using mobile phones and GPS-technology for 200 students having the age of 12-14. The results demonstrate that different types of inferences play a different role accordingly to what a recreational planner needs to infer, that is, the location of interactions among players and the environment.

Index Terms — Recreation planning, mobile outdoor gaming, spatial knowlegde representation, ontology.

1 Introduction

In the planning of recreation space, the aim is to provide a range of functional and aesthetically pleasing environments for outdoor recreation [1]. Mobility is an integral part of the process of recreation planning. However, most of the approaches to planning for leisure and even those that utilise spatial principles have not been developed to handle the sense of mobility of players and its significance to recreation development.

Monica Wachowicz is with the Technical University of Madrid, E-mail: m.wachowicz@topografia.upm.es.
Daniel Orellana is with the Technical University of Madrid, E-mail: danielorellanav@gmail.com.
Chiara Renso is with National Research Council (CNR), Italy E-mail: chiara.renso@ isti.cnr.it
Estefania Muñoz Moraga is with the Technical University of Madrid, E-mail: emunozmoraga@yahoo.es
Javier Parada is with the Technical University of Madrid, E-mail: fjpo@alumnos.upm.es

The term mobile game typically stands for an isolated interactive game on a mobile device which does not utilise location and movement of the player. The availability of positioning technology such as GPS, together with more powerful mobile devices, and mobile networking infrastructures can allows us to develop mobile location-based multimedia games.

Existing mobile games that introduce location in their application context often go into the direction of augmented reality, using extensive hardware and software. Integrating the location, such games bridge the real and the virtual world. Some examples include Pirates! [2], which uses additional proximity sensors to locate the players and hence is not very suitable for an (ad hoc) outdoor game. With GPS drawings [3] we find systems that use GPS to draw a picture in the virtual world by physical movement, however, have not life game momentum.

We are particularly interested in understanding the movement of players and

foreseen possible new riddles of a mobile outdoor gaming. Our approach is to develop a spatial knowledge representation about these movements by developing an ontological formalism within which not only definitions (concepts) but also a supporting set of axioms must be true in every possible location of a player. Our effort should not be considered of a simple simplification of particular epistemic states, but as a basis for causal inference that enables the understanding of what we call movement. In fact, we are searching for the explanation of the spatial patterns (e.g. flows) of the actual trajectories followed by players, not only the starting and ending points.

2 THE NOTION OF DIFFERENT SPACES IN MOBILE OUTDOOR GAMING

The first theoretical assumption is the existence of multi tier spaces as a mental construction of movement. Movement is conceptualised as “motion” or “translation” of a player over time. This excludes the rotation, parts-of-body motion, or internal motion of a player. Knowledge about movement arises from the reflective and abstract conceptualisation and representation of seemingly distinguishable types of spaces, interacting causally with concepts in a common space and time [4].

2.1 Sensing space

The concepts are related to the general picture of movement in space and time that can be interpreted as a simply one of concrete and discrete units, such as node, stop, move, vector and flow. In fact, each concept represents the analytical perspective of movement, because they represent the logic-geometrical and topological understanding of movement which can be seen or sensed at one place and one time. They also provide a basis for interpretation of measurements and observations of the actual trajectories of the players.

2.2 Symbolic space

The conceptualisation of movement is not divided into discrete units, but instead, it involves the distinct semantics of movement as a crucial precondition of explicating the logic-semantic structure of the movement in space and time. The symbolic space represents the essence of movement, that emphasises the underlying continuity and not the separation of things, even though the continuity might in some sense be conceptualised in terms of the discrete concepts, for example, the generalisation of flows through the conceptualisation of attractors.

2.3 Social space

It is connected with what has happened or is going to happen. Movement needs to be associated with intentional behaviour and therefore, it needs to be represented directly to social and economical behaviour. This space is NOT a generalisation or abstraction of the previous ones. Some examples of concepts include actor (i.e. player) and his actvity involved in solving a riddle.

3 THE MOBILE OUTDOOR GAMING

Paper chase (also known as scavenger hunt) is an old children’s game in which an area is explored by means of a set of questions and hints on a sheet of paper. Each team tries to find the locations that are indicated on the questionnaire. Once a place is found, they try to best and quickly answer the questions on the sheet, note down the answer, and proceed to the next checkpoint (CP). Based on this game idea, a mobile outdoor game was developed to evaluate the proposed spatial knowledge representation of the different spaces in mobile outdoor gaming (Fig. 1).

The game mainly consists of a set of georeferenced checkpoints associated with multimedia riddles. With the mobile game client a player logs in to the game server, receives a map and the player has to find during the game.

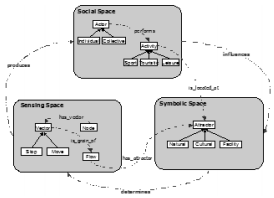


Fig. 1. The spatial knowledge representation of multi-tier spaces developed for the representation of the movement of players of a mobile outdoor gaming. It was implemented as a computational ontology in Protégé, using OWL DL that allows the maximum expressiveness while retaining computational completeness.

Each of the checkpoints is geo-referenced by a Gauss Krueger coordinate which is transformed into a screen coordinate and drawn on the map. The player's device includes a GPS receiver which continuously tracks the current position of the device. As the checkpoints are proximity-aware an event is raised and the server is contacted, whenever a player physically approaches one of the virtual checkpoints. The server responds by sending the information about the corresponding riddle, which is presented in a hypermedia presentation to the user.

Each riddle has associated resources like an image or other additional (media) information that are needed to solve the riddle with the respective interaction(s). The player tries to solve the riddle not only correctly but also as quick as possible, because the time needed to solve all the riddles is accumulated and added to the overall score. The answer to the riddle is communicated to the game server. It is possible for the player to interact with the system but also with other players.

3.1 The experiment: frequency 1550

In the Frequency 1550 mobile outdoor game, students were transported to the medieval Amsterdam of 1550 via a medium that's familiar to this age group: the mobile phone. The pilot took place in 2005 from 7 to 9 February and was supported by KPN Mobile's UMTS network (Fig. 2). The Waag Society educational staffs worked with the school to make sure the mobile game experience fits with the traditional curriculum. Apart from adding to historical awareness and knowledge the pilot was meant to enhance communication and collaboration skills (game tactics) and educational abilities (interpreting historical sources and references). Through this pilot, the game was focused on whether actively experiencing history through the immersing qualities of a (location-based) game and the creation of your own media (pictures, sound, video) adds to the understanding and appreciation of the city and its history.

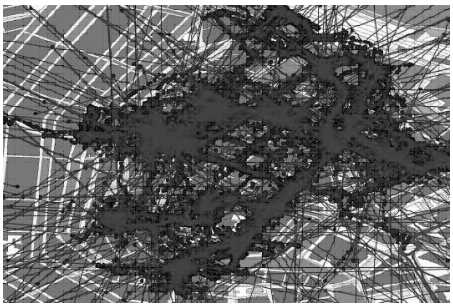


Fig. 2. The GPS data set collected during the Frequency 1550 Mobile Outdoor Game.

4 REASONING ABOUT MOVEMENT

Reasoning allows the encoding of knowledge about specific domains and often includes ontology languages that support the processing of that knowledge. Among all the ontology languages, the Web Ontology Language (OWL) is a well known standard from the Semantic Web and it is now a W3C recommendation [5]. An interesting feature of OWL is that it relies upon a family of languages known as Description Logics (DL) that provide an inference system based on a formal well founded semantics [6]. The basic components of DL are *concepts*, *roles (properties),* termed as TBox, and *individuals,* termed as ABox. Concepts describe the common properties of a collection of individuals and roles are binary relations between concepts. Furthermore, a number of language constructs, such as intersection, union and role quantification, can

be used to define new concepts and roles.

OWL currently has three sublanguages of increasingly expressive power that are: OWL Lite, that is the syntactically easiest version, that can define hierarchies and simple constraints; OWL DL that allows the maximum expressiveness while retaining computational completeness, corresponds to Description Logics. Finally, OWL Full allows for maximum expressiveness and the syntactic freedom of RDF with no computational guarantees.

In this paper we exploit OWL DL for the formalisation of the concept ***STOP*** and the reasoning about movement patterns rather than a particular trajectory of a singular player.

Concept 1. **STOP** represents the suspension of movement of a set of players. It is defined as the spatio-temporal relation between a high density and low velocity of players within a specific region (Fig. 3).

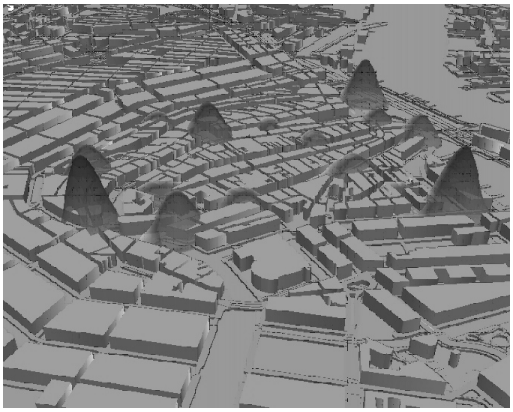


Fig. 3. A snapshot of the location of places with the highest density of players during the entire game.

Therefore, the characterization of an **ATTRACTOR** during the game can be infered using the **STOP** concept, as well as a-priori knowledge about the location of checkpoints of the game (Fig. 4).

ATTRACTOR ≡ HasRegion some (hasDensity some HIGH) and (hasVelocity some LOW)

ATTRACTOR ⇒ is_at some STOP

Fig. 4. The results from processing the inferred ATTRACTOR concept based on the suspension of movement of players. An interesting finding is that a large number attractors have ocurred during the game and they were located at the bridges.

This example, despite its simplicity, shows how OWL axioms allow to perform automatic reasoning over the movement of players taking into account additional background information, such as geographical and application-dependent knowledge.

5 CONCLUSIONS

Three main findings can be drawn from our research described in this paper. They are:

1. Mobile devices, linking the real and virtual worlds could change your perception of your surroundings. *They* will gather *event driven data* which will incorporate real-time observations collected upon players requests from mobile multi-sensor networks. Most of the gaming processes will move away from the post-processing step, which is today very time consuming, due to the fact that raw data from orbiting satellites and in-situ observations are collected in such a volume that varies from place to place and time to time.
2. Mobile location-based outdoor games will create new cultural, social, and virtual landscapes, which will require the development of a knowledge representation *of* different notions of spaces, with attractors, activities, and processes potentially taking context information everywhere.
3. The impacts and implications on *privacy* in the sense of preventing the disclosure of sensitive data, both explicitly

(e.g., providing individual's identity) and implicitly (providing non-sensitive data from which sensitive information can be inferred).

References

[1] A. Dietvorst, ¨Planning for outdoor recreation *and* tourism in the Netherlands¨. In Hubert N. van Lier and Pat D. Taylor (eds) *New Challenges in Recreation and Tourism Planning*, Elsevier, pp. 69-86, 1993.

[2] S. Bj¨ork, J. Falk, R. Hansson, and P. Ljungstrand. Pirates! - using the physical world as a game board. In Interact'2001, IFIP TC.13 Conf. on Human-Computer Interaction, Tokyo, Japan, July 9-13 2001.

[3] GPS , Global Positioning System drawing project, www.gpsdrawing.com, 2004.

[4] H. Laycock. Words without objects: Semantics, Ontology, and Logic for Non-Singularity. Oxford University Press, 2006.

[5] W3C Consortium. The web ontology language. http://www.w3.org/TR/owlfeatures/ , 2008.

[6] F. Baader, D. Calvanese, D. L. McGuinness, D. Nardi, and P. F. Patel-Schneider. The Description Logic Handbook: Theory, Implementation, Applications. Cambridge University Press, Cambridge, UK, 2003.

[7]

Acknowledgments

This work has been supported by GeoPKDD EU Project IST-6FP-014915, http://www.geopkdd.eu/.

Prof. Dr. Monica Wachowicz Currently in sabbatical as Visiting Associate Professor, Department of Cartography and Topography, Technical University of Madrid, Spain. Her research interests are in the areas of geographic knowledge representation and reasoning, spatio-temporal data modelling and usability.

Dr. Chiara Renso Her research interests are related to spatio-temporal reasoning, ranging from extensions to logic programming to perform spatio-temporal and uncertain reasoning in geographical daya and data mining query language for movement data.

Daniel Orellana, Estefania Muñoz Moraga, and Javier Parada They are currently students at the Technical University of Madrid.

MMV4 PROCEEDINGS
POSTERS

Implementation of results of visitor and environmental impact monitoring: an example of Kauksi campsite of the recreation area along the northern coast of Lake Peipsi of Estonian State Forest Management Centre

Anu Almik, Kaidi Maran, Kalle Karoles and Marge Rammo

Abstract — Kauksi campsite, located in the recreation area along the northern coast of Lake Peipsi of Estonian State Forest Management Centre, is an area of intensive and long-term recreational use. In the years 2003 and 2007 a permanent monitoring network was established in the area and the environmental situation and its changes were evaluated. Based on the results of the environmental status assessment and visitor monitoring, recommendations were made for improving the campsite condition and an action plan for performing the works was prepared. In 2004-2007 an infrastructure for the protection of campsite and the lakeshore dunes was designed and constructed, and measures of landscape protection were introduced, as a result of which the environmental condition has stabilised and for some indicators, considerably improved. This case shows that in an area of intensive use it is important to know the user and use specifics and, in order to support the periodic assessment of environmental impacts, to continuously monitor environmental status and perform preventive landscape protection works in order to maintain the stable condition and the recreational values of the area.

Index Terms — Forest recreation, visitor and environmental impact monitoring, recreational load, campsite condition monitoring, damages on trees, soil vegetation and soil.

1 Introduction

State Forest Management Centre, the manager of state forests in Estonia, provides opportunities for forest recreation in 13 recreational areas. For making financing and development decisions, State Forest Management Centre has organised visitor and environmental impact monitoring in recreational areas since 2002. This poster deals with Kauksi campsite in the recreational area along the northern coast of Lake Peipsi of State Forest Management Centre. The campsite is located in a dune forest and is an area of intensive (on average 21000 visits per year) and long-term recreational use and users and traditional ways of use – swimming, sunbathing, camping and picnicking, the two latter causing a strong impact on the landscape. Visitors come to the campsite from surrounding municipalities, 89% arrive by car

A. Almik, K. Maran and M. Rammo are with State Forest Management Centre, Tallinn, Estonia, E-mail: anu.almik@rmk.ee; kaidi.maran@rmk.ee; marge.rammo@rmk.ee;
K. Karoles is with Estonian Centre of Forest Protection and Silviculture, Tartu, Estonia; E-mail: kalle.karoles@metsad.ee

and on average visitors stay in the campsite for two days.

2 Methodology

The situation and changes in campsite condition were monitored by field measurements in summer and autumn of 2003 and 2007.

A network of permanent transects with the distance of 30 m between the transects was established. Sample plots with the area of 1 m^2 were established systematically on transect lines. Condition class distribution, share of bare mineral ground and ground vegetation cover, plant species composition, distribution and abundance were estimated. Recreational injuries and damages to trees and natural regeneration, fire scars and trash were also assessed.

3 Results of the environmental impact assessment in 2003

In 2003 environmental impact assessment was conducted in the area, its results revealing that the impacts cause excess of the limits of acceptable change. So the proportion of area with vegetation loss due to trampling was 33,6 %. The proportion of area with bare mineral ground and partly with erosion was 10,9 %. Anthropogenic damages were found on 25 % of dominant-story pines.

4 Works of landscape protection and visitor management in 2004-2007

On the basis of the results of environment impact assessment and visitor monitoring, recommendations were made for improving the campsite condition and an action plan was prepared to perform the works.

In the years 2004-2005 a free gravel-covered and log-railed parking area was designed and built at the entrance to the campsite for the vehicles of one-day visitors. By the road in the campsite six gravel-covered and log-railed parking spaces were designed and built for multi-day visitors. In addition, traffic of motor vehicles in the campsite was regulated so that a fee is charged for each entry to the campsite with a motor vehicle.

Appropriate infrastructure was constructed for the protection of the dunes between the campsite and the lakeshore, and soil protection works were performed. In the years 2006-2007 stairs were made on the highest dune both on the side of the campsite and on the side towards the shore and a small wooden observation platform was built on the dune ridge. The dune slope facing the campsite was covered with geotextile and mountain pines were planted on the slope. At the foot of the dune side facing the campsite a log rail was constructed, and signs prohibiting climbing and a stand with necessary information were installed. Boardwalks were made on the four paths from the campsite over the dunes to the lakeshore.

Fireplaces were removed from the coastward part of the campsite, where the soil is more vulnerable, and the campsite was expanded towards inland.

The total cost of landscape protection works performed in the years 2004-2007 was approximately 29 000 euros.

5 Results of the environmental impact assessment in 2007

In 2007 a repeat survey was conducted at Kauksi campsite, which showed that as a result of the implemented measures environmental status in the area had considerably improved, especially as regards ground vegetation and natural regeneration of trees and the recovery of understory. The share of area with vegetation loss due to trampling had decreased by 12,1 per cent compared to the year 2003. The proportion of area with bare mineral ground and partly with erosion was 9,9 %, down by 1 %, despite the continued use of the area. New anthropogenic damages occurred on only 1,3 % of the pines of the dominant story. The total number of

natural regeneration of trees and understory on the campsite increased, although natural regeneration only took place in groups and the number and proportion of pine understory decreased to some extent.

Littering of the area had also diminished considerably.

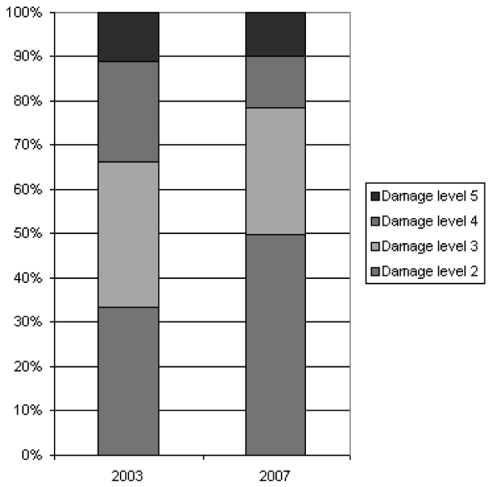


Fig. 1 Proportion of area with different soil and ground vegetation damage in Kauksi campsite in 2003 and 2007. Damage level 2 marks an area with ground vegetation. Damage level 5 denotes an area with bare mineral ground and partly with erosion.

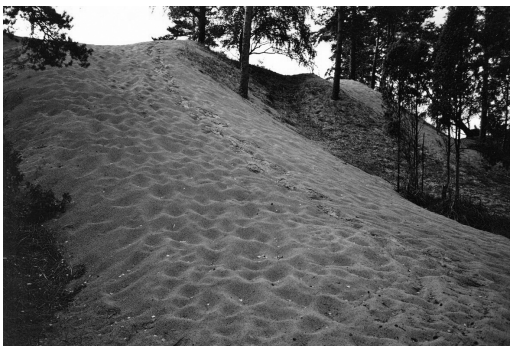


Fig. 2. The state of the highest dune in 2003

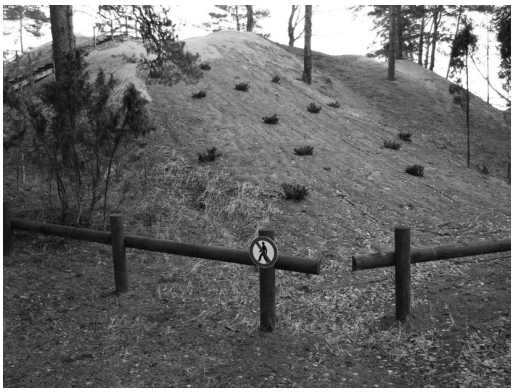


Fig. 3. The dune slope facing the campsite was covered with geotextile and mountain pines were planted on the slope

Fig. 4. Boardwalk and observation platform for dune protection

6 Conclusion

Expenses made for improving the campsite condition raised the cost of a visit to the area by 30%. The performed landscape protection works improved the environmental status of the area and at the same time the extension of the campsite created conditions for increasing the social satisfaction of visitors.

This case shows that in an area of intensive and eroding use it is important to know the specifics of the user and use and, in order to support the periodic assessment of environmental impacts, to continuously monitor the environmental status and per-

form preventive landscape protection works in order to maintain the stable condition and the recreational values of the area.

References

[1] Metsade rekreatiivse koormustaluvuse määramise metoodika väljatöötamine, koormustaluvuse määramine ning kaitseabinõude kavandamine mitmekülgse kasutusega rekreatiivsel maastikul. 1. (Manuscript). 2003. Tartu, 103 p.

[2] Stankey, G. H., D. N. Cole, R. C. Lucas, M. E. Petersen and S. S. Frissell. 1985. The limits of acceptable change (LAC) system for wilderness planning. USDA Forest Service General Technicl Report. INT-176.37 pp.

Comparative research on outdoor recreation between Austria and Japan

Y. Aoki and A. Arnberger

Abstract — The University of Natural Resources and Applied Life Sciences, Vienna and the National Institute of Environmental Studies, Tsukuba conducted a research project to identify differences and commonalities in outdoor recreation activities between Austria and Japan. Between 2005 and 2007 the recreational use in several recreational urban and peri-urban areas was investigated in both countries using a range of methods. Standardized data collecting procedures were established for comparative analyses. The results of this cross-cultural research project showed that although different outdoor activities were carried out, several commonalities in recreation use patterns and recreationists' perceptions were found. This inter-area and cross-cultural comparison of green space users added to the understanding of urban green space use in Japan and Austria. Urban green space management of both countries will benefit from this cross-cultural research project.

Index Terms — Cross-cultural comparison, outdoor recreational activities, climate, Austria, Japan.

1 Introduction

Green spaces are important for humans. They offer opportunities for recreational physical activities, are places for social gathering and refuges from urban living [1], [2], [3]. Attractive urban and suburban green spaces in Austria and Japan are experiencing increasing numbers of visitors, often exceeding their social as well as ecological carrying capacities. Therefore, information about recreation use is needed.

Reliable and valid research about recreation use supports green space management and provides useful data for urban planning. It also demonstrates the importance of urban green space.

In particular standardized cross-country comparisons of recreation use focusing on urban green spaces are rare. In addition, little research has focused on cross-cultural comparisons of outdoor recreation use and behaviour between Japan and Austria.

Standardised cross-cultural comparisons would further enhance the understanding of recreation behaviour in general, and, in particular, of the recreation use in urban green spaces. Cross-cultural research can identify the role such spaces play for their visitors of different cultures. Comparisons deliver helpful information for green space management, how to provide optimal opportunities for outdoor recreation and to maintain or increase the quality of the outdoor recreation experience.

Y. Aoki is with the National Institute of Environmental Studies, Tsukuba; Japan. E-mail: yojiaoki@nies.go.jp.

A. Arnberger is with the Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Applied Life Sciences, Vienna, Austria. E-mail: arne.arnberger@boku.ac.at.

2 The project

2.1 Research goals

This 2.5-year cooperative research project funded by the Austrian Science Foundation (FWF) and the Japan Society for the Promotion of Science (JSPS) aims at enhancing the understanding of recreation use and recreation behaviour in both countries [4], [5]. Cross-cultural and inter-area recreation use comparisons across several Viennese and Japanese recreation areas were carried out in a standardized manner, applying sophisticated outdoor recreation research methods.

Beside its focus on urban and suburban green spaces, additional research investigated cross-cultural differences in recreation behaviour and activities as well as the perceptions of landscape change by season [4], [5].

This project involved several researchers from different disciplines. The Japanese side involved 9 universities to gather data of urban and suburban park visitors for the comparative research. The Austrian side was predominantly presented by the Institute of Landscape Development, Recreation and Conservation Planning at the University of Natural Resources and Applied Life Sciences Vienna. Based on several visits by the researchers in Japan and Austria a network of partners was established, and study sites in Japan and Vienna for the cross-cultural comparison were identified. A standardized strategy for data collection was developed.

The project targeted on a range of research topics such as visitor perceptions, satisfaction, use patterns, crowding, user conflicts, use displacement, visitor motives, user conflicts, park design, spatial distribution of visitors within a recreation area, and the influence of weather on recreation.

2.2 Study sites

The settings investigated were urban pocket parks, historical gardens (Fig. 1) and historical sites, theme parks, urban forests and conservation areas differing in size, physical setting and recreation uses. Green spaces were heavily used or with low visitation, used predominantly by the local population or tourists. The area sizes ranged from less than one hectare to more than 1000 hectares. Although there was a high diversity of areas studied, management problems were often similar both in Japan and Austria.

Fig. 1. The Stadtpark - a famous historical garden in Vienna was one of the study areas.

2.3 Methods

A range of methods were applied. Several of the methods were set up in a standardized way enabling comparative analyses between the cultures and among recreation areas:

- Visitor counts by human observers and long-term video monitoring
- Face-to-face interviews with thousands of green space visitors
- Visitor observations
- Image-based stated choice methods for the assessment of trail use preferences and intended use displacement behaviour using digitally calibrated images (Fig. 2).
- 3D computer animated choice model for the assessment of trail use preferences using digitally calibrated films
- GIS-based route analysis exploring spatial behaviour patterns of visitors
- Surveys among Japanese and Austrian students
- Collection of weather-related data (Fig. 3)

Fig. 2. Digitally calibrated images of a choice model asked in several Viennese recreation areas [6].

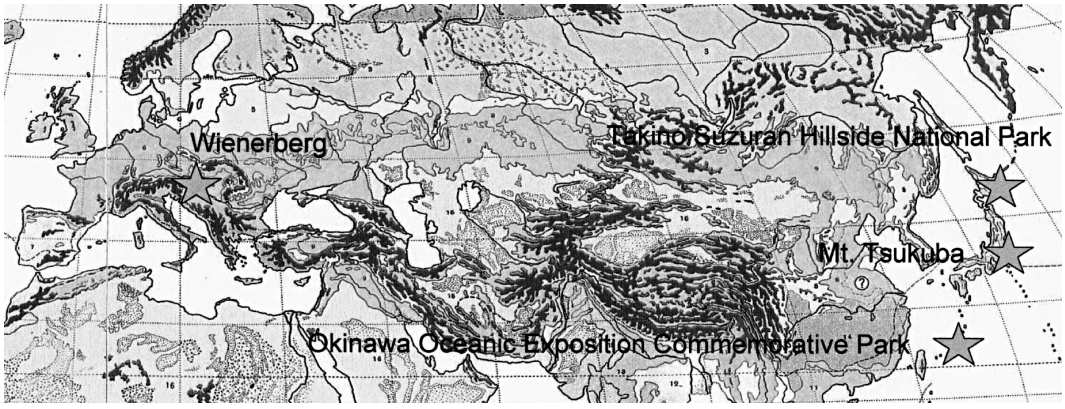


Fig. 3. Location of study areas with analyses on the impact of weather on recreation use levels.

3 Results

The results of this cross-cultural research project showed that although different outdoor activities were carried out, several commonalities in recreation use patterns and visitor perceptions were found. For both ethnic groups recreation, health, nature und landscape are important visiting motives, while dog walking, watching other people, meeting with friends and family, taking children outside, and solitude were rather unimportant.

Cross-cultural differences in crowding preferences of urban forest visitors between Vienna and Sapporo, using several standardised image-based stated choice approaches [7], [8], revealed that Viennese forest visitors are more sensitive to overcrowding, while undercrowding seem to be a more prominent issue in Japan. However, among each ethnic segment the group with preferences for lower use densities is dominating.

Similar effects of climatic conditions and the day of the week on the visitor numbers were found. Figs. 4 and 5 showed the results of analyses obtained by the Quantification Theory I by Hayashi. Similar deviations of parameters were found for the Wienerberg recreation area in Vienna and the Takino Suzuran Hillside National Park in Sapporo. Both are located in the cool temperate climatic zone.

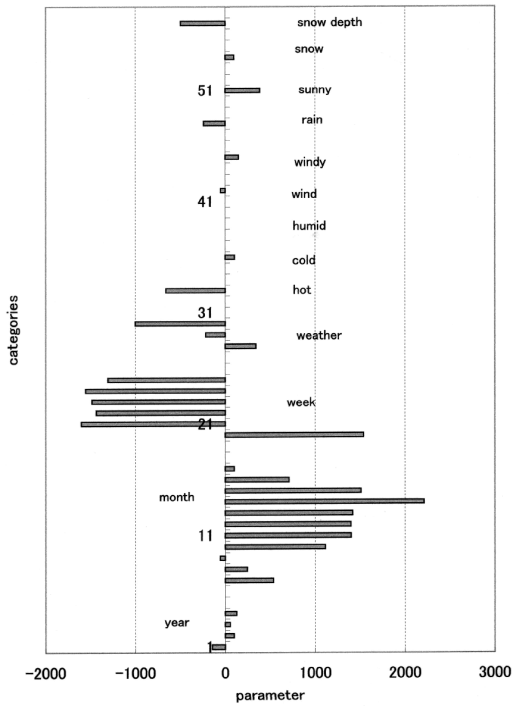


Fig. 4. Daily numbers of visitors to Takino Suzuran Hillside National Park analyzed with the Quantification Theory I by Hayashi.

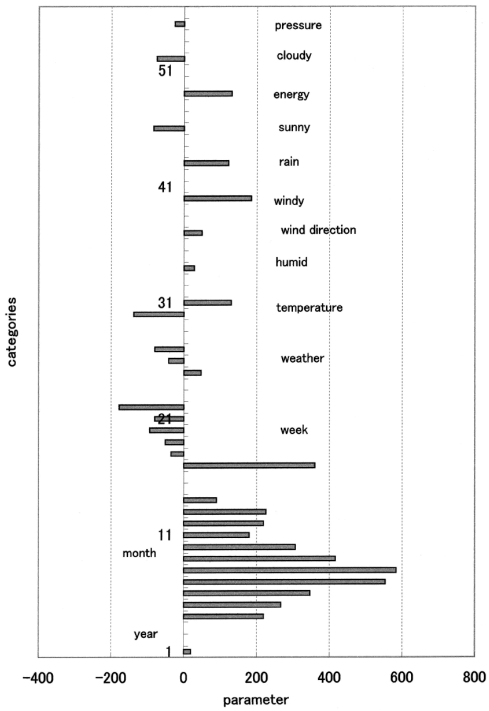


Fig. 5. Daily numbers of visitors to the Wienerberg recreation areas analyzed with the Quantification Theory I by Hayashi.

4 Conclusion

So far, little recreation research in urban settings in respect to visitor motivations, visitor perceptions, visitor behaviour etc. and the influence of weather has been carried out, compared to backcountry and frontcountry settings. Most of outdoor recreation research has been undertaken in North America, while particularly for Austrian's and Japan's urban green spaces information is scarce. Investigations on cross-cultural differences in recreation behaviour between Austria and Japan are also missing.

This inter-area and cross-cultural comparison of green space users added to the understanding of outdoor recreation use in Japan and Austria. Results indicate that urban green space users in both countries seem to be quite similar and green space management of both countries are facing related challenges. Thus, urban green space management of both countries will benefit from this cross-cultural research project. The results of this international project strengthen the importance of outdoor recreation research in urban settings.

Acknowledgements

We want to thank all our Austrian and Japanese colleagues, supporting us in carrying out research in Austria and Japan, the park and forest administrations which assisted us in collecting recreation use data, and the FWF and the JSPS for their financial support.

References

[1] W. H. Whyte, "*The Social Life of Small Urban Spaces*", Washington, DC: The Conservation Foundation, 1980.

[2] W. E. Hammitt, "Urban forests and parks as pri-

vacy refuges," *Journal for Arboriculture*, vol. 28, no. 1, pp. 19-26, 2002.

[3] A. Arnberger and W. Haider, "A comparison of global and actual measures of perceived crowding of urban forest visitors", *Journal of Leisure Research*, vol. 39, no. 4, pp. 668-685, 2007.

[4] Y. Aoki and A. Arnberger (eds.), "A data book of outdoor activities in Austria and Japan", Research Report from the National Institute for the Environmental Studies, Tsukuba, Japan, in press.

[5] Y. Aoki and T. Aikoh, "Comparison of outdoor activities between Austria and Japan", *Journal of Environmental Information Science*, vol. 36, no. 5, pp.109-118, 2008.

[6] A. Arnberger and W. Haider, "Crowding, behavioural, managerial and aesthetic preferences of urban park users: an image-based choice experiment", In: Haider, W., et al.: ISSRM 2006, June 3-8, 2006, Vancouver, BC; Book of Abstracts, p. 7, 2006.

[7] A. Arnberger and R. Eder, "Social trail use preferences, use displacement and crowding perceptions of urban forest visitors: a comparison between forest visitors of Sapporo and Vienna", Unpublished research report, University of Natural Resources and Applied Life Sciences, Vienna, 2007.

[8] T. Aikoh, A. Arnberger, Y. Shoji, T. Mieno and R. Eder, "Comparison of motivations and crowding preferences between Austrian and Japanese urban forest visitors", Fourth conference on "Visitor monitoring and visitor management in recreational and protected areas", Montecatini Terme, Tuscany, Italy, October 14-19, 2008, in press.

Yoji Aoki is Doctor of Engineering (1976: Tokyo Institute of Technology). He is Special Senior Researcher of the Social and Environmental Systems Division at the National Institute for Environmental Studies in Tsukuba, Japan. In 2006, he took the prize by the head of the Academic Committee at the Center of Environmental Information Science. He is associated with National Parks Association, Tourism Research Association of Japan, International Haiku Association, Japan IFLA, and some others.

Arne Arnberger is an associate professor in the Institute of Landscape Development, Recreation and Conservation Planning of the University of Natural Resources and Applied Life Sciences, Vienna. He has written several articles about visitor monitoring methods, social carrying capacities, crowding and conflicts between recreation use and nature conservation in urban and protected areas. More information can be found at:
https://forschung.boku.ac.at/fis/suchen.person_uebersicht?sprache_in=en&menue_id_in=101&id_in=4968

Peregrine Falcon at Rocca Pendice: a difficult but possible relationship

Alberto Barbirato, Fabio Favaretto, Stefano Bottazzo

Abstract — Among the family of Falconidae, Peregrine falcon (*Falco peregrinus*) is considered to be the most beautiful and fascinating member of its family. The history and fame of this family dates back to ancient times and the frequent crisis that this species underwent in the years triggered preservation actions that often dealt with climbing and nesting of this bird. The discover in 2001 of a couple of Peregrine falcon that nested on the Eastern cliff of Rocca Pendice brought up the problem of overlapping between the two species (falcon and man) forcing the management of the Colli Euganei Park to assess the situation with LIPU and CAI in order to find a common strategy to solve the problem. From 2001 to nowadays several limitation strategies have been applied with different results depending upon the protected area along with the protection period. The action plans that are hereafter described have proved a positive effect on nesting of the bird. Although climbers have undergone disadvantages because of these decisions we have recorded an increased sensibility in the problem by them that led to a respectful use of the cliff. The encouraging results show how a good collaboration is possible to establish a peaceful cohabitation between sport tourism and endangered species in protected areas.

Index Terms — Protection, Peregrine falcon, alpine climbers.

1 Introduction

When thinking about falcons the peregrine (Falco peregrinus) is for sure estimated as the most famous of its family. The fame of this beautiful and fascinating bird commences already in ancient times when it was worshipped as a god as drawn on Egyptian tombs and monuments. Its celebrity was also achieved thanks to the great bibliography that can be found on it worldwide since it's a cosmopolitan species.

Falcon is a species of raptor that stands at the top of the trofic chain therefore resulting highly vulnerable to pollutants such as DDT and chlorine compound used in agriculture that between the 50s and 70s contributed to reduce Falcon's population in Europe and America of about 80-90%. It took more than 20 years to the falcon to bounce back to its original population magnitudes thanks to the protection programs established both in USA and Europe.

The Colli Euganei are of volcanic genesis therefore numerous rocky structures, mainly trachyte, of great size that every year are climbed by a large number of climbers.

In particular, Rocca Pendice cliff, with its 300m a.s.l. was well known among climbers already at the beginning of 20th century. It was considered to be a perfect training facility by mountaineers that were getting ready to Dolomitic deeds.

Famous alpine climbers as R. Messner and E. Comici have come to train on these walls making Rocca Pendice one of the best known climbing facility of Veneto, where climbers from different countries can come and climb all the year around

The establishment in 1989 of the Region-

A. Barbirato is with the Parco Regionale dei Colli Euganei
F. Favaretto is with the CAI-TAM (Veneto)
S. Bottazzo is with the LIPU (Padova)

al Park of Colli Euganei and the discover, in 2001, of the presence of a couple of falcons nesting on the eastern cliff of Rocca Pendice triggered a wide range of cohabitation problems between the two species (man and falcon) forcing the board of the park to start an action table with LIPU and CAI.

2 Cohabitation is possible

2.1 Setting up of a working group

The records of a couple of falcons from LIPU in Rocca Pendice was transmitted to the park board and a working group was set up. This comprised the park, LIPU of Padova, CAI-TAM Veneto, CAI Padova, Field monitoring volunteers, County police, National Forestry service.

The aim of the working group was to allow the falcons to reproduce without disturbances and to the climbers to practice sport activity. To find a common strategy that delights both the actors wasn't an easy task, especially taking count of the targets of the park but the positive collaboration of LIPU and the two CAIs made it possible.

2.2 Limitation measures.

The strenuous participation of all the members and in particular LIPU, CAI and the park ended up with a no climbing zone and with a period in which climbing was forbidden.

Along the years, from 2001 to nowadays, various experimentations for limiting climbers were assessed and the results were different.

CAI and LIPU proposed to build and place a nesting house on a nearby cliff that was less attractive to climbers so more suitable to be protected and managed. This proposal didn't bring any good results however it allowed to study and better understand falcon behavior.

When limitation proceedures where finally chosen an "information sign" was made and placed at the main access points to the walls of Rocca Pendice. Later on the same sign was introduced in the web site of the park.

2.3 Effects of the protection actions and offspring.

Nesting became a certainty when during February 2001 Aldo Tonelli (LIPU Padova), spotted a couple of falcons doing the prenuptial court that was promptly followed three days later by the first reproduction. No special protection action was taken on the first year since nobody knew about the presence of these individuals.

Luckily for falcons a rainy spring limited significantly climbers' activities and the first egg hatched successfully on April 22nd just after a heavy rainstorm that saw some snowflakes and a sudden drop in temperature.

Even thuogh the lack of information on the presence of the nest led to anthropic disturbance, the two juveniles were able to regularly fly by the end of May.

During 2002 the access to the wall where the nest stood was forbidden and next spring 3 young falcons were born. The following two years was characterized by a beautiful springs and the protection area around the nesting zone did little to avoid damage. A large number of climbers, probably ignoring the consequences, passed next to the nest. Female was forced to leave the nesting both in 2003 and 2004 resulting in the loss of the offspring.

This led the board of the park along with CAI and LIPU to close the East cliff completely from March to May in order to protect the falcons which were the only couple in the Province of Padova.

In 2005 just one juvenile was able to fly but this event has to be estimated as positive since the bad results of the previous years.

During spring of 2006 the protection area size was somewhere between the extreme 2005 decision and the mild 2002.

This action along with the information policies performed by CAI made possible for three juveniles to hatch in 2006.

In 2007 the location of the nest was really close to the one of 2006, therefore the same limitations were kept and this allowed four young falcons to fly out. In 2008 the protection area was considered to be solid and this permitted three juveniles to be born.

Fig. 1. Hunting activity of peregrine falcon.

3 Conclusions

The experience that was gained in these years and the positive collaboration with LIPU and CAI-TAM Veneto and CAI Padova allowed to find a strategy that met the requirements of both the falcon and the climbers.

The solution that is actually under use provokes a slight damage to the climbers that on the other hand have proved to acknowledge the delicate scenario accepting the limitations.

CAI-TAM played a major role in educating and making aware climbers on this problem. The knowledge that built up and the comparison with other realities brought to a result that we hope will lead to a code for the users of Rocca Pendice, a code that will assure protection to the falcons along with the use of the cliffs from CAI members and occasional climbers.

It can be said that the board of the park was able to find the right solution to the problem granting at the same time safety for an endangered species and the valorization of the territory for tourism.

Strengthening local support for community tourism (in Uganda) through University – Community Partnerships

Michael J. Campbell, K. J. MacKay, D. J. Walker, C. Dranzoa,

Abstract — Rural poverty, poor environmental health and the resultant threat to biodiversity are significant impediments to sustainable tourism development in Uganda. These problems reinforce one another and are compounded by: a) weak institutional linkages between rural communities, NGOs, universities, government departments and public policy makers; b) deficiencies in community oriented professional skills in sustainable tourism and biodiversity conservation; c) the need to transform community attitudes to view parks and protected areas and wildlife as natural capital on which rural livelihoods can be improved; and d) the need for interdisciplinary approaches in higher learning to address intertwined problems of biodiversity conservation and sustainable tourism development. The University of Manitoba in co-operation with Makerere University in Uganda has initiated a program to address these issues though the development of: 1) a master's degree at Makerere University; 2) a strategic partner's network and; 3) three demonstration projects in communities surrounding national parks. This poster presents initial results that illustrate how the university community-partnership is leading to stronger institutional links to not only the university and community but also to NGOs and government departments while providing much needed capacity building in local communities.

Index Terms — Community tourism, GIS, partnerships, Uganda.

1 Introduction

Once a prime tourist destination in Africa, Uganda's share of tourism dropped dramatically after decades of internal conflict, during which time wildlife populations were decimated through widespread poaching. After over a decade of relative stability, wildlife numbers and international tourist arrivals have begun to increase. As such, enormous potential exists to utilize Uganda's rich natural and cultural heritage resources for sustainable tourism while providing a much needed local impetus to support their conservation.

Uganda is home to one half of the world's endangered mountain gorillas and harbors over 1000 species of birds, many of them rare Albertine endemics. Uganda's capacity to manage these visitors is currently very limited at all levels of the tourism sector and to date has depended almost entirely upon outside expertise. Lack of expertise in visitor management, market research, monitoring and the application of GIS is a serious impediment to sustainable tourism development.

Tourism is an inherently geographical industry where supply and demand cycles often relate to finite resources in time and space [1],[2]. Geographic Information

J. M. Campbell, K. J. MacKay and D. J. Walker are with the University of Manitoba, Winnipeg, MB Canada R3N 0T9. E-mail: campblm@cc.umanitoba.ca
C. Dranzoa is with Makerere University, Kampala, Uganda. Email: cdranzoa@mulib.mak.ac.ug.

Systems (GIS) can be used to assess and manage these resources as natural capital on which rural livelihoods can be improved while facilitating approaches to biodiversity conservation [3]. Within the context of sustainable development, GIS can guide development objectives and infrastructure planning, assist in sensitivity analysis and determining location suitability, assess resource availability and carrying capacity, aid in evaluation of visitor experience preferences and in tourism promotion through on-line services (e.g. Google Earth, for a review and examples see [4]). Sustainable tourism planning and development can be thought of as occurring in three phases (modified from Boers and Cottrel 2007): 1) tourist/market segmentation through identification of cultural and natural assets; 2) zonation of assets geographically based on supply and demand as well as carrying capacity; and 3) infrastructure and resource development. Although GIS has numerous applications in sustainable tourism development and is widely recognized as an essential tool, it is often under utilized in planning because of limited expertise and lack of training [3]. A major contribution of this project is the training of faculty members and technicians at Makerere University, together with wardens of the Uganda Wildlife Authority (UWA), to use GIS technology as one strategy to enhance visitor management in the national parks.

2 University – community partnership

Tourism in Uganda has recently overtaken all other sectors as the number one contributor to the GDP (Personal Communication, Minister of State for Tourism 2008). In spite of being Uganda's primary foreign income generator, tourism resources in Uganda are still under explored and utilized, partly due to limited tourism infrastructure, lack of integrated approaches to resource utilization, and limited capacity in tourism planning, partnership building and networking. Makerere University (Uganda) and the University of Manitoba (Canada) are in partnership to implement tourism community outreach through building and nurturing tourism networks at institutional, government, NGO and community levels by developing a masters' curriculum in Wildlife Tourism and Recreation Management. The partnership and embedded Master's programme is based upon the premise that developing in-country expertise in Uganda will allow Uganda to better plan for, manage, and benefit from tourists. Built in to the curriculum is field based practicum. Graduate students will work in poor rural communities adjacent to protected areas where their knowledge will be shared to assist villagers in generating healthy livelihoods through wildlife and community-based tourism and as a consequence motivating them to advocate for conservation.

The curriculum provides the vehicle for action learning with the rural communities around protected areas of Bwindi, Queen Elizabeth, and Kibale National Parks forming the life laboratories or workshops for developing/transferring skills, and learning tourism best practices while serving as rich data-base in indigenous knowledge and cultures. The curriculum also helps to draw together all key players in wildlife and community tourism; NGOs, local government, line ministries, conservationists, tourism board, tourism association, Uganda Wildlife Authority to work together with students and university professors to harness this valuable resource in sustainable manner. The model adopted herein de-mystifies universities as the "Ivory Tower" devoid of shared vision for rural community development concepts. Instead, the rural communities and the protected ecosystems serve as attractive centers for innovations in tourism, learning, and knowledge creation and economic development. Finally as tourism is still a relatively nascent industry in Uganda, the education of tourism professionals capable of anticipating and managing a growing number of visitors is essential.

3 CASE STUDY: COMMUNITY INVOLVEMENT – KITOJO - RUHIJA

In the initial project work-plan all community-university projects were to be run as a component of the practicum requirements of the degree. However, during the needs assessment and Rapid Rural Appraisal conducted in 2007 in association with project partners UWA and the Uganda Community Tourism Association it became apparent that the community training component needed to be accelerated. The reason for the acceleration was the decision on the part of the Ugandan Wildlife Authority to issue tourist permits to a group of gorillas habituated by researchers in the Kitojo-Ruhija (henceforth to be called Ruhija) Parish of Kabale District. The short timeline for tourist permits (July 2008) and the community's lack of experience with tourist and tourism lead to the decision to engage the community immediately and send students from the University of Manitoba to begin the sensitization process and to identify community strengths weaknesses and training needs in terms of tourism capacity and visitor management.

3.1 Attraction

The primary tourist attraction in Uganda is the endangered mountain gorilla (Gorilla gorilla berengei). At the outset of the project there were 4 habituated gorilla groups operative in Uganda, however the Ugandan Wildlife Authority had plans to habituate other groups to tourists so as to distribute the benefits of tourism more widely (previously habituated groups were concentrated in two districts). The process of habituation, where wardens follow gorillas daily slowly getting closer to reduce the animals natural fear of humans, can take up to two years. In Ruhija, however, gorilla groups had been under study for a number of years and the process of habituation was advanced. As a result it was possible for the UWA to plan to sell tourist permits within a shorter time frame than usual.

3.2 Community expectations

During the initial Participatory Rural Appraisal (PRA) conducted in 2007 the Ruhija community was identified as one in which there was some potential for tourism development based in large part upon the existence of at least three rare Albertine endemic bird species being resident on community land and the potential to attract serious birdwatchers to the community. With an assessed moderate level of organization and potential for tourism development, UWA notified the project team that gorilla permits were likely to be issued in early to mid 2008 for the Ruhija gorilla group. While the community had been hoping to have a habituated gorilla group for some time, news of the decision was still something of a surprise.

As noted previously, visitor management skills and knowledge are still largely rudimentary in Uganda, where to a large degree major sections of many parks are simply off limits to tourists. As numbers of tourists to Uganda are increasing and the recognition of their significance to the national and local economies grows, there will undoubtedly be increased pressure to expand the suite of experiences available to them. Given the current lack of expertise in visitor management, the implementation of this programme (UM/MAK CIDA) is essential to ensure the optimization of tourism in Uganda.

3.3 Participatory rural appraisal

In 2007 and 2008 two fieldwork placements were conducted by University of Manitoba graduate students under the supervision of the project directors. The principle functions of these fieldwork placements were to conduct Participatory Rural Appraisals (PRA) to determine community awareness, capacity for and openness to receiving tourists. The PRA were conducted with U of M students, in part to develop the template for subsequent placements by Makerere students enrolled in the Master's curriculum.

Over the course of the PRA process students remained in the community for

extended periods of time meeting with community members and gathering information regarding the level of organization of community groups, level of understanding of the potential impact of tourists on the community (positive and negative), potential cultural and natural attractions (crafts, dancing, birds, caves, etc), and the ability to "interpret" these resources and understanding of tourist needs and desires. In addition, as a follow-up to the PRA, project teams consisting of university faculty and NGO partners visited the communities to formalize the partnership and facilitate and organize training initiatives. It became readily apparent that while the community possessed tremendous resource potential for tourism, they lacked the capacity to transform these resources into income generating opportunities. As an example the Gorilla Friends Group had combined their resources to develop a tourist accommodation and with some input from the 2007 U of M student (in landscape architecture) developed a site plan for their enterprise. However, in the absence of ongoing support and advice the group changed locations and constructed "accommodations" based upon local understanding of a guest house.

The result was a structure wholly unacceptable to all but the most rugged tourist and unlikely to attract a single visitor. Subsequently, the project partners provided opportunities for members of the Gorilla Friends Group to travel to several budget tented camps to gain an appreciation of the style and standard required to attract budget and mid-range travelers. In addition, the team provided input to site design and planning and the group is now in the process of constructing a tented camp at the site which sits atop a ridge overlooking the Bwindi Impenetrable Forest. Currently, the 2008 student intern has been providing on site training to members of the Gorilla Friends Camp in customer service, hygiene, and accommodations management.

Other groups within the community are also being trained to take advantage of the tourism potential of the community. Specifically, the beekeepers group have had two members sent to Nakasongola for training in beekeeping business management. In addition, they have received instruction in "interpreting" their operation for tourists (something they never thought tourists might be interested in) and initiatives are underway to assist them in developing and packaging product for tourist consumption and export. The organized community orphans group and several women's groups are also receiving training in craft production and basic accounting and money management for their small enterprises.

As a result of the project's involvement in the community, in a very short period of time a number of tourism initiatives and income generating activities are underway. A key component of the agreement with each of the groups was that a percentage of the income generated by their initiative would be set aside to assist other groups in developing their initiatives ensuring sustainability and reducing resentment within the community.

3.4 Role of GIS training

Within Ruhija, GIS addresses deficiencies in community oriented professional skills in sustainable tourism and biodiversity conservation by providing a toolset to manage existing resources more efficiently while simultaneously presenting new development opportunities. For example, a key economic limiting factor with respect to the natural resources is the policy of managing by exclusion - gorilla are a significant revenue source so access to any part of Bwindi is highly regulated, reducing opportunity for development of other attractions. In the absence of real geographic information regarding abundance and distribution of gorilla, guided bird viewing, nature walks and canopy tours, etc. are unlikely to be developed. Yet the number of visitors viewing gorilla per day is strictly regulated and therefore revenue is capped. GIS can be used to identify areas of high habitat suitability for gorilla and other wildlife species, while sensitivity analysis can aid

in the assessment of development impacts on the landscape. Through careful visitor access management, the Ugandan Wildlife Authority can protect gorilla and at the same time provide critical market segmentation and economic development opportunities. The cultural and community resource segments can similarly benefit from GIS through zonation and planning. Application of GIS within Ruhija does face significant challenges, primarily through lack of geographic, culture and species data beyond basic physical attributes (e.g. climate, topography, coarse thematic habitat maps from remotely sensed data, roads from GPS telemetry). However, the partnering of the Uganda Wildlife Authority with local communities to manage wildlife and tourism through the use of GIS technology does provide a basis for enhanced economic opportunities, and improved visitor and resource management.

4 Conclusions

As a result of the CIDA project, community capacity in tourism enterprise and visitor management is already being enhanced. While the graduate programme and curriculum is slated to begin in the fall of 2008, early intervention in the community has accelerated the partnership development component of the programme. The Uganda Wildlife Authority and several partner NGOs have been actively involved in facilitating and training of community members. Indeed it was the partnership with UWA that allowed the project team to learn in advance of any public declaration that Ruhija was to be a location for gorilla tourism, thus allowing the project to respond as rapidly as it did. Such proactive community capacity building to prepare for visitors will lead to sound visitor and resource management.

References

[1] B. Boers and S. Cottrel. 2007. “Sustainable Tourism Infrastructure Planning: A GIS-Supported Approach” *Tourism Geographies* 9:1-21

[2] W. van der Knaap, 1999. “GIS-oriented analysis of tourist time-space patterns to support sustainable tourism development” *Tourism Geographies* 1:56-69.

[3] D. McAdam 1999. “The Value and Scope of Geographical Information Systems in Tourism Management” *Journal of Sustainable Tourism.* 7: 77-92. HTMLCONTROL Forms.HTML:Hidden.1

[4] T. Bahaire and M. Elliott-White. 1999. “The Application of Geographical Information Systems (GIS) in Sustainable Tourism Planning: A Review” *Journal of Sustainable Tourism.* 7:159-174

Assessment of a passive infrared counter with a remote data transfer facility

Renate Eder, Albert Kahler and Arne Arnberger

Abstract — This study evaluated the reliability of the Ecocounter - Ecotwin© equipped with a remote control facility (Eco-GSM-unit) under different conditions. The counter is connected to a modem, which allows transferring data from the counter to the office via internet. We will discuss the reliability of the modem and the influences of the different locations and surroundings on it.

Index Terms — Passive infrared sensor, remote data transfer, video monitoring.

1 Introduction

Over the past decades, numerous devices have been developed for the purpose of monitoring visitor flows in recreational and protected areas [1], [2], [3], [4], [5], [6], [7], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17]. Beside visitor counting by human observers, most common is the usage of automatic counters such as active and passive infrared counters. These long-term counting systems have several advantages as well as disadvantages.

One problem is the data download. Many of recreational and protected areas are large and difficult to access. It is time consuming to access remote located counting devices. Because of the high costs associated with data download, researchers, managers and producers are looking for more suitable solutions. Newest developments have equipped some of these counter types with remote download systems [17].

This study evaluated the reliability of the Ecocounter - Ecotwin© equipped with a remote control facility under different conditions.

2 Methods

The Ecocounter - Ecotwin© is a passive infrared-counter which is equipped with a remote control facility (Eco-GSM-unit). The counter is connected to a modem, which allows transferring data from the counter to the office via internet.

We placed the counter at different locations with different surroundings during spring and summer of 2008. We installed it indoors to assess the influence of walls and buildings, and outdoors. The outdoor setting was the Danube Floodplains National Park which is situated in the east of Austria and stretches from the city of Vienna, the

R. Eder, Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Applied Life Sciences, Vienna, Austria, renate.eder@boku.ac.at
Albert Kahler is with the the Institute of Landscape Development, Recreation and Conservation Planning, BOKU – University of Natural Resources and Applied Life Sciences, Vienna, Austria. E-mail: albert.kahler@gmx.at.
Arne Arnberger is with the Institute of Landscape Development, Recreation and Conservation Planning, BOKU – University of Natural Resources and Applied Life Sciences, Vienna, Austria. E-mail: arne.arnberger@boku.ac.at.

Fig. 1. The Ecocounter - Ecotwin© with the remote control facility (Eco-GSM-unit)

capital of Austria, along the Danube River to the Slovakian border. The outdoor settings include shared recreational trails in close proximity to settlements and more remote locations, which are characterized as open spaces and those under a closed roof of leaves within the park. At each location, the counter worked for several weeks.

The data were provided at a website which was administered by the company eco-counter. Using a password, data could be downloaded.

3 Results

In all settings, the remote data transfer unit worked without any disturbances. We could not find any influences depending on weather or setting. The system was simply to install. The provided software for the data download was easily to use.

We used the system in an urban-proximate area. Further testing should be done in, for example, mountainous alpine regions.

Acknowledgements

We want to thank Jean-Francois Rheault (Ecocounter) and Heinz Salzer (Velometer) for their help to establish this comparative research.

References

[1] A. E. Watson, D. N. Cole, D. L. Turner and P. S. Reynolds, “Wilderness recreation use estimation: A handbook of methods and systems”, General Technical Report RMRS-GTR-56. USDA Forest Service, Rocky Mountain Research Station, Fort Collins, CO, 2000.

[2] J. C. Hendee and C. Dawson, “Wilderness management: Stewardship and protection of resources and values”, (3rd ed.). Golden, Colo.: Fulcrum Publishing, 2002.

[3] K. E. Hornback and P. F. J. Eagles, “Guidelines for public use measurement and reporting at parks and protected areas”, International Union for Conservation of Nature and Natural Resources. Gland, Switzerland, 1999.

[4] G. Cessford and A. Muhar, “An overview of monitoring options for visitor numbers in national parks and other protected natural and recreation areas”, *Journal for Nature Conservation*, vol. 11, no. 3, pp. 240-250, 2003.

[5] L. Kajala, A. Almik, R. Dahl, L. Dikšaitė, J. Erkkonen, P. Fredman, F. S. Jensen, K. Karoles, T. Sievänen, H. Skov-Petersen, O. I. Vistad and P. Wallsten, “Visitor monitoring in nature areas – a manual based on experiences from the Nordic and Baltic countries”, Nordic Council of Ministers, 2007.

[6] T. Sievänen, A. Arnberger, J. Dehez, N. Grant, F. S. Jensen and H. Skov-Petersen (eds.), “Forest Recreation Monitoring – A European Perspective“, Working Papers of the Finnish Forest Research Institute 79, Helsinki, pp. 43-58, 2008.

[7] A. Arnberger, W. Haider and C. Brandenburg, „Evaluating visitor monitoring techniques: A comparison of counting and video observation data”, *Environmental Management*, vol. 36, no. 2, pp. 317-327, 2005.

[8] W. L. Hadwen, W. Hill and C. M. Pickering, “Icons under threat: Why monitoring visitors and their ecological impacts in protected areas matters”, *Ecological Management & Restoration*, vol. 8, no. 3, pp. 177-181, 2007.

[9] R. Beunen, C. F. Jaarsma and R. N .A. Kramer,

"Counting of visitors in the Meijendel dunes, The Netherlands", *Journal of Coastal Conservation*, vol. 10, pp. 109-118, 2004.

[10] D. Gasvoda, "Trail traffic counters: Update", Report 9923-2835-MTDC. USDA Forest Service, Missoula Technology and Development Centre, Missoula, MN, 1999.

[11] A. Arnberger, C. Brandenburg and A. Muhar, "Besuchererfassungstechnologien als Beitrag für eine nachhaltige Erholungsgebiets- und Stadtentwicklung", In: Schrenk, M. (Hrsg.): CORP 2006 & Geomultimedia06, 13.-16. Februar 2006, Wien: 573-580, 2006.

[12] K. Madden and K. Love, "User analysis: An approach to park planning and management", American Society of Landscape Architects, Washington, D.C., 1982

[13] A. Arnberger, C. Brandenburg and A. Muhar (Eds.), „Monitoring and Management of Visitor Flows in Recreational and Protected Areas". Conference Proceedings. Institute for Landscape Architecture and Landscape Management, BOKU - University of Natural Resources and Applied Life Sciences Vienna, pp. 485, 2002.

[14] A. Arnberger and R. Eder, "Monitoring recreational activities in urban forests using long-term video observation", *FORESTRY*, 80(1), 1-15, 2007.

[15] A. Arnberger and R. Eder, "Assessing user interactions on shared recreational trails by long-term video monitoring", *Managing Leisure*, vol. 13, no. 1, pp. 36-51, 2008.

[16] M. Campbell, "Monitoring tail use with digital still cameras: strengths, limitations and proposed resolutions". In: Siegrist, D., Clivaz, C., Hunziker, M., Iten, S. (Eds.), Exploring the Nature of Management. Third International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas. 13.09.2006 - 17.09.2006, Rapperswil; Proceedings of the Third International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas. University of Applied Sciences Rapperswil: 312-316, 2006.

[17] S. Melville and J. Ruohonen, "The development of a remote-download system for visitor counting". Pages 37-43 in T. Sievänen, J. Erkkonen, J. Jokimäki, J. Saarinen, S. Tuulentie, and E. Virtanen (eds.) Proceedings of the Second Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas. Rovaniemi, Finland, 2004.

Renate Eder is a research and teaching assistant in the Institute of Landscape Development, Recreation and Conservation Planning of the University of Natural Resources and Applied Life Sciences, Vienna. She has written several articles about visitor monitoring methods, environmental education and educational trails. More information can be found at:
https://forschung.boku.ac.at/fis/suchen.person_uebersicht?sprache_in=en&menue_id_in=101&id_in=4547

Albert Kahler is a graduate student at the University of Natural Resources and Applied Life Sciences, Vienna. His diploma thesis focuses on comparative analyses of visitor monitoring methods.

Arne Arnberger is an associate professor in the Institute of Landscape Development, Recreation and Conservation Planning of the University of Natural Resources and Applied Life Sciences, Vienna. He has written several articles about visitor monitoring methods, social carrying capacities, crowding and conflicts between recreation use and nature conservation in urban and protected areas. More information can be found at
https://forschung.boku.ac.at/fis/suchen.person_uebersicht?sprache_in=en&menue_id_in=101&id_in=4968.

Outdoor recreation in change. A Swedish program on outdoor recreation research

Peter Fredman, Lena Ernerfeldt Burman

Abstract — *Outdoor Recreation in Change* is an interdisciplinary research program which will analyze current dynamics of outdoor recreation and nature based tourism in Sweden, forming a thorough knowledge base for future research and monitoring. The program is organized into six projects to emphasize the diversity of outdoor recreation research. (1) The research is integrated through a common empirical arena that includes case studies of recreation landscapes and a national survey to provide information on outdoor recreation activities, participation and constraints. This will give a comprehensive input to five deepening projects: (2) Outdoor recreation patterns (motives, access, urban-rural tensions, gender, immigrants, youth, non-users and trends); (3) Urban proximate nature (outdoor recreational opportunities, economics and health); (4) Outdoor recreation in spatial planning (land use, conflict resolution, impact assessment and local management); (5) Outdoor recreation and nature conservation (integrated land management, environmental education and guiding); and (6) Nature-based tourism for regional development (demand, supply, impacts, protected areas and governance). Communication at three levels (information, dialogue and collaboration) will establish strong linkages and ensure that results are disseminated to a broad group of external stakeholders and practitioners. The program, which is financed by the Environmental Protection Agency, is planned for six years and involves 18 researchers at seven universities in Sweden. This presentation will give an overview of the program, current program activities, and highlights of recent results.

Index Terms — Outdoor, recreation, change, sweden.

Peter Fredman is with the Mid-Sweden University, 831 25 Östersund, Email: peter.fredman@miun.se, www.etour.se, www.friluftsforskning.se.

Lena Ernerfeldt Burman is with the Mid-Sweden University, 831 25 Östersund, Email: lena.burman@miun.se, www.etour.se, www.friluftsforskning.se.

Climbing management in protected areas of southern Poland

Miłosz Jodłowski

Abstract — Hundreds of rock cliffs and isolated rocks can be found in Southern Poland within upland, mid-mountain or high-mountain landscapes. Most of these sites are, to a various extent, protected by law – within national parks, landscape parks, nature reserves or nature monuments. They are major tourist attractions for visitors of the respective protected areas who generally do not interfere with cliffs ecosystems. This is not the case with climbing activities which remain a subject of an unremitting controversy.This work focuses on the analysis of the climbing management with respect to the assessment of the impact of climbing activities on cliff environment. Polish environmental law does not regulate climbing management, referring it to the competence of protected area managers. However, in the majority of protected areas management consists only in a total closure of some areas to any climbing activities. Trees have been frequently planted in the vicinity of rocks; rock surfaces on which climbing had been curtailed are now overgrown with mosses and herbaceous vegetation, while natural xerophyte and heliophyte communities have been destroyed. Resulting landscape changes largely decreased many geosites' attractiveness not only for climbing but tourism in general. Only recently in some climbing areas trees and shrubs in the vicinity of cliffs have been cleared, however, frequently such actions are not previously consulted with reserve or national park managers. With the growing popularity of this type of qualified tourism, it is necessary to create a modern system of climbing management, based on environmental conservation. Conservation and management plans for protected areas should contain detailed regulations of access to particular geosites where climbing activities are to be allowed. Such regulations may impose seasonal closure of particular cliffs or parts of cliffs to climbing during bird nesting periods or closures due to protection of cliff plant communities. Specified should be the types of permitted climbing activities together with protection method. Finally, monitoring of climbing intensity and environmental impact should be carried out for sustainable tourism development

Index Terms — Rock climbing, climbing management, environmental impact, bolts, Southern Poland.

Miłosz Jodłowski is with the Institute of Geography and Spatial Management, Jagiellonian University, Gronostajowa 7, 30-387 Kraków, Poland, E-mail: m.jodlowski@.uj.edu.pl

A comparison of passive infrared counter results with time lapse video monitoring at a shared urban recreational trail

Albert Kahler and Arne Arnberger

Abstract — This study compared two visitor counting methods at a heavily used multi-use access trail to the Donau-Auen National Park in Vienna, Austria. We compared visitor numbers gained by video monitoring with passive infrared counter results (Ecocounter – Ecotwin©). Both devices were installed at the same place and recorded the recreation use along the trail between December 2007 and January 2008. During daylight the video camera took pictures every 1.6 seconds. Counting by Ecotwin resulted in 3477 counts, while the total amount of counts by video monitoring was 4405. We will discuss causes for the differences in visitor numbers, and the pro and cons of both methods.

Index Terms — Passive infrared sensor, shared trail, video monitoring, Vienna.

1 Introduction

The monitoring of visitors to recreational and protected areas and forests has long been regarded as an important component of recreation and ecological management [1], [2], [3], [4], [5], [6], [7], [8], [9]. Data on recreational use are essential for selecting appropriate visitor and area management and marketing strategies [1], [3], [4], [5], [7].

Over the past decades, numerous techniques and methods have been suggested for the purpose of monitoring visitor flows in recreational and protected areas [1], [2], [3], [4], [5]. [6], [7], [8], [10], [11] [12] [13]. Area managers must decide on the most appropriate observation strategy and most suitable methods for their visitor monitoring. Consequently, knowledge about the many technical and methodological options, their costs, and their respective advantages and disadvantages is a prerequisite for sound decision making. For that purpose, methodological comparisons are essential.

Especially for recreational and protected areas close to a large conurbation, managers and researchers have to cope with many problems due to a multifaceted visitor structure and high use loads [7], [11], [12], [14], [15],. Therefore it is important to have reliable data on the amount of visitors and the temporal use patterns.

Usage of automatic counters is most common in the different protected area systems worldwide [1], [2], [3], [4], [5]. [6], [7], [8], [9], [10]. These include active and passive in-

Albert Kahler is with the the Institute of Landscape Development, Recreation and Conservation Planning, BOKU – University of Natural Resources and Applied Life Sciences, Vienna, Austria. E-mail: albert.kahler@gmx.at.

Arne Arnberger is with the Institute of Landscape Development, Recreation and Conservation Planning, BOKU – University of Natural Resources and Applied Life Sciences, Vienna, Austria. E-mail: arne.arnberger@boku.ac.at.

frared counters, acoustic counters, radar, pressure pads, seismic sensors, magnetic and pneumatic sensors etc. Newest developments have equipped some of these counter types with remote download systems [16].

These long-term counting systems, however, have several disadvantages. Automatic counters provide no indication as to the activities, in which visitors are engaged, the size of the group or visitor behaviour, and their interactions [7], [11]. Especially for automatic counters, a calibration process is necessary, as counts may be biased for many reasons [1], [5], [11]. For example, an active infrared counter can be triggered by wildlife, swaying grass and moving leaves, breaking branches, or curious visitors tampering with the device, in addition to properly passing visitors. Miscounts from a passive infra-red counter can be associated with visitors walking past in tight groups or can also be caused by certain colors of user clothing [10]. For the calibration of automatic counters one usually relies on counting by observers or to use a video- or camera-based system [1], [5], [6], [7], [8], [11], [15], [17].

Compared to automatic counters one main advantage of video monitoring is that it adds the opportunity for analysis by user types, user behavior and use levels. However, the analysis of the video tape data is time consuming [4], [7], [11], [14], [15], [18]. Comparing passive infrared counter results with time lapse video monitoring at a shared urban recreational trail allows identifying factors, which bias passive infrared counter results.

2 Study area

The Danube Floodplains National Park is situated in the east of Austria and stretches from the city of Vienna, the capital of Austria with a population of 1.7 million inhabitants, along the Danube River to the Slovakian border. In 1996, the area was declared as a national park and accredited by the IUCN in 1997. The National Park covers an area of about 9300 hectares. The Lobau, the Viennese section of the National Park, covers an area of 2400 hectares. Since several decades, the Lobau has been a traditional recreational area for the Viennese population as well as for the inhabitants of the surrounding communities. Visitor counting resulted in an annual use estimate of around 0.60 million visits to the Lobau [18].

The entrance near the new National Park Information Centre Lobau at the Dechantweg (Fig. 1), is one of the main access points to the national park. It is a paved and flat trail of about 4 m of width. Based on previous visitor monitoring studies about 90,000 visitors are entering and leaving the National Park at this point. This entrance is used by several user groups. Walker, dog walker, bicyclist, jogger, horse rider and car use is observed.

3 Methods

Between December 19, 2007 and January 19, 2008 a passive infrared counter and a time-lapse video camera were installed at the access point Dechantweg. Both devices observed the same trail section during the same time period.

3.1 Time-lapse video recording

The video monitoring unit consisted of a weatherproof black-and-white video camera with integrated heating and two time-lapse video recorders. In order to avoid vandalism the video camera was fixed to a fenced building inaccessible for visitors. The time-lapse video recorder took images

Fig. 1. The Danube Floodplains National Park (www.donauauen.at): The observed entrance point, called Dechantweg, is located at the west side of the National Park.

of the trail every 1.6 seconds during daylight. With the low resolution of the black-and-white camera and a minimum distance between visitor and camera the anonymity of the visitors was ensured.

The following data were captured from the video tapes and recorded on a MS-Excel spreadsheet: date and day of the week, time of visit, direction of movement, number of persons, group size, activity type and number of dogs.

3.2 Passive infrared sensor

The passive infrared unit consisted of a pyro-electric sensor (Ecocounter – Ecotwin©) and a logger (Fig. 1). The system is weatherproof and the included batteries should last for up to ten years. The sensor was fixed on a pole about 90cm above ground. The cables were buried and the logger was hidden behind a tree. In order to avoid vandalism the system was set up within a fenced plot bordering the trail and camouflaged by bushes and leaves. With the two-way sensor, not only the number of passing persons could be recorded, but also the direction of movement. For the data download from the logger a Pocket PC with an infrared link was used.

4 RESULTS

Video monitoring resulted in 4405 “events” entering and leaving the park. About 68% were walkers, joggers or dog walkers, and 13.5% were bicyclists. Further users were motorbikers and horse riders. Close to 18% of the “events” observed were cars. Car traffic originated because of a nearby riding stable about 100m behind the monitoring place, and cars of the national park management and other area administrations.

The passive infrared counter recorded only 3477 “events” during the same time period, about 20% less than video monitoring.

Although the correlation between the hourly video and sensor results was very high ($R^2 = 0.943$), the scatter plot (Fig. 2) documents a permanent undercounting of the sensor for low as well as for high use times.

Further analysis explored causes for this undercounting of the passive infrared sensor, focusing on activity types. For that purpose the relative differences between video and sensor counts were divided by the median into two groups: In one group with higher differences between video and sensor results and one group with no or few differences.

Times with higher differences in counting results are characterized by a significantly higher walker and lower car use. Further analysis targeting the walker group identified group size as one influencing factor. During times with high discrepancies between both methods, the group size was significantly larger. Obviously, when two or more people were walking side by side the passive infrared counter counted only one person.

Fig. 2. Ecocounter ECO-TWIN (www.velometer.at)

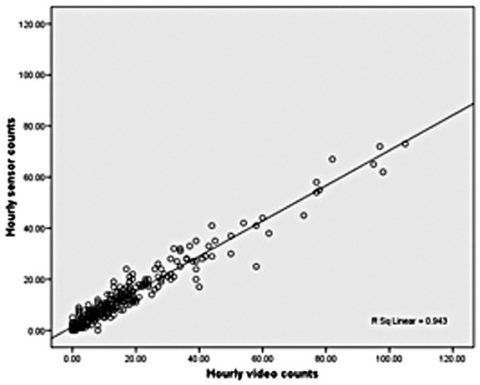


Fig. 3. Scatter-plot of the hourly video and sensor counts.

5 Conclusion

Each monitoring method has its advantages and disadvantages. The advantages of this passive infrared counter are that it is not dependent on electricity, is very easy to handle, and it needs very little maintenance efforts. That makes the counter valuable for many in particular remote recreational areas. However, the undercounting of walkers may limit its use. We recommend using this device at more narrow trails which force the visitors to walk one behind the other. On the other hand, the consistent undercounting of the counter (Fig 2) documents that a calibration factor is very useful for producing reliable counting results.

Acknowledgements

We want to thank Jean-Francois Rheault (Ecocounter) and Heinz Salzer (Velometer) for their help to establish this comparative research.

References

[1] A. E. Watson, D. N. Cole, D. L. Turner and P. S. Reynolds, "Wilderness recreation use estimation: A handbook of methods and systems", General Technical Report RMRS-GTR-56. USDA Forest Service, Rocky Mountain Research Station, Fort Collins, CO, 2000.

[2] J. C. Hendee and C. Dawson, "Wilderness management: Stewardship and protection of resources and values", (3rd ed.). Golden, Colo.: Fulcrum Publishing, 2002.

[3] K. E. Hornback and P. F. J. Eagles, "Guidelines for public use measurement and reporting at parks and protected areas", International Union for Conservation of Nature and Natural Resources. Gland, Switzerland, 1999.

[4] G. Cessford and A. Muhar, "An overview of monitoring options for visitor numbers in national parks and other protected natural and recreation areas", *Journal for Nature Conservation*, vol. 11, no. 3, pp. 240-250, 2003.

[5] L. Kajala, A. Almik, R. Dahl, L. Dikšaitė, J. Erkkonen, P. Fredman, F. J. Søndergaard, K. Karoles, T. Sievänen, H. Skov-Petersen, O. I. Vistad and P. Wallsten, "Visitor monitoring in nature areas – a manual based on experiences from the Nordic and Baltic countries", Nordic Council of Ministers, 2007.

[6] T. Sievänen, A. Arnberger, J. Dehez, N. Grant, F. S. Jensen and H. Skov-Petersen (eds.), "Forest Recreation Monitoring – A European Perspective", Working Papers of the Finnish Forest Research Institute 79, Helsinki, pp. 43-58, 2008.

[7] A. Arnberger, W. Haider and C. Brandenburg, „Evaluating visitor monitoring techniques: A comparison of counting and video observation data", *Environmental Management*, vol. 36, no. 2, pp. 317-327, 2005.

[8] W. L. Hadwen, W. Hill and C. M. Pickering, "Icons under threat: Why monitoring visitors and their ecological impacts in protected areas matters", *Ecological Management & Restoration*, vol. 8, no. 3, pp. 177-181, 2007.

[9] R. Beunen, C. F. Jaarsma and R. N .A. Kramer, "Counting of visitors in the Meijendel dunes, The Netherlands", *Journal of Coastal Conservation*, vol. 10, pp. 109-118, 2004.

[10] D. Gasvoda, "Trail traffic counters: Update", Report 9923-2835-MTDC. USDA Forest Service, Missoula Technology and Development Centre, Missoula, MN, 1999.

[11] A. Arnberger, C. Brandenburg and A. Muhar, "Besuchererfassungstechnologien als Beitrag für eine nachhaltige Erholungsgebiets- und Stadtentwicklung", In: Schrenk, M. (Hrsg.): CORP 2006 & Geomultimedia06, 13.-16. Februar 2006, Wien: 573-580, 2006.

[12] K. Madden and K. Love, "User analysis: An approach to park planning and management", American Society of Landscape Architects, Washington, D.C., 1982

[13] A. Arnberger, C. Brandenburg and A. Muhar (Eds.), „Monitoring and Management of Visitor Flows in Recreational and Protected Areas". Conference Proceedings. Institute for Landscape Architecture and Landscape Management, BOKU - University of Natural Resources and Applied Life Sciences Vienna, pp. 485, 2002.

[14] A. Arnberger and R. Eder, "Monitoring recreational activities in urban forests using long-term video observation", *FORESTRY*, 80(1), 1-15, 2007.

[15] A. Arnberger and R. Eder, "Assessing user interactions on shared recreational trails by long-term video monitoring", *Managing Leisure*, vol. 13, no. 1, pp. 36-51, 2008.

[16] S. Melville and J. Ruohonen, "The development of a remote-download system for visitor counting". Pages 37-43 in T. Sievänen, J. Erkkonen, J. Jokimäki, J. Saarinen, S. Tuulentie, and E. Virtanen (eds.) Proceedings of the Second Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas. Rovaniemi, Finland, 2004.

[17] M. Campbell, "Monitoring tail use with digital still cameras: strengths, limitations and proposed resolutions". In: Siegrist, D., Clivaz, C., Hunziker, M., Iten, S. (Eds.), Exploring the Nature of Management. Third International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas. 13.09.2006 - 17.09.2006, Rapperswil; Proceedings of the

Third International Conference on Monitoring and Management of Visitor Flows in Recreational and Protected Areas. University of Applied Sciences Rapperswil: 312-316, 2006.
[18] A. Arnberger, "Recreation use of urban forests: An inter-area comparison", *Urban Forestry & Urban Greening*, vol. 4, no. 3-4, pp. 135-144, 2006.

Albert Kahler is a graduate student at the University of Natural Resources and Applied Life Sciences, Vienna. His diploma thesis focuses on comparative analyses of visitor monitoring methods.

Arne Arnberger is an associate professor in the Institute of Landscape Development, Recreation and Conservation Planning of the University of Natural Resources and Applied Life Sciences, Vienna. He has written several articles about visitor monitoring methods, social carrying capacities, crowding and conflicts between recreation use and nature conservation in urban and protected areas. More information can be found at
https://forschung.boku.ac.at/fis/suchen.person_uebersicht?sprache_in=en&menue_id_in=101&id_in=4968.

Solutions for a new challenge in the field of visitor flows: paragliding and nature protection

Judit Karacsonyi, Zoltan Karacsonyi

Abstract — One segment of the increasing number of visitors of nature areas are the visitors with sporting purpose. Among these the technical sports have essentially different characteristics. The relationship between exercisers of technical sports and nature, landscape involves the possibility of a non-harmonic relation and not-rarely the fact of that. We delineate the characteristics of the paragliding sport its practice and its relationship with nature, landscape by examining the Hungarian situation. We review the status of the paragliding sport, the increasing number of sportsman and the paragliding clubs. We introduce the decisive authorisation procedures of paragliding (Civil Aviation Authority of Hungary, nature conservation) and its adaptation and problems. Presentation of the outcome of the workshop organized with the presence of the concerned parties (paragliders, national parks, aviation authorities) which was set up to formulate and negotiate the interest and opinion of the actors. It was the first time that a workshop gave the opportunity for the reconciliation, harmonization of the two differing demand. Tasks of the near future was formulated for create a long lasting co-operation between the paragliding sport and the demand for protecting the natural values.

Index Terms — Paragliding, visitor flows, harmonization efforts, stakeholders' workshop.

Judit Karacsonyi is with University of Debrecen, Centre for Environmental Management and Policy
E-mail: judit@envm.unideb.hu

Zoltan Karacsonyi is with University of Debrecen, Centre for Environmental Management and Policy

The impact of experimental trampling on the biodiversity of beech forests: basic knowledge for the management of urban forest for recreation

Kissling Marion

Abstract — In the last few years forests became an important function as natural recreation sites, especially in the surroundings of urban areas. Nowadays, large numbers of forest visitors can lead to conflicts between recreation and nature conservation The extent of damage to the forest vegetation depends not only on the kind of recreational activity and frequency of visitors, but also on the type of soil and forest vegetation. The effects of trampling on soil microorganisms and the level of disturbance that will cause changes are mostly unknown. In order to gain a better understanding of these relationships I investigated the effect of different trampling regime – single trampling versus repeated trampling – on the ground vegetation, soil microbial biomass and the activity of dehydrogenase (an indicator for the total metabolic activity of soil micro-organisms), glucosidase and phosphomonoesterase (both key enzymes in the nutrient cycle)

Index Terms — Experimental trampling, soil enzyme activity, outdoor recreation, urban forest, ground vegetation.

Marion Kissling is with the Department of Environmental Sciences, Section of Conservation Biology, University of Basel, St. Johanns-Vorstadt 10, 4056 Basel, E-Mail marion.kissling@unibas.ch

Are Natura2000 SPAs and SACs perceived by local communities like important elements for local development? The case study of Fortore-Alto Tammaro, a rural area on the mid-southern Apennines

Danilo Marandola, Antonio Raschi, Roberto Tognetti

Abstract — Apenninic areas cover a wide part of the italian surface and represent an important element of conservation for cultural, biological, economical and social diversity. Many difficulties, however, expose these internal areas to high risks of abandonment and loss of diversity. A long-run research project aims to calibrate action models for sustainable rural development based on eco-agri-tourism, also to promote conservation and knowledge of local natural resources.

Index Terms — Natural resources, eco-agri-tourism, rural development

1 Research background

The area of Fortore - Alto Tammaro (Benevento province) represents a good model to evaluate the problems that mountain-inner areas, far from the main communication ways, usually experience in Southern Italy.

Apenninic areas cover a wide part of the italian surface and represent an important element of conservation for cultural, biological, economical and social diversity. Many difficulties, however, expose these internal areas to young escape, underemployment, ageing and agricultural abandonment, with high risks for the integrity of the so called “basket of goods” that groups all the elements of diversity of the Apenninic rural areas.

In the most recent years, investments in tourism were expected to give impulse to the local economy [1], yet so far the results did not correspond to the expectations.

2 The Research

In the frame of a research project, the local economy has been analysed, and a census of the small enterprises was taken.

Territorial partnership and networking have been stimulated through information

D. Marandola, National Research Council (CNR), Institute of BioMeteorology (Ibimet), Firenze, Italy E-mail: d.marandola@ibimet.cnr.it
Antonio Raschi, National Research Council (CNR), Institute of BioMeteorology (Ibimet), Firenze, Italy E-mail: a.raschi@ibimet.cnr.it
R. Tognetti, Department STAT, University of Molise, Pesche (IS), Italy E-mail: tognetti@unimol.it

and training activities, involving associations, firms and local people. In three townships of the Fortore district, namely S. Marco dei Cavoti (population 3707, main centre of the district), Castelvetere in Val Fortore (pop. 1801), Molinara (pop. 1946), a more thorough analysis was performed. Structured interviews were used to perform a qualitative and quantitative analysis of small enterprises and shops, aiming to identifying the perspectives of future development.

Tourist flows, offer and demand have been analysed [2] on the basis of the data collected by the Provincial Board for Tourism in the period 1999-2007.

Questionnaires and SSI (Semi Structured Interviews) have been realized to know tourist's preferences and local people awareness about the natural resources of the area.

3 Results

Questionnaires have shown that tourists use to visit a rural area on the Apennines for the whole "basket of goods", nature included. Focus Groups and SSI, on the contrary, have shown that local firms and tourist establishments give importance only to a part of that "basket of goods" (especially to local food and folklore), absolutely underrating the nature-landscape element.

This difference, between the nature of the tourists' demand and the awareness of the tourism operators about it, should not be neglected representing an obstacle for local and tourist development processes. In addition, it can expose interesting natural areas to the risk of abandonment.

These observations have a particular value considering that a big part of the studied territory is today preserved like SPAs and SACs (i.e. Castelvetere in Valfortore forest).

4 Further Perspectives

Ad hoc researches will aim to value cultural, leisure and economic value of these Natura2000 areas; to know and increase the level of awareness of tourism entrepreneurs. Territorial networking processes will be promoted, stimulating an active participation of local people and supporting the diffusion of information and knowledge.

References

[1] D. Vergari, A. Raschi, F. Camilli, E. Pagliarino, F. Scarafia, L. Bacci (2003) *Rural tourism as an aspect of a multifunctional agricolture: Experiences in Italy.* Proc. Of the First European Congress of Rural Tourism, Jean, Spain, 03-05 October 2003.

[2] D. Marandola, F. Cannata, P. De Palma, S. Fragnito, I. Parletta, A. Raschi (2006) *Business and tourism in a rural area of southern Italy.* In Proc. Of the 5th International Conference on Perspectives of rural tourismin the New Europe. Kosice, Slovakia, 5-7 October

D. Marandola, graduated in Agrarian Science and Technologies, University of Molise (2004). Under PhD in "Environment and Territory", STAT Department, Molise University. Cooperating with the Italian National Research Council (CNR) since 2005 on topics related to rural development, sustainable agriculture and tourism, rural animation, conservation and use of the agro-environment.

Biodiversity and rural development: the case-study of the “Shepherd’s walnut”. An action model for sustainable rural development shaped on the peculiar features of a rural area

Danilo Marandola, M.E. Malvolti, Roberto Tognetti

Abstract — Walnut tree, for nutritional value, wood and its connections to local culture and society, is a very typical product of the Apennine rural areas. Anyway, the economical value of the traditional/local varieties is today very reduced and this may expose rural areas to a loss of biodiversity, cultural values and landscape elements. FIMONT is a research project which aims to calibrate action models to increase the value of mountain traditional food products. The research, starting from some specific morpho-genetic analisys carried out by IBAF, has considered the possibility to increase the value of local walnut calibrating a model based on the peculiar features of the rural territory. An ancient path for sheeps transhumance has been choosen like a “red line” for the model.

Index Terms — Biodiversity, local resources, rural development

1 Research background

Rural areas can be considered like a complex puzzle of different elements that, all together, tend to rend unique and peculiar the structure of the territory. This way, the simultaneous conservation, valorisation and consideration of each one of the elements of the rurality has to be assumed like a milestone for a sustainable rural development. In Italy, agriculture and local foods are the pillars of the rural systems, and all the different development processes have to be based on them for a big part. However, we should not forget that local culture, customs, history, people and biodiversity are also important pixels of the rural puzzle. Their valorisation is a conditio sine qua non of a sustainable development and it is also a good opportunity to contribute in increasing the value of food and local products. But, how to transform biodiveristy in an active element for rural development?

2 The walnut tree

Walnut tree, for nutritional value, wood and its connections to local culture and society,

D. Marandola, National Research Council (CNR), Institute of Agro-Environmental and Forest Biology (Ibaf), Porano (TR), Italy E-mail: d.marandola@ibimet.cnr.it
M.E. Malvolti, National Research Council (CNR), Institute of Agro-Environmental and Forest Biology (Ibaf), Porano (TR), Italy E-mail: mimi@ibaf.cnr.it
R.Tognetti, Department STAT, University of Molise, Pesche (IS), Italy E-mail: tognetti@unimol.it

is a very typical product of the Apennine rural areas. Anyway, walnut is produced today only in few and specialized areas (with commercial varieties) and quite completely neglected in many parts of the Apennines. The economical value of the traditional/local varieties is today very reduced and this may expose rural areas to a loss of biodiversity, cultural values and landscape elements.

3 THE PROJECT

FIMONT is a research project promoted by the Italian Mountain Institute which aims to calibrate action models to increase the value of mountain traditional food products. In the frame of this project, IBAF-CNR has been engaged to deal with the case-study of the spontaneous walnut growing on mid-southern Apennines. Some of the researches are developed in the frame of a PhD with the Department STAT of the Molise University

4 THE RESEARCH

The research, starting from some specific morpho-genetic analisys carried out by IBAF, has considered the possibility to increase the value of local walnut calibrating a model based on the peculiar features of the rural territory. An ancient path for sheeps transhumance (Regio Tratturo), that connects Candela (Apulia) to Pescasseroli (National Park of Abruzzo) crossing the Apennines for 210 km, has been choosen like a "red line" for the model.

To explain the genetic similarities founded in fruits collected in different Apenninic areas, actually, the path has been supposed to be the road through which shepherds spreaded walnut's genes during the ages. In the supposed model, moreover, the Regio Tratturo plays a very useful role: it provides a "physical" defined basis for the research (in a very wide area); links different administrative areas (provinces, municipalities, regions...);

represents a strong element of culture, history and identity and this can contribute to stress the value of a traditional product like the walnut is. But local development means also economy and market, so, how to do with a product without economical value like local walnut? From this point of view, a Win-Win model, based on the association "Tratturo-walnut", has been developed adding also the element "agriculture/local food/rural tourism". The idea is to link walnut with the different rural economical systems growing up along the path, to create connections with stronger and well known local products (i.e. cheese, bread, sweets and turistic systems).

5 FURTHER PERSPECTIVES

In the frame of a PhD with the Department STAT of the Molise University, specific researches will be carried out to know the structure of the rural system growing along the Tratturo and to value the possibility of interaction between walnut and local products. Specific attention will be reserved to the active participation of local communities for the definition of a development model. Focuses will be realized upon specific rural areas, with particular attention to areas such as Pescasseroli and the Abruzzo Park.

With its structure, the case-study "Shepherd's walnut" stands as an action model that can be applied in other contexts and that can contribute to make biodiversity an active element for rural development.

REFERENCES

[1] G. Cannata, D. Marino, *"La biodiversità quale risorsa per lo sviluppo rurale endogeno"*, in P. Bevilacqua, G. Corona, *"Ambiente e risorse nel Mezzogiorno contemporaneo"*., Donzelli Editore, 2000.

[2] G. Cannata, D. Marino, C. Salvioni,"The role of plant genetic resources in the development of Mediterranean marginal rural areas", Proceedengs on *"Development issues in marginal regions II: policies and strategies"*,

International Geographic Union, Mendoza Argentina, 1996

[3] EU Commission, *"Evaluation of Agri-Environment Programmes. State of Applica-tion of Regulation (EEC) n. 2078/92.Working Document,VI/7655/98"*, 1998

[4] EU Commission, *"Biodiversity Action Plans in the areas of Conservation of Natural Resources,Agriculture, Fisheries, and Development and Economic Cooperation"*, Final.Vol I, II e III. Brussels, 2001

[5] C.Vazzana, *"The role of farmers associations in safeguarding endangered populations of farro in Italy"*. Hulled wheats, in Proceedings of the First International Workshop on Hulled Wheats, 21-22 July 1995, Castelvecchio Pascoli.

D. Marandola, graduated in Agrarian Science and Technologies, University of Molise (2004). Under PhD in "Environment and Territory", STAT Department, Molise University. Cooperating with the Italian National Research Council (CNR) since 2005 on topics related to rural development, sustainable agriculture and tourism, rural animation, conservation and use of the agro-environment.

Towards a sustainable tourism for the Italian mountains: the role of CAI

Giorgio Maresi, Filippo Didonato

Abstract — Since its foundation in 1863, The "Club Alpino Italiano" has been playing an active and often decisive role for the invention, the spread and the development of mountain tourism either on Alps and Apennines. In the last years this role has been more and more related to a clear attention to sustainability and protection of mountain environment. Both Association' activities (hiking, climbing, caving and sky-tourism) and structures (refuges and paths) were object of a practical and cultural work aimed to reduce impact especially in protected areas. For activities, the main work is still based on improving knowledge of mountain environment in association members during technical formation courses, focusing to all the attentions to be adopted to avoid damages at wildlife and vegetation. Refuges proved to be experimental sites for innovative application of alternative source of energy and new solution of waste management. Creation of new paths and management of old ones are now carried out following practical criteria adopted at national scale and aiming to reduce damages due to erosion and impact on vegetation and wildlife. A GIS approach for excursionist paths net has been adopted in different situation, proving effective as a tool for a environmentally sustainable planning and management. Parks and protected area were strongly supported by CAI in the last years, when the Association was between the more active promoters of new protected areas. A strong collaboration is now working on with Parks, both national and regional: the target is a responsible frequentation protection of mountain endangered habitat.

Index Terms — Alpine club, climbing, hiking, refuges, protected area

1 Introduction

Founded in1863 The Club Alpino Italiano (CAI– Italian alpine Club) is an independent national association that "has mountaineering, the knowledge and study of mountains, specifically those in Italy, and the protection of the mountain environment" in the forefront in all of its events. The Association is made up of volunteers members and is divided into local branches coordinated in regional groups. The central structure of the Club Alpino Italiano is a non-profit public organization, while all the subordinate Local Branches and regional and provincial groups are subject to private law.

In particular, in application of law no. 766 of December 24, 1985, related to the new organization of the Club Alpino Italiano, the association promotes, for its members and others, and as established in its Charter, the following objectives:

- enjoyment of the mountains and the organization of mountaineering, hiking and caving initiatives throughout the nation;
- the organization and management of training courses for safe mountaineering, alpine ski touring, hiking and caving and naturalist activities;
- training for 22 different qualifications (instructor, guide and operator), necessary to perform the above stated activities.
- mapping, building and maintaining trails, alpine structures and mountaineering sites;
- the construction, maintenance and management of mountain huts and shelters owned by the Club Alpino Italiano and the individual local branches.;

Giorgio Maresi is with CAI Tam operator, past president of CCTAM. Emaill: Giorgio.maresi@iasma.it
Filippo DiDonato is with CAI Tam operator, referent for CAI in Federparchi E-mail: f.didonato@CAIabruzzo.it

- the organization of CAI stations suitable for initiatives to patrol and prevent injury for mountaineers, hikers or cavers and to aid the injured, rescue those in danger and recover accident victims through the National Alpine and Caving Rescue Squad (CNSAS);
- scientific and educational activities to increase the knowledge of all aspects of the mountain environment as well as any initiative suitable for the protection and improvement of the domestic mountain environment, also through national and regional technical bodies;
- ethnic-cultural training, studies dedicated to the diffusion and knowledge of the mountain environment and its people and the multiple aspects, mountain photography and cinematography, and the conservation of the alpine culture;

The enormous enthusiasm of our volunteers and their contributions have allowed the association to build a solid strategy to promote the mountains and help those who visit them with mountain huts, shelters, trails and social and cultural initiatives. In this contest we reported here the initiatives and the objectives aiming to satisfy the above statements.

2 CAI and sustainable mountain tourism

- **Hiking** is the main activity carried out by members, but it is proposed with a modern approach, in which the walking in mountain environment is considered the best way to improve naturalistic and cultural knowledge, improving respect and involvement in management and protection choices.
- In this context several initiatives were built up in the last years. *Sentiero Italia* with the colligated *Camminaitalia* is an example of a long trail along all the Italian regions, involving valleys and villages as restore point and basis for excursion. These initiatives were finalized to rediscover the middle part of mountain, aiming to historical path and cultural centres instead of peaks and ridges.
- The creation of a path net in all the Italian regions is a result of a general increasing interest in hiking and walking. Recovering of historical trail and creation of new path have permitted to obtain a wide spread net able to explore most of our mountains. The realization of this net was anyway based on a cultural and environmental approach which in the last years was focused in a GIS approach, adopted especially in several park context. Gis proved a right tool to plan and to manage the trail net, permitting to avoid the interaction with the most sensible habitat and enhancing the knowledge of the landscape also for people involved in path management
- **Paths building marking, and management** were object of a strong interest and accurate guidelines were adopted to all the national area. The goal is to reduce impact on the crossed habitat and to reduce risk of localized erosion by mean of the right building criteria. Moreover standard marking criteria are an help for a safe frequentation and try to avoid unsightly signature not in harmony with the landscape [1;2]. Till now about 60.000 km and 8500 trails are marked and managed following this criteria by associated volunteers. Between the structures devoted to climbing and hiking , a particular way was reserved to kletterstegs. The CAI has chosen to stop the building of this alpinist equipped routes aiming to conserve and manage only the historical ones which are very attractive point for most of the tourists, especially in the Dolomites' area. New route were not supported if not adequate to environment and also some of the old ones were demolished in respect of some environmental characteristics and for safety.
- About impact of climbing on cliffs, the CAI with its alpinist school supports and promotes the adoption of com-

partmental rules, agreed upon all the involved agents related to cliff use and conservation: public protection agency, climbing association, land owner, environmental association. This has produced some good result and conflicts between protectionist and climbers were reduced and resolved in some cases. Of course, a lot of work was and is currently made as continuous formation of climber and guides.

- **Mountains huts and bivouacs** are the main structures managed by the association. We talk about 761 buildings for a total of 21,681 beds, located in strategic point of the all the Alps and Apennines. These structures allowed the frequentation and the practises of climbing, hiking and other activities proving fundamental for any kind of mountaineering. They act so as focal point for most of tourists, influencing greatly the flux of presences on paths [3]. Till now mountain hut were mainly a source of financial worries and environmental problem for the management of people, energy and waste in so delicate areas. A new concept of mountain hut is now growing up and the structures are offered as e*co-hut and cultural presidium*, strictly linked to their territory and landscape. CAI supported the creation of small library in the hut to improve the knowledge of mountain culture and environment: with a synergic work with school several attempts were made to use huts as an instrument of naturalistic education. Moreover a strong effort was made to experiment new sustainable sources of energy, trying both small eolic and hydroelectric and solar power. Water and wastes were also object of attention aiming to avoid lost of the first and to improve the recycling of the seconds. Mountain huts proved to be excellent sites to test new technologies and some good results were obtained both with energy and waste management. Implementation of an environmental management system was carried out and tested in several refuges. A long course was followed for the “Capanna Regina Margherita”, the highest refuge in Europe at 4552 a.s.l., on Gnifetti peak. Working for several years and pairing the difficulties of quote, technical solutions were adopted to save energy, and to improve the management of water and wastes. The work made possible to obtain the final certification UNI EN ISO 14001 proving its reduced impact on environment. The work to improve a sustainable management has produced substantial guidelines published and now object of courses and divulgation [4].
- **Educative role** of CAI is fundamental not only for members but also for people which are approaching the mountains following the association initiatives.
- Courses and technical preparation of operative figures and members are the main activities carried out by the association. Behind all the information and experience transmitted to improve a safe approach to the mountain in each season, guidelines are proposed to avoid damages on mountain habitat during activities. The educative work points out to enhance the knowledge of environmental characteristics both to improve awareness of risks for people and to understand fragility of mountain ecosystems in each component, fauna and vegetation, water and soil. Specific indication are suggested for each activities, as example to save games during winter sky trail and to teach the difficult of vegetation at high altitude and the risk of small sky damages for trees growth and survival. It is to notice that frequentation of mountains is changed and now hikers and climber are present on the territory all over the year, while the spread of new tools as snow shoes has opened the use of trail also in not conventional period. So the

education is fundamental to avoid a permanent disturbance for wildlife or other kind of damages.

- The educative role of CAI is not limited to membership but several effort are made to propose cultural moments both in the cities and in the valleys. A large production of books, guides and also films is made both at local level than at central one.
- Schools are object of specific formation moments in which CAI associates take student to make contact with environment in mountains. Not only technical aspects for safety but also environmental ones ware proposed , trying to couple with the lack of nature knowledge and experience showed by so many young people. Youngers' approach to mountain is followed by the "Alpinismo giovanile" commission: the education at the mountain environment is strictly based on its comprehension and understanding, with particular emphasis to an integrate approach to landscape lecture.
- Cultural role of CAI is carried out by the scientific commission and by the mountain environment protection commission. The first is more dedicate to scientific divulgation, the second is involved in protection problems and in educational aspects. "Terre alte" groups is a specific cultural group working on several aspect of the presence of man in the high lands. An impressive work of recovering of trails and building related to past human activities was carried on in the last years allowing the persistence of an historical heritage.
- It is to point out that many of the activities and cultural works are made with the direct involvement of people living in the mountains. This because of many CAI sections are present directly in the valley villages and moreover for the effort to respect and to enhance the work of mountaineers. On this aspect we remember also the cognitive role of social excursions towards several agricultural or transformation products and the potential of refuges as commercial centres for this high quality food products.

3 parks and CAI

CAI has common purposes with parks and protection agencies. Quite all the Italian parks and many of SIC and ZPS are located in mountains areas. The CAI was between the most active supporters of the creation of a protection net for mountain as tested by many official acts and by association documents. The role of protected areas as centres of sustainable development for mountains population is a statement for CAI public engagement.

On these basis, programmatic agreements were subscribed by CAI and most national parks, as like as at regional level. The simple but efficient approach to a mountain tourism without heavy infrastructure, which produces many damages and costs as in the case of alpine sky tourism, seem the best approach for supporting an economic growth of local population. Coexistence between economic aspects and protection ones are the aim of most of CAI works in mountain environment. Moreover the intermediary role between population and agency prove to be important to avoid conflict and problems.

4 conclusion

As the biggest alpinist association, the CAI plays a decisive role to improve a sustainable approach towards a new type of mountain fruition. The reported situations are the first steps of a continuous work which is mainly based on a cultural approach, where permanent formation is a focal point of technical figures and of the whole mass of members. Difficult are related to lack of scientific experience about the impact of large parties of people in the mountain habitat. On this point fur-

ther investigations are needed. The collaboration between parks and CAI also with other associations and other public structures appears to be the best strategy for the future: the work of volunteers and the technical and scientific supervision of park staff can help greatly the development of tourism in protected area, linked them also with local population.

Protection, sustainable tourism, solidarity, sharing, planning and monitoring are the key word for the future action of CAI, always aiming to enhance the value both naturalistic and cultural of our mountains.

REFERENCES

[1] aavv, "sentieri: ripristino – manutenzione - segnaletica," I manuali del Club Alpino Italiano, RER CAI ,Milano, pp. 137, 1999.

[2] aavv, "sentieri: pianificazione, segnaletica manutenzione 1 -" quaderni di escursionismo del Club Alpino Italiano, CAI, Milano, pp. 50, 2000.

[3] V. Tosi, G. Scrinzi, turismo nel parco naturale delle dolomiti di Sesto (Bolzano): an'analisi quail quantitative dell'utenza. Isafa , comunicazioni di ricerca 94/1 pp32 1994

[4] R. Beltramo, B. Cuzzolin manual for he implementation of an environmental management system for mountain refuges. Edition l'eubage, Aosta, pp 341.2001

An audience based approach to communication intervention

Joe Roberts

Abstract – Communication Interventions (CIs) are often used by the environmental and outdoor sectors to try to manage and mitigate the impacts of recreation. This research audited the CIs currently being used in Wales, reviewed the process of creating them and explored the way that audiences gather and responded to advice, instruction and guidance. It found that currently most CIs are too narrow in their delivery and do not consider behaviour change sufficiently, tending to over focus on the message. The study recommends that CIs should utilise a broad range of integrated media, linked, if possible, to direct 'points of contact'. A guide to creating effective audience based CIs is being developed using the results and recommendations.

Index Terms — Audience-based communication, Codes of conduct, Recreational impacts.

1 Introduction

Communication Interventions (CIs), such as codes of conduct and signage, are often used by the environmental and outdoor sector to try to manage and mitigate the impacts of recreation. In Wales, there is no single promoted method for creating CIs; they are usually put together on a pretty ad-hoc basis by whoever is trying to resolve the issue at the time. Skills and experience accrued from working in the field are rarely passed on from one organisation to another. Over the last three years the Countryside Council for Wales has been exploring the process of creating CIs; looking at where they are effective, what makes them work and how they can be tailored to suit their target audience.

Joe Roberts is a Recreation Policy Officer with the Countryside Council for Wales, Maes Y Ffynnon, Bangor, UK, LL57 2DW E-mail: j.roberts@ccw.gov.uk

2 Method

Due to the nature and diversity of the audiences targeted by CIs, the initial research [1] defined a number of generic audience groups. The groups were segmented on the basis of their interest in the site/activity in question, along with their level of expereince. The segemented audience groups are outlined in table 1.

TABLE 1

Audience groupings

General users	Local
	Visitor
Special interest users	Beginner
	Experienced
	Club
Providers	Educational
	Commercial
	Resource

These audience types were then approached to see how they gathered and responded to advice, instruction and guidance. This was done by means of point of contact questioning, focus groups and interviews with key representatives. Simultaneously, an audit was carried out of the environmental codes and CIs currently being used in Wales. The results were then categorised and a cross section of the authors were contacted to find out about the process they had gone through to create the CIs.

3 RESULTS

The research [2] found that each audience type had different needs when it came to gathering and responding to information.

These needs could be categorised to help shape and target the creation of CIs more effectively. Table 2 illustrates a general interpretation of the findings of the study.

The research also found that general users have very little knowledge of specific environmental issues. Most organisations approached produced single stream CIs such as stand-alone codes of conduct. These are often produced without extensive research into how they are to be delivered and are very rarely monitored for their effectiveness. Single stream CIs are not particularly effective at influencing behaviour because they have very narrow penetration and do not consider behaviour change sufficiently, tending to over focus on the message.

The study [2] recommended that CIs should be:

- A broad package of media used to deliver environmental awareness-raising measures;
- Integrated into other methods of communication which relate to the site, location or event more specifically;
- Linked to 'points of contact' – people who will send the message in a 'human' way;
- Couched in simple, succinct, direct, positive and authoritative language;
- Focused on elements of the behaviour/ part of an activity that needs to change to achieve the organisation's goals.

3. 1 Next steps

A guide for creating effective audience specific CIs is being developed as part of the project. The content of the guide is currently being piloted and a web-based resource will soon be created. The poster will present the conclusions of this final stage of the project.

TABLE 2

GENERAL REPRESENTATION OF STUDY FINDINGS

These audiences respond:	General users	Special interest users	Providers
To:	Authority, Community	Peers, Community	Peers, Authority
By:	Direct contact	Direct contact + community of interest	Direct contact + community of interest + official channels
When:	Directly before or during the activity	In preparation for, or during, the activity	When planning, training and preparing

References

[1] Peter Scott Planning Services Ltd and Judith A. Annett Countryside Consultancy (2006). A new approach to Codes that promote responsible enjoyment of the countryside in Wales. CCW Policy Research Report No. 06/8. CCW, Bangor

[2] Asken Ltd and Resources For Change Ltd (2007). Developing an Audience-Specific Guide to Creating Environmental Codes and Guidance in Wales – CCW policy research report No. 07/26, CCW Bangor

Joe Roberts is with the PGDip Countryside Management (2004); BA (Hons) Applied Arts (2001). Recreation Policy Officer, Countryside Council for Wales.

Can tourism change the traditional use of Potsotaroki (*Trichilia pallida*)?

Giselle C. N. Melendez, Teresa C. Magro

Abstract — The traditional people who live from the resources that come from the forest had kept an almost symbiotic relation with their surrounding land, using the resources. However the contact with factors that are different from their culture, including tourism, can generate variations in the way of traditional handling, causing impacts in the environment. In this paper we analyze the traditional employment of the tree bark from "Potsotaroki" (Trichilia pallida), used as dye in the production of cotton handcrafts. The evaluated factors have the goal of registering the status of this forest species, and its relation with the natural process of insertion of the indigenous communities in the dominant social system. The research was done in an Asháninka community, from the high forest in the Peruvian Amazon.

Index Terms — Asháninka People, Indigenous handcraft, Potsotaroki, Trichilia pallida

1 Introduction

In their contact with modern societies the Asháninka indian communities have undergone many changes, mainly in relation to their utilization of natural resources, some overexploited, others under-exploited. Such was the case of forest species Potsotaroki (Trichilia pallida), whose usage techniques have been subjected to changes and whose amount of extracted bark has increased with the years.

This research describes the traditional aspects of the use of forest species *Trichilia pallida* as natural coloring for garments and accessories, a property that has been registered by indians in both Peruvian and Brazilian forests. Harvesting techniques are recorded along with the changes observed during the past years as a consequence of their contact with exogenous factors to the Asháninka culture, among them, insertion in the market, intermediaries such as NGOs and the government, and tourist visitation.

This research is aimed at: *i*) documenting the traditional process of dying and the products that utilize the species *Trichilia pallida*; *ii*) assessing the influence of tourism and other outside factors on the traditional use of the species *Trichilia pallida*.

2 Methodology

The study was carried in two villages of the Asháninka ethnic group: the Camantavishi Indian Community and the smaller outlying Shima Village, both in the Peruvian Amazon, within the buffer zone of a system of protected areas.

This research can be categorized as an intercrossing of biological and anthropological sciences, or ethno ecology as incorporated to "Ethno science" in the 1960's [1]. That approach permits an interdisciplinary view of the subjects of the study and encompasses greater amplitude of the spectra involved.

As a choice among the qualitative research methodologies a case study was used in which the Camantavishi community

G. C. N. Melendez is with Conservacion Internacional, Peru. E-mail: chiselita@hotmail.com
T.C. Magro is with the Forest Department, University of São Paulo,Av. Pádua Dias 11, 13418-900, Piracicaba, SP, Brasil. E-mail: tecmagro@esalq.usp.br.

was analyzed in depth [2]. by means of participant observation and partially structured or semi-structured interviews [3], [4]. Forty-three women and twenty-three men were interviewed. In the participant observation, we followed the people in charge of bark extraction and of making handicraft. The whole procedure was evaluated, from collecting plant dyes to making the final product.

To verify whether damages were being caused to the forest species we traveled the ways and paths where the group collected Potsotaroki bark. As a companion to the inspections we had a member of the Indian group designated by the group chief. Track coordinates to the *Trichilia pallida* trees were recorded and the locations of usable species were geo-referenced along with regeneration data. Data collection led to mapping of species concentration in the more accessible areas to the community in the study. Data were later compared with those of forest inventories taken by NGO *Asociación Cutivireni* – ACPC in 2005 [5].

3 Results

3.1 Harvest techniques

Three cutting techniques were recorded for harvesting the bark: **1) Selective cut**: part of the bark is cut off around the stem and a narrow 20cm- to 55-cm border is left to allow nutrients to flow to the top of the tree; **2) Total cut**: a complete ring is cut off to obtain the most bark available. Machetes and stones are used for cutting as high from the ground as possible with the help of hands and feet. Often nearby trees are used as ladders to higher reaches. As a consequence of the use of this technique many bark-stripped and rotting individuals were observed; and **3) Felling**: the bark can be collected to its full. According to villagers' accounts, that type of harvest is generally carried when they need a larger amount of raw material or when many cuts have been made into the same tree and little bark is left. In that case it is most convenient and faster to fell the tree and remove the remaining bark.

Villagers reported that upon finding a Potsotaroki tree in an area chosen for their crops they cut it down and kept only a small portion of the bark to be utilized by their wives in the future. The rest of the tree would later be burnt along with the other slashed trees. When the tree is on the borderline of the cropland it is felled, but left in the area so that other families may use its bark. In conversations with the former chief of the community he informed that in his time (at least one decade ago) they did not cut down a Potsotaroki tree.

Harvesting techniques seem to depend on the profile of the family that will utilize the bark. An older couple will opt for the selective cut in order to attempt to keep a safety margin. A young couple will try to save time and collect the greatest amount of bark when they go into the forest to search for the plant, opting for the total cut or for felling when that seems to be the case. As presented in table 1, there is a great difference between villagers in the Camantavishi nucleus and those in adjacent Shima, whose ages range between 30 and 40 years. Older people say they make a selective cut as opposed to villagers in Camantavishi, where an average proportion opts for that technique and the rest prefer total cutting or felling of the tree.

It must be highlighted that age range in the main village is 20-52 years, with greater proportion of women between 25 and 35 years old. In Shima age ranges from 20-40 years and 50% are between 30 and 40 years old. That age bracket, when related to the type of cut and use of *Trichilia pallida* may indicate that there is a greater tendency among young women to use cutting techniques that are harmful to the species as well as to substitute pre-dyed fabrics with artificial coloring for the natural dyes.

TABLE 1

TYPES OF CUT AS REPORTED IN INTERVIEWS

	Camantavishi Village[1]	
	Frequency	
	Absolute (nr)	Relative (%)
Selective cut	24	58.5
Total cut	4	9.8
Felling	13	31.7
Total interviewees	41	100.0

	Shima Annex[2]	
	Frequency	
	Absolute (nr)	Relative (%)
Selective cut	13	100.00
Total cut	-	-
Felling	-	-
Total interviewees	13	100.00

[1] nr:41
[2] nr:13

3.2 Possible impact-generating factors

From the results of interviews one can infer that a change occurred in the way the forest species is being used nowadays. During the interviews we tried to identify and later characterize the probable factors that determined those changes.

3.2.1 Availability of natural resources

The greater the distance to the individuals to be harvested, the longer the time and the greater the difficulty to obtain the final product. he availability of a resource can be measured in the field by real technical means such as those done in forest inventories (objective factors) or through other means such as the perception of distance that each person reports (subjective factors). This study took into account that people's references of time and space, which are different from those of someone who has access to mechanical means of transportation. As shown in table 2, in the main village of Camantavishi most people report that the *T. pallida* trees are relatively close to home, while all villagers of more remote Shima reported that the species is easy to find. The village is more distant from exogenous factors such as intermediaries and tourists.

TABLE 2

PERCEPTION OF ACCESSIBILITY OF T. PALLIDA

Availability of species	Main center of community	
	Observations	
	Absolute (nr)	Relative (%)
Near	13	31.71
Far	28	68.29
Total interviewees (Nr)	41	100.00

Nr: 54

Availability of species	Shima	
	Observations	
	Absolute (nr)	Relative (%)
Near	13	100.00
Far	-	-
Total interviewees	13	100.00

During guided visits after the species, trees mature enough to be harvested were georeferenced along with regeneration data. A map was then drawn plotting those data and the harvesting routes followed by villagers. Travel time from the center of the community to the first tree was approximately one hour; that to the last individual was five hours. Thirteen adult trees and three young plants were located.

Data from the 2005 forest inventory by NGO ACPD and routes followed by indians to reach the dyes were then integrated. From the species concentration map one can observe the magnitude of the area to be traveled in order to locate new individuals as well as their location as related to protected areas. The inventory indicates that there is a high concentration of *T. pallida* on the slopes above 700m altitude. That form of natural association is characteristic of the *meliaceae* family. The availability of the resource is high as compared to that of other species inventoried in the communities and in the protected areas [5], [6].

3.2.2 Tourist visitation

Tourism in this zone is mainly of a scientific and ethnic nature. When asked about the presence of tourists during the past years, 74% of interviewees stated that the number has remained unchanged, while 26% mentioned that number had increased (fig 1).

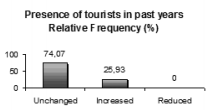


Fig. 1. Perception of number of tourists in the community

Those figures could be compared with statistical data that indicate actual tourist visitation, but it is not a custom nor is there any local norm that regulates visitor control. Data on diversity and number of visitors to those zones are referenced by oral transmission of information provided by indians, which are valid for this study.

Supporting the reports on the presence of tourist visitors, 90% stated that the main buyers of their handicraft are the intermediaries and only 10% stated that buyers are tourists that pass through the community on their way to Parijaro Falls or those brought in by NGO ACPC.

3.2.3 Contact with intermediaries

The main intermediaries identified by indians are traders, NGOs and government institutions. When traders arrive in the communities, generally every 15 days, they bring a variety of products of interest to indians such as milk, canned tuna, flashlights, batteries, soap, matches, synthetic-dyed cotton fabric, beer, biscuits, pans, blankets, radios, etc. [7]. As means of payment indians barter produce and forest products, as well as dyed fabrics.

The question on indians' perception about the influence of intermediaries on the quantity of bark utilized was limited to the presence of ACPC during the past years (2000-2005). Through its projects, the NGO is the only source of continuous demand for the indian products. As recorded in the community, of the 41 interviewees in Camantavishi, 65.85% of villagers stated that they did not notice any type of change after the arrival of the NGO and 34.15% noticed some changes.

4 Some considerations

There is a clear reduction in the use of Potsotaroki (T*richilia pallida*) for day-to-day clothing. Until 2003 a high percentage of women observed (60%) were wearing Cushmas dyed with Potsotaroki and in 2006 only 8 women (20%) were seen in dyed Cushmas. Reduction in three years was 40% in the use of natural dyes. That phenomenon is observed not only in Peruvian communities, but also in Bolivia's Tsimane population, where plant dyes are progressively disappearing due to substitution of artificially dyed cotton fabrics brought in by traders for the natural fibers [8].

As well-mentioned by Rojas [9], when a society adopts certain behaviors that belong to another cultural frontier, one of the reasons for that change is greater efficiency of one method against another. The process of dyeing with *Trichilia pallida* is considered long and time consuming [10], [11], requiring greater dedication, often to the detriment of other tasks that are equally important within the family nucleus; that may explain the changes observed.

Camantavishi's community is currently exposed to many factors of change, among them tourism, the presence of NGOs, government institutions and intermediate traders. It may be stated that the latter act indirectly as tourists as they take handicraft to be sold in town. From the data presented it can be deduced that the impact that a "direct tourist" visitor can cause was considered minimal, for the number of visitors during the past years remained unchanged.

5. REFERENCES

[1] Marques, J. G.. O Olhar (des) multiplicado. O papel do interdisciplinar e do qualitativo na pesquisa etnobiologica e etnoecologica. In: AMOROZO, M.; MING, L. C.; SILVA, S. P. Métodos de coleta e analise de dados em Etnobiologia, Etnoecologia e disciplinas correlatas. Rio Claro: UNESP /CNPQ. 2002. p.30-46.

[2] Trivinhos, A. N. Introdução à pesquisa em ciências sociais: a pesquisa qualitativa em educação. São Paulo: Atlas, 1987. 175 p.

[3] Haguette, T. M.. O objeto das metodologias qualitativas. In: __. Metodologias qualitativas na sociologia. Rio de Janeiro: Vozes. 1992. p. 55-92.

[4] Viertler, R. 2002. Métodos Antropológicos como ferramenta para estudos em Etnobiologia e Etnoecologia. In: AMOROZO, M.; MING, L. C.; SILVA, S. P. Métodos de coleta e analise de dados em Etnobiologia, Etnoecologia e disciplinas

[5] ACPC- Asociación Cutivireni. Inventario e Plan de Manejo forestal en la comunidad Indígena Camantavishi. Lima. 2005. 50 p.

[6] Kometter, R. Expedientes técnicos para la recategorización de la Zona Reservada Apurimac. Lima: Conservación Internacional-Perú. 123 p. Documento producido por el proyecto GEF/ Banco Mundial-CI-Perú. 2001

[7] Peralta, P. Análisis de los circuitos económicos en Vilcabamba. Lima: ACPC; CI-Perú. 150 p. Informe de evaluación para la recategorización de las Áreas Protegidas. 2001

[8] Reyes, V. G. Indigenous People, Ethnobotanical knowledge, and market economy. a case study of the tsimane' amerindians in lowland Bolivia. 2001. 273p. (Thesis-Doctor of philosophy) - University of Florida, Florida. 2001

[9] Rojas, Z. E . Los Asháninka: un pueblo tras el bosque, Contribución a la etnología de los campa de la selva central peruana. Lima: [s.n]. 1994. 354 p.

[10] Veber, H. 1996. External inducement and non-westernization in the uses of the Ashaninka Cushma. Journal of Material Culture. Londom, v.1, p. 155-183, Jul 1996

[11] ACPC-ASOCIACIÓN CUTIVIRENI. Diagnostico de las capacidades productivas en las Comunidades Asháninka del río Ene. Lima. 2001. 32 p.

Giselle C.N. Melendez got her undergraduate degree in Forestry in 2000 at La Molina University in Peru. Her Master Degree she received at University of São Paulo in 2007. Giselle has a good field experience working together with Indigenous Organizations especially at the field of etnobotanic and forestry. Her expertise is more related with the Asháninka and Matsiguenga Communities when she has worked with Association for the Conservation of the Cutivireni Patrimony. Now she is working with Conservacion Internacional in Peru.

Teresa C. Magro got her undergraduate degree in Forestry in 1983. Her Master Degree she received in 1987 and the PhD Title in 1999. As a Professor at Department of Forest Science, University of São Paulo, she works with the environmental and cultural effects of recreation and tourism in Protected Areas.

Potential interpretation index: a tool for assessing landscape diversity from pathways

García-Ventura, D.; Tejedo, P.; Muñoz-Santos, M. and Benayas, J

Abstract — Nowadays, a well developed net of pathways allows people to enjoy nature in countryside. Into natural protected areas, the pathway network is generally used to bring closer natural /cultural values and visitors. However, the design of these interpretation pathways usually doesn't bear in mind how much representative are them to make a complete visit through all landscapes of the natural protected area. We have developed an index based on useful and popular ecological diversity index (Shannon-Wiener, 1948), which has been applied to 56 pathways open to visitors in 6 Spanish National Parks. This Potential Interpretation Index takes into account several factors with high attractiveness to visitors, like environmental units, water bodies and slopes. In addition, we consider these topics either crossed by the pathways than observed from these ones. Spatial data was processed by GIS tools in order to obtain landscape diversity and viewshed from each pathway in these National Parks. The result of this work is an index easier to apply in natural protected areas and the whole countryside, in order to asses its significance for interpretation activities and for guaranteeing a representative visit to the area. This tool could be added to others planning models in natural protected areas management, with the aim of reconcile conservation and visitors use.

Index Terms — Landscape, pathways, ecological divesity index.

García-Ventura, D. is with the Department of Ecology. Universidad Autónoma de Madrid. Madrid (Spain)

Tejedo, P. Faculty of Experimental Sciencies. Universidad SEK. Segovia (Spain**)**

Muñoz-Santos, M. is with the Department of Ecology. Universidad Autónoma de Madrid. Madrid (Spain)

Benayas, J. is with the Department of Ecology. Universidad Autónoma de Madrid. Madrid (Spain)

Snow leopard (*Uncia uncia*) as an indicator species and increasing recreation loads in the Almaty Nature Reserve

Saltore K. Saparbayev, Dilya B. Woodward

Abstract — The purpose of this research is to analyze the data on ecology, biology and dynamics of snow leopard population in the Almaty Nature Reserve and to identify if the increasing numbers of ecotourists could contribute to the decrease of *Uncia uncia* population. The results of the study show that increasing recreation loads in the Reserve and adjacent territories elevate the disturbance level to the snow leopard's main prey Siberian Ibex and to the predator itself that could result in a decrease of population of this endangered species or its total extinction.

Index Terms — Snow leopard *(Uncia uncia),* Siberian ibex (*Capra sibirica*), Almaty Nature Reserve, Kazakhstan, ecotrail.

1 Introduction

The research was conducted in the Almaty State Nature Reserve, which is situated in the central part of the Zailiysky Alatau in the basins of Talgar and Issyk rivers. The Zailiysky Alatau range is situated in the most northern part of Tyan Shan mountain range, with the highest point - peak Talgar (4 978 m absolute height).

At present, the only stable populations of snow leopards in Kazakhstan are found in the following two reserves – Almaty Nature Reserve and Aksu Jabagly Nature Reserve. However, increasing recreation loads lead to the elevated disturbance levels on snow leopard and its main prey. This could potentially result in a decrease of the snow leopard population in Almaty Reserve. The *purpose* of this research is to analyze the data on ecology, biology and dynamics of snow leopard population in the Reserve for the last 30 years and to identify if the increasing numbers of ecotourists could contribute to the decrease of *Uncia uncia* population.

The snow leopard habitat in the Reserve lies in the range of subalpiane and alpine zones of 2 500 m and higher (Fig.1). In winter the animal can descend to the forest zone and river valleys following its main prey, the Siberian Ibex *(Capra sibirica)* (Fig.2).

Fig.1. Talgar mountains – snow leopard habitat in the Almaty Nature Reserve. Sredniy Talgar gorge. 2 900-4 000 m absolute heights. (9 514 f- 13 123 f). All photos S. Saparbayev unless stated otherwise.

S.K. Saparbayev is with the Almaty State Nature Reserve Almaty, Kazakhstan. E-mail: saltore1@mail.ru.
D. B. Woodward is with the Institute of Geography, Almaty, Kazakhstan. E-mail: dilyara@alum.rit.edu.

Fig.2. Siberian Ibex in the Almaty Nature Reserve. 2 800 m absolute height (9 186 f).

Snow leopard is considered to be an indicator of the state of Asian mountainous ecosystems because it occupies the highest positions in the food chain, requires vast habitat territory, moves on large distances and can only survive in virgin, pristine environment where its prey is abundant [1], [2], [3], [4], [5]. For this reason, a yearly inventory of population of the snow leopard is carried out in the Almaty Reserve. The results are then sent to the Ministry of Agriculture of the Republic of Kazakhstan in order for this data to be analyzed and measures to be taken, if the population has declined.

Ecology and biology of snow leopard in the Zailiysky Alatau was studied by Sludskiy [6], Fedosenko [7], Fedosenko and Zhiryakov [8], Zhiryakov and Janyspayev [9], Janyspayev [10] and others. At present, no research is conducted on snow leopards in Kazakhstan [11], [12]. To date no research has been conducted on the impact of ecotourism on the population of snow leopards in this region.

2 Materials and methods

Field survey was conducted from February 2005 to April 2008 in the Almaty Nature Reserve. Signs considered were: counts of tracks, remains of prey, feces and urination, scrapings on rocks and tree trunks. Other methods included inventories of hoofed animals in the study area, reconstruction and extrapolation methods, registering of sign locations with GPS, analysing original scripts of encounters with the animal, expert knowledge (interviews) and collection of data on the numbers of visitors to the Reserve.

3 Results

From the period 1975 to 2000 there were multiple sightings of the leopard's footprints on the snow. Twice the snow leopard's lair was found and in more than 40 cases the animal was directly observed (Fig. 3).

Fig.3 Snow leopard in the Almaty Nature Reserve. Sredniy Talgar gorge. 1650 m absolute heights (5 413 f). February, 1986. Photo A. Janyspayev.

According to our field logbook, the the animal's footprints are frequently found on the territory of the Reserve. However, compared to the period between 1970 and 1990, the number of direct encounters with the animal have decreased. In a 25-year period there were 40 documented encounters with the snow leopard in the Reserve or 1.6 encounters a year on average. From the 2001 to 2008 there were only 6 encounters or 0.8 sightings a year.

In Almaty Nature Reserve the snow leopard uses the same trails as ecotourists. There are six government-approved ecotrails: Leviy Talgar, Pravyi Talgar (includes Monakhov's gorge and Kuvshinki), Sredniy Talgar, Issyk, Pravyi Talgar – Issyk and Lake Isssyk (Fig. 4). The ecocamp that offers regular hikes for its participants is held annually in Pravyi Talgar. In winter time the snow leopard's footprints were found along these ecotrails (Figs.5-7).

Fig. 4. Ecotourists on the Praviy Talgar ecotrail. Almaty Nature Reserve. 1 700 m (5 577 f). July 2007. Photo D. Woodward.

Fig. 5. Snow leopard's footprints found in the Monakhov's gorge. 1 900 m absolute height (6 233 f). November 28 th, 2006.

Snow prints of a female snow leopard with two cubs were found on the 4th of December 2007 in Sredniy Talgar gorge. Based on the footprint patterns it appears that the cubs were following in the tracks of the mother, playing with each other, jumping side to side and then returning to the trail. Prints of tail marks were also found (Fig. 6,7)

On the 12th of March 2008 in Sredniy Talgar gorge we observed a female Siberian Ibex a broken right horn. On the 27th of March 2008 we discovered the remains of that female mountain goat. The evidence pointed to a snow leopard attack. Her age according to the horn rings was 10-12 years (Fig.8).

Fig.6 Snow prints of two snow leopard cubs playing in front of the "Talgar" mountaineering camp. 2 500 m absolute height (8 202 f). December 2007.

Fig.7 Snow prints of a female snow leopard with two cubs. Sredniy Talgar gorge. 2 600 м absolute height (8 530 f). December 4th, 2007.

Fig. 8. Remains of a female Siberian Ibex killed by the snow leopard. Almaty Nature Reserve. Sredniy Talgar gorge. 1 800 m absolute height (5 905 f). March 27th, 2008.

The research results have helped us to determine the main threats to the mountain goats and to the snow leopards in the Reserve. Increased ecotourism activity [Figs.9,10], illegal tourists trespassing from

the adjacent territories (Ile Alatau National park and Almatau tourist center), helicopter rides from the Tabagan Family park, particularly on holidays and on weekends. Ski resort construction as well as noise pollution from the "Sputnik" scout camp have been identified as a serious disturbance factor to the Reserve's fauna. In the summertime the service for monitoring of mudflows conducts regular helicopter transportations of its researchers.

Fig. 9. The snow leopard's main prey in the Almaty Nature Reserve is the Siberian Ibex. The animal is in a state of alert due to the approaching ecotourists. The Skiffs' valley. 2 600 m absolute height (8 530 f). November 2007.

Fig. 10. The Siberian Ibex is leaving the site disturbed by the presence of ecotourists. The Skiffs' valley. 2 600 m absolute height (8 530 f).November 2007.

Conclusion

The results of the research show that the current population of snow leopard is stable and population of the Siberian Ibex is increasing. This points to the stability of mountain ecosystems in Almaty Nature Reserve at present. However, ecotourism activity in the Reserve and recreation pressing from adjacent to the Reserve areas, such as ski resorts, the "Tabagan" Family park and the Ile Alatau National Park are a threat to the predator and its main prey. Further research into the impact of tourism and recreation on flora and fauna of the Reserve is required. This would allow for a new set of recommendations for protection and maintaining the stable population of *Uncia uncia* in the area.

The authors are grateful to A. Janyspayev of Almaty Nature Reserve, Kazakhstan, for his valuable consultations and advice and to G. Gibson of Enbridge Inc., Canada, for editing the final draft of the paper.

References

[1] P. B., Landres, J. Verner and J. W. Thomas, "Ecological Uses of Vertebrate Indicator Species: a Critique," *Conservation Biology,* vol. 2, pp. 316-327, 1988.

[2] B. Dexel, "The Illegal Trade in Snow Leopards – A Global Perspective," Technical Report, German Society for Nature Conservation (NABU), Oct. 2002.

[3] http://www.catsg.org/

[4] E. A. Kreuzberg-Mukhina, A. V. Esipov, E. A. Bykova, E. V. Vashetko, B. Aromov, "Development of the National Action Plan for the Conservation of Snow Leopard in Uzbekistan," Final Report on the ISLT project, Tashkent, 2003.

[5] R. Jackson, D. Hunter and O. Don, "Snow Leopard Survey and Conservation Handbook," International Snow Leopard Trust, Seattle, Washington and U.S. Geological Survey, Fort Collins Science Center, Colorado, 1996.

[6] A.A. Sludskiy, "Snow Leopard or Irbis," *Commercial Mammals of Kazakhstan*, pp. 74-83, 1973. (А.А. Слудский, "Снежный барс или ирбис," *Промысловые млекопитающие Казахстана,* с. 74-83, 1973.)

[7] A.K. Fedosenko, "Snow Leopard," *Mammals of Kazakhstan.* Alma-Ata, vol. 3, part 2, pp. 222-240, 1982. (А.К. Федосенко, "Снежный барс," *Млекопитающие Казахстана.* Алма-Ата, т. 3, ч. 2, стр. 222-240,1982.)

[8] A.K. Fedosenko, V.A. Zhiryakov, "Relations Between Predators and Wild Hoofed Animals in Northern Tyan Shan and Dzhungarskiy Alatau," *Ecological Fundamentals of Rational Use of*

Predatory Mammals. Moscow: Nauka, pp. 72-74, 1979. (А.К. Федосенко, В.А Жиряков, "Взаимоотношения хищников и диких копытных в Северном Тянь-Шане и Джунгарском Алатау," *Экологические основы рационального использования хищных млекопитающих*. Москва: Наука, стр. 72-74, 1979.)

[9] V.A. Zhiryakov, A.D. Janyspayev, "Snow Leopard in Almaty Nature Reserve," *Rare Animals of Kazakhstan,* E. Gvozdev*,* ed., Alma-Ata: Nauka, pp. 51-54, 1986. (Жиряков В.А., Джаныспаев А.Д., "Снежный барс в Алма-Атинском заповеднике," *Редкие животные Казахстана*, под ред. Е. Гвоздева, Алма-Ата: Наука, стр. 51-54,1986.)

[10] A.D. Janyspayev, "Hunting Behaviour of the snow leopard at the Alma-Atinski Nature Reserve," *Snow Line,* vol. 9, no. 2, Ch. 6, 1991.

[11] A.D. Janyspayev, "Distribution and snow leopard population in the Zailiiskiy Alatau," *Almaty Nature Reserve Flora and Fauna*, vol. 3, Almaty: Kaganat, pp. 328-334, 2006. (А.Д. Джаныспаев, "Распространение и численность снежного барса в Заилийском Алатау," *Алматы мемлекеттік табиғи қорығының өсімдіктер және жануарлар әлемі,* 3 том, Алматы: Қағанат, стр. 328-334, 2006.)

[12] A. Ormanova, "The Symbol Flourishes While the Prototype is Dying," *Svoboda Slova*, 29th of November, 2007. (А. Орманова, "Символ процветает, а прототип – погибает," *Свобода слова*, 29 ноября, 2007).

Saltore K. Saparbayev B.S. and M.S. in Biology, Kazakh National Agrarian University, 2005. S.Saparbayev is a member of staff and senior researcher in Almaty State Nature Reserve since 2005 until present. S.Saparbayev is the principal investigator of the Reserve's research theme: "Hoofed mammals in Almaty Nature Reserve". Saltore is conducting yearly inventorying and monitoring of mammals, is one of the authors of the book "Annals of Nature of Almaty Reserve" and Management Plan. Research interests include theriology, protected areas, photography of flora and fauna.

Dilya B. Woodward B.S. in Tourism, summa cum laude, 1996, Almaty State University; M.S. in International Tourism, summa cum laude, 1998, Almaty, State University; M.S. in Hospitality-Tourism Management, summa cum laude, 1999, Rochester Institute of Technology. She is a winner of a full President's scholarship for graduate studies in the US. D. Woodward served in National Company "Silk Road – Kazakhstan", lectured at the Kazakh Academy of Sports and Tourism, since 2005 until present is a PhD student at the Institute of Geography, Kazakhstan. D. Woodward has 12 publications with primary research focus on landscape science, ecotourism, carrying capacity and protected areas, including one monograph on ecotourism carrying capacity assessment in Almaty Nature Reserve. Latest research interests include biology and ecology of snow leopard (*Uncia uncia*).

The therapeutic effect of taking in the atmosphere of a forest

Norimasa Takayama

Abstract — The concept of "Taking in the atmosphere of a Forest" (*shinrin-yoku*, in Japanese) was proposed in 1982 by the Japanese Forestry Agency to help people to relax and revitalize their body and soul (therapeutic effect). Previously, the therapeutic effect had been based on only empirical evidence. However, thanks to the rapid improvement of measurement technology and equipment, the government has been scientifically examining the therapeutic effect of forests and using the resulting data for the benefit of the public. The effect is thought to differ depending on the kinds of trees, the spatial structure and the specific atmosphere of the forest environment. Therefore, we decided to study the therapeutic effect of two old-growth forests. As a control, we selected a well-maintained artificial forest. We measured and compared the therapeutic effect on the subjects, paying attention to 1) their impression of the forest space and 2) how their feeling changed after walking through each forest. Consequently, we found that subjects considered the old-growth forests with huge trees as more sacred, more comfortable, more serene and more natural than the control forest. Moreover, in the control forest there was no difference in any of the indicators used in the survey, while in the old-growth forests the therapeutic effect was confirmed by several indicators.

Index Terms — Profile of mood states, Semantic differential method, Taking in the atmosphere of the forest (Sinrin-yoku), Therapeutic effect

1 Introduction

It t is often said many people living in cities feel stressed for various reasons, lose their sense of the seasons, and lack sufficient physical activity. The concept of "Taking in the atmosphere of a forest" (shinrin-yoku in Japanese) was proposed in 1982 by the Japanese Forestry Agency to help people to relax and revitalize their body and soul [1]. In Japan, many people visit forests every year to alleviate stress, to feel refreshed or to improve their health, and have high expectations for the effect of shinrin-yoku.

Previously, the therapeutic effect of Shinrin-yoku had been based on only empirical evidence. However, due to the rapid improvement of measurement technology and equipment, the government and some universities have been examining it scientifically by physiological or psychological methods, and using the resulting data for the benefit of the public [2], [3], [4].

The therapeutic effect is thought to differ depending on the kinds of trees, the spatial structure and the specific atmosphere of the forest environment [5]. Against this backdrop, research was conducted on two old-growth forests and one control forest, for the following purposes: 1) to reveal the distinguishing features of the psychological effects of taking in the atmosphere of an old-growth forest, and 2) to examine the relationships among *shinrin-yoku* effect, spatial impressions, and forest environment.

Norimasa Takayama is with the Forestry and Forest Products Research Institute, Tsukuba, Ibaraki, Japan, E-mail:hanri@ffpri.affrc.go.jp

2 MATERIAL AND METHODS

2.1 Study sites

We chose two old-growth forests as study sites (Fig. 1). The first is a forest in Koya Town, Wakayama Prefecture owned by a temple, consisting mainly of Japanese cedars 250 years old or older. Located on Koya Mountain, it was planted by Kukai in 816 and has been managed by Kongobuji Temple, the head temple of the Shingon sect of Buddism (Fig. 2). The second is the Akazawa Recreation Forest in Agematsu Town, Nagano Prefecture, which consists of around 300-year-old Japanese cypresses, giving the illusion of a virgin forest with a mysterious atmosphere (Fig. 3).

As a control, we selected a well-maintained artificial forest in Gero City, Gifu Prefecture of Japanese cedars and cypresses planted about 50 years ago (Fig. 4). We measured and compared the effects on the subjects, paying attention to 1) their impression of the forest space and 2) how their feeling changed after walking through a forest.

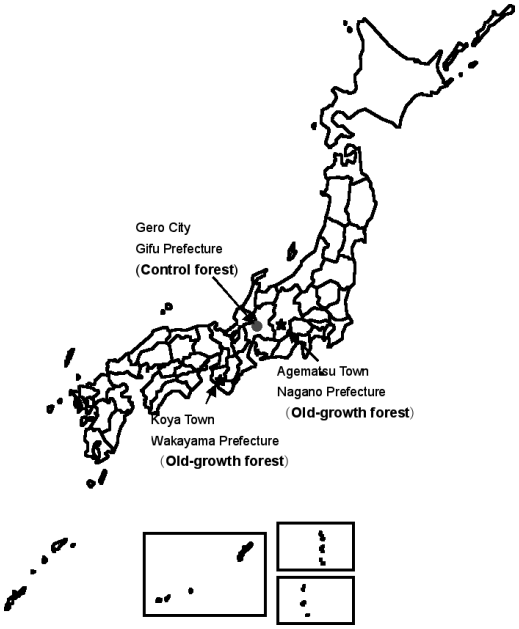


Fig. 1. The Locations of study sites.

Fig. 2. The Old-growth forest - Koya Town, Wakayama Pref. (Giant Japanese Cedar).

Fig. 3. The Old-growth forest - Agematsu Town, Nagano Pref. (Giant Japanese Cypress).

Fig. 4. The Control forest - Gero City, Gifu Pref. (Typical Man-made Cedar and Cypress).

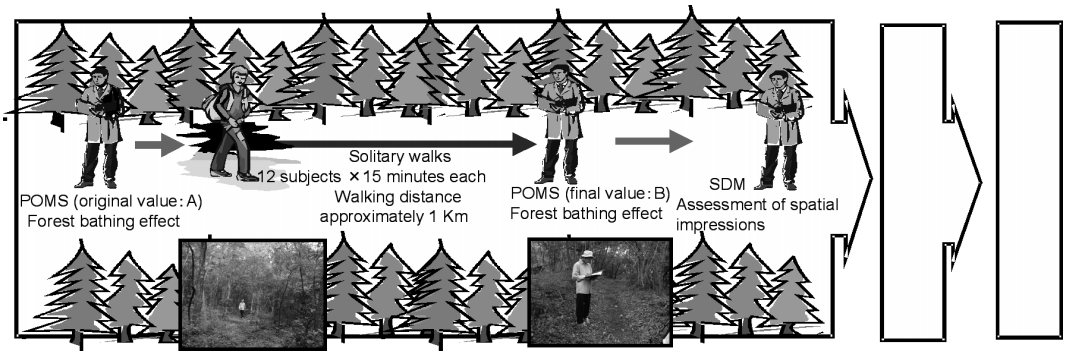


Fig. 5. The flow of the psychological experiment.

TABLE 1

OVERVIEW OF THE SHINRIN-YOKU EXPERIMENT

Study area	Koya Town Wakayama Pref.	Agematsu Town Nagano Pref.	Gero City Gifu Pref.
Category	Old-growth forest	Old-growth forest	Control forest
Period of forest bathing experiment	2006/8/1-3	2005/7/6-8	2004/11/3-5
Forest study area	Three-Cedar Trolley Trail	Akasawa Recreational Trail	Shimi Hiking Trail
Number of subjects	12	12	12
Affiliation of subjects	Wakayama University (graduate and undergraduate)	Shinshu University (graduate and undergraduate)	Gifu University (graduate and undergraduate)
Gender of subjects	Male	Male	Male
Average age of subjects	21.5±1.1	21.8±1.3	23.0±0.9

All subjects in the experiments were male national university students in their 20' (12 subjects per experiment).

2.2 Subjects

The subjects were 12 male university students aged from 20 to 24 in each study area. They were 36 subjects in total (Table 1).

2.3 Experiment method

After strolling in the forest for 15 minutes, the Semantic Differential Method (SDM) and Profile Of Mood Status (POMS) were used to learn 1) the subjects' impression of the forest space (SDM) and 2) how their feeling changed after walking through the forest (Fig. 6).

3 ANALYTICAL RESULTS

3.1 Analysis of *shinrin-yoku* results

There was no significant difference in *shinrin-yoku* effects between the two old-growth forests. But compared with the control forest, vitality significantly increased in the old-growth forests. The old-growth forests also showed a significant reduction of tension and anxiety (Table 2).

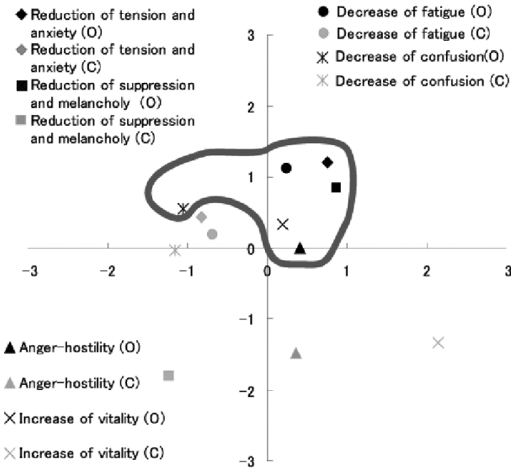


Fig. 6. Factor axes (Axes: I - IV) and factor scores of POMS criteria (O= Old-growth forest; C= Control forest).

3.2 Analysis of physical environment

The old-growth forests had fewer trees and less basal area at breast height, meaning that the views were less cluttered. They also had a higher relative light intensity than the control forest, meaning that their light environment had a more soothing effect (Table 3).

TABLE 2

COMPARISONS OF EVALUATIONS BETWEEN OLD-GROWTH AND CONTROL FORESTS

Category	Study area	Tension/ anxiety	Suppression/ melancholy	Anger/ hostility	Vitality	Fatigue	Confusion
Old-growth forest	Koya town Wakayama Pref.	-1	-0.33	0	6.17	-3.67	-0.5
	Net value (B-A*)	low	low	low	high	medium	low
	Agematsu town Nagano Pref.	-1.08	0.33	0.08	5.58	-1.67	-1.33
	Net value (B-A)	low	low	low	high	medium	low
Control forest	Gero City Gifu Pref.	-5.75	-1.83	-3.17	-0.83	-0.83	-2.42
	Net value (B-A)	high	medium	medium	low	low	medium
Established level of significance							
＊：Koya Town – Gero City		＊＊			＊		
☆：Agematsu Town- Gero City		☆☆	☆☆		☆		
※：Koya Town- Agematsu Town							

＊＊,☆☆,※※:p<0.01 ＊,☆,※:p<0.05% ANOVA-Fisher B-A* = Final value minus original value

TABLE 3

CHARACTERISTICS OF FORESTS IN THE STUDY AREA AND CLIMATIC CONDITIONS

Study area	Koya Town	Agematsu Town	Gero City
Category	Old-growth forest	Old-growth forest	Control forest
Date of environmental measurements	2006/8/3	2005/7/8	2004/11/5
Weather	Fair	Fair	Fair
Temperature (℃)	24.5	19.2	20.1
Humidity (%)	83.1	86.1	44
Radiant heat (℃)	24.7	18.9	20.1
Wind speed (m/s)	0.4	0.62	0.4
Species composition	Coniferous (Cedar)	Coniferous (Cypress)	Mixed coniferous (Cedar and Cypress)
Forest age	40-200	300	30-60
Relative light intensity (%)	19.1	22.6	26.4
	low	low	high
Number of trees per unit area	6.6	8.6	9.6
	low	low	high
Breast height basal area (m^2)	26.6	34.6	38.5
	low	low	high

3.3 Evaluations of forest impressions

There was no significant difference between the two old-growth forests. However, compared to the control forest, SD criteria for the old-growth forests showed highly significant differences in naturalness, beauty, sense of spirituality, soothing ability, and wholesomeness (Table 4).

3.4 Analysis of differences in impressions

Four factor axes were obtained as a result of the factor analysis (Table 5): Comfort -aesthetics (Axis I), Mystique (Axis II), Understandability (Axis III), and Gentle coolness (Axis IV).

TABLE 4

COMPARISON OF EVALUATIONS OF IMPRESSIONS OF FOREST INTERIORS

Category	Study area	Artificial-natural	Ugly-beautiful	Vulgar-spiritual	Unnerving-relaxing	Unhealthy-healthy
Old-growth forest	Koya town Wakayama Pref.	6.67 *high natural*	6.33 *high beautiful*	5 *high spiritual*	6 *high relaxing*	5 *high healthy*
	Agematsu Town Nagano Pref.	6.67 *high natural*	6.17 *high beautiful*	4.33 mideum spiritual	6.33 *high relaxing*	6.33 *high healthy*
Control forest	Gero City Gifu Pref.	4.83 mideum natural	4.83 mideum beautiful	3.25 mideum spiritual	5.08 mideum relaxing	4.17 mideum healthy
Established level of significance		5/21 sets of adjectives				
＊：Koya Town – Gero City		＊＊	＊＊	＊＊	＊	＊
☆：Agematsu Town- Gero City		☆☆	☆☆	☆	☆☆	☆☆
※：Koya Town- Agematsu Town						

＊＊,☆☆,※※:p<0.01 ＊,☆,※:p<0.05% ANOVA-Fisher 7 levels:1(low)-2-3-4-5-6-7(high)

TABLE 5

FACTOR ANALYSIS OF CORRELATION COEFFICIENTS

Interpreted Axis Name / Evaluation Criteria	Axis-Ⅰ Comfort-aesthetics	Axis-Ⅱ Mystique	Axis-Ⅲ Understan-dability	Axis-Ⅳ Gentle coolness
3-dimensional-2-dimensional	0.911	-0.151	-0.157	0.200
Ugly- beautiful	0.872	0.220	-0.273	0.223
Gloomy- cheerful	0.856	0.181	-0.290	0.134
Friendly-unfriendly	-0.833	-0.417	0.281	-0.039
Comfortable-uncomfortable	-0.758	0.128	0.229	-0.504
Likeable-dislikeable	-0.756	-0.492	0.328	-0.192
Good smelling-bad smelling	-0.717	-0.524	0.355	-0.067
Quiet-noisy	-0.702	-0.056	0.277	-0.516
Artificial-natural	0.701	0.269	-0.530	0.380
Unnerving-relaxing	0.669	0.132	-0.507	0.492
Healthy-unhealthy	-0.663	-0.307	0.560	-0.357
Bright-dark	-0.130	0.864	-0.155	-0.359
At ease-uneasy	-0.374	-0.815	0.100	-0.231
Inactive-lively	-0.178	0.720	0.352	-0.327
Sparse-luxuriant	-0.241	-0.706	0.489	-0.230
Orderly-disordered	-0.392	-0.690	0.161	-0.265
Open-closed	-0.358	-0.314	0.874	-0.074
Generic-individual	0.507	-0.018	-0.777	0.215
Spiritual-vulgar	-0.654	0.056	0.688	-0.296
Stimulating-sedating	0.366	-0.131	-0.038	0.914
Warm-cool	0.101	0.176	-0.489	0.757
Contribution rate	0.376	0.193	0.190	0.150
Total contribution rate	0.376	0.569	0.759	0.909

For the control forest, all factor scores of all criteria occurred within the negative range of at least one negative factor axis (Fig. 6).

For the old-growth forests, numerous criteria were located within the positive ranges of both Comfort-aesthetics (Axis I; x-axis) and Gentle coolness (Axis IV; y-axis).

4 Discussion

4.1 Characterizing the psychological results of *shinrin-yoku* in old-growth forests

According to the analytical results (Table 2), taking in the atmosphere of an old-growth forest significantly increased the vitality criterion compared with the control forest. Furthermore, tension and anxiety were reduced, albeit at a low level of significance. However, because there was no significant difference in the values for tension and anxiety between the control forest and old-growth forests after the walks, it appears that before walking in an old-growth forest, subjects felt neither tense nor uneasy.

4.2 Understanding the interrelationship among *shinrin-yoku* effect, spatial impression, and forest environment

According to the analytical results, the old-growth forests had a much better viewing environment, and more soothing light conditions, than did the control (Table 3), and gave better feelings of spirituality, naturalness, and calmness (Table 4). Differences in impressions were especially reflected in the increase in vitality (Table 2).

According to the analytical results (Tables 5, 6), the distinctive spatial structure of the old-growth forests gave subjects greater impressions of comfort, beauty, gentleness and coolness than did the control (50-year-old) forest, and may have helped to relieve the emotional tensions, anxieties, feelings of suppression, melancholy, and fatigue of forest walkers and increase their vitality.

Conclusion

In conclusion, the psychological investigation in the present study has proved the therapeutic effect of taking in the atmosphere of a forest (especially old-growth forest) environment (*shinrin-yoku*). As the psychological effect suggested, on-demand-*shinrin-yoku* will likely help to decrease the incidence of stress-related illness. Hence, much more research will be required about how *shinrin-yoku* and forest environments help to promote human health and well-being.

References

[1] Research and Extension Division of Forest Agency, Planning Division of Forest Agency, “Aiming at establishment and the spread of the forest therapy: the next stage of the forest bathing,” Forestry Agency Times, 610, pp. 4-15, 2004 [in Japanese].

[2] H. Ohira, S. Takagi, K. Mauis, M. Oishi, A. Obata, “Effects of shinrin-yoku (forest-air bathing and walking) on mental and physical health,” Tokai Women’s University Kiyou, 19, pp. 217-232, 1999 [in Japanese].

[3] Q. Li, A. Nakadai, H. Inagaki, M. Katsumata, T. Shimizu, Y. Hirata, K. Hirata, H. Suzuki, T. Kawada, Y. Miyazaki, T. Kagawa, Y. Koyama, T. Ohira, N. Takayama, A.M. Krensky, K. Morimoto, “Forest bathing enhances human natural killer activity and expression of anti-cancer proteins,” International journal of immunopathology and pharmacology, 20(2), pp. 3-8, 2007.

[4] Y.Tsunetsugu, B.J. Park, H. Ishii, H. Hirano, T. Kagawa, and Y. Miyazaki, “Physiological Effects of Shinrin-yoku (Taking in the Atmosphere of the Forest) in an Old-Growth Broadleaf Forest in Yamagata Prefecture, Japan,” Journal of Physiological Anthropology, 26(2), pp. 135-142, 2007.

[5] E. Morita, S. Fukuda, J. Nagano, H. Yamamoto, Y. Iwai, T. Nakashima, H. Ohira, T. Shirakawa, “Psychological effects of forest environments on healthy adults: Shinrin-yoku (Forest-Air Bathing, Waking) as a possible method of stress reduction,” Public Health, 121, pp.54-63, 2007.

Norimasa Takayama is Doctor of Philosophy in Agriculture (2007: the University of Tokyo). Now he is Researcher at the Forestry and Forest Products Research Institute (F.F.P.R.I.) in Tsukuba, Japan. And also, he is researching in a psychosomatic health science as a doctoral student at University of Human Arts and Sciences. In 2005, he took the Research exhortation prize by the head of the society at Japanese Institute of Landscape Architecture. In 2007, he took the prize by the head of the Academic Committee at the Center of Environmental Information Science also. His major interests are the forest scenery and effects of the forest therapy. He is associated with Japanese Institute of Landscape Architecture, Japanese Forestry Society, and some others.

Public participation Forests – conserve, protect, enjoy

Peter Thaxter and Sarah Colas

Abstract — The PROGRESS Project is a joint EU funded project between France (Office National des Forêts and Comité Départemental du Tourisme de Seine et Marne), England (Forestry Commission and Natural England) and the Netherlands (Alterra Research Institute). It aims at improving recreation management in the New Forest (120 km south of London) and Fontainebleau Forest (60 km south of Paris), both protected areas. The main objective was to use a range of tools for a better understanding of forest biodiversity and recreation to help reconcile the needs of conservation and recreation. The strategy was to work closely with stakeholder groups and the general public using a participatory approach to help plan the environment for local people and tourists whilst optimising the benefit for the wildlife. This involved very detailed recreation surveys and information about ecological issues being discussed with the stakeholders, to allow changes about channelling the public and alternative facilities off Natura 2000 to be proposed. This was followed by consultation with the public to get acceptance and ownership of these proposals. This led to a variety of actions being implemented including totally new facilities, signage and access control. It also involved a communication program, sustainability program, and other initiatives such as computer-based lessons for schools, promotion of health walks and best practice guides. All of this was done in differing ways in France and England, and the presentation will document the clear success this had in legitimising management changes required for a sustainable balance, and also some insight to lessons learnt. This is being followed up by a five year program of recreation and wildlife monitoring to give long term results.

Index Terms — Public participation, forest, wildlife monitoring

Peter Thaxter is with the Forestry Commission, New Forest, The Queen's House, Lyndhurst SO43 7NH, England, Email: peter.thaxter@forestry.gsi.gov.uk,

Sarah Colas is with the Office National des Forêts, Service Accueil Biodiversité Cynégétique,
Parc de la Faisanderie 77 300 Fontainebleau, France, Email: sarah.colas@onf.fr

TuristiCO_2: a carrying capacity assessment for sustainable tourism in a park island

Francesco Vaccari, Silvia Baronti, Ramona Magno, Sonia Trampetti, Francesca Giannini and Antonio Raschi

Abstract — Carrying capacity has been a long-standing issue in management of parks, outdoor recreation and tourism. This paper describes the first analysis concerning a project on touristic carrying capacity assessment on Pianosa, an island of the Parco Nazionale of Arcipelago Toscano, using an Eddy-Covariance tower for CO_2 fluxes measurement. The preliminary results show that Pianosa represents a sink of carbon, thus actively contribute to reduce the amount of CO_2 in the atmosphere.

Index Terms — Carrying Capacity, Carbon Sequestration, Greenhouse effect, Park Islands.

1 Introduction

Natural areas play an important role in promoting the tourist product [1], and they can be added to other considerable efforts and funding to enhance the tourist image and attractiveness of certain destinations [2]. Indeed, much has been written, in both the scientific literature and popular press, about the carrying capacity of parks and related tourist attractions [3]. The underlying concept of carrying capacity has a rich history in the natural resource professions. Indicators of carrying capacity usually take in account the available resources, the management and experiential evaluation. This paper describes the preliminary results of the TuristiCO_2 project, that aims to using data on Pianosa's potentiality in CO_2 sequestration, and comparing them with the CO_2 caused by tourists' trip to Pianosa itself, to work out an assessment of tourism sustainability.

Pianosa is a 10 square km island of the Arcipelago Toscano, located at about 13 km from Elba island, and characterized by flat terrain. The first historical record of Pianosa island dates back to the Roman age, when the Emperor Ottaviano, in the 6-7 A.C., forced the grandson Agrippa Postumo to live on Pianosa island. Following the decadence of the Roman Empire, during the periods of Barbarians invasions, the island was abandoned.

The name of Pianosa island newly appeared in some documents of the Repubbliche Marinare of Pisa and Genova (XII and XIII Century) that reported the remarkable strategic position of the island. The original vegetation of Pianosa island was presumably represented by a Mediterra-

F.P. Vaccari, S. Baronti, R. Magno, S.Trampetti and A. Raschi are with the CNR – IBIMET, Firenze, Italy E-mail: f.vaccari@ibimet.cnr.it, s.baronti@ibimet.cnr.it, r.magno@ibimet.cnr.it, s.trampetti@ibimet.cnr.it *and* a.raschi@ibimet.cnr.it

F. Giannini is with the Parco Nazionale dell'Arcipelago Toscano, Portoferraio, Italy: E-mail: giannini@islepark.it

nean macchia, dominated by a mixture of sclerophyllous and deciduous trees, bushes and grassland.

This has fostered, throughout centuries, the development of agriculture, yet, in spite of many attempts, the island has seldom housed through centuries a permanent human population, also in consequence of the difficulty in defending it from war attacks, common in the area until all the eighteenth century. For many decades, the presence of a jail has severely limited the access of tourists, helping to preserve an unexploited marine environment; yet, the agricultural overexploitation of soils has led to environmental problems, including the nitrate pollution of deep freshwater, while other problems, related to the maintenance of infrastructures, arose ten years ago, when the jail was closed.

The island passed quickly from being an overexploited but very well monitored area, to being an outpost of a national park in an area characterized by heavy tourism pressure in summer months. At the same time, the abandonment of agriculture and breeding started to foster changes in biodiversity, in consequence of the renaturalization of most cropland. At the moment, the island can be visited by a limited number of tourists per day in summer season on one day excursion from Elba, as overnighting on Pianosa is in general forbidden. A large debate is open, involving the park administration, local policy makers and tour operators, about the carrying capacity of the island [4], and the number of tourists it could accept daily. On this basis, aiming mainly to assess the number of visitors on the only beach where bathing is allowed, the maximum number of visitors per day has been defined in 250. Yet, the largest part of the island can be described as abandoned farmland, rather than an endangered natural ecosystem, and the possibility to use other parameters, more strictly based on the available resources, to assess its carrying capacity, cannot be ruled out.

2 THE TURISTICO_2 PROJECT

1.1 The carbon balance of Pianosa Island (Pianosa_Lab)

The Pianosa_LAB is a research network established in the 2000, aiming at the long-term monitoring of the actual exchange of carbon, water and energy among the biosphere and atmosphere of the island. Key objective of the Pianosa_Lab project is the determination of the C balance of the Pianosa island, thus, it significantly contributes to the understanding of the role of Mediterranean ecosystems as sinks or sources of atmospheric CO_2. Additionally, the project aims at monitoring on the long term the vegetation dynamics on the island also in view of the future conservation management plans proposed for the island. The above objectives are pursued through the quantification of C stores in soils and vegetation and through the quantification of biosphere-atmosphere carbon, water and energy fluxes, for the entire island [5].

2.2 The aim of the project

The concept of sustainable tourism is strictly related to the concept of carrying capacity: it has been defined as the maximum number of people visiting a site without compromising its environmental, economic and socio-cultural conditions. Yet, the impact of Green-Houses Gases (GHG) emissions on the global environment, first of all their role in the ongoing climate change, imposes to take in account, in evaluating the sustainability of tourism, also the GHG strictly related to tourists' movement. Transport represents one of the major sources of GHG, and has been proved to be the most difficult to reduce. TuristiCO_2 aims to use the compare the data on carbon sequestration of Pianosa with the footprint of tourists reaching the island (the surface of forest land needed to absorb the CO_2 emitted by their travel), using as reference term the carbon sequestration activity of the island itself.

The work will be carried out by submitting questionnaires and by interviews to the tour-

ists arriving on Pianosa, in order to assess the typology of their travels to the Elba island, and to calculate the corresponding greenhouse gases emissions. In addition to them, the CO_2 emissions caused by boat transport and by tourists' stay on Pianosa, will also be calculated. The data will be compared with CO_2 assimilation of the island, to assess its ability to compensate for tourism emissions.

The project will have an additional educational value, by involving tourists in the evaluation of the environmental effects of their trip, and in a deeper knowledge and appreciation of the environment they are visiting.

2.3 Results

The Island of Pianosa represents a typical example of a MTE (Mediterranean Ecosystem) as its surface is a mosaic of different ecosystems that include both natural patches and areas where anthropogenic disturbances have been predominating. Considerations on the specific land use history of the island, together with a comparison of the total amount of carbon contained in the soils of the disturbed and undisturbed part of the island, suggests that Pianosa's ecosystems soils did loose a significant fraction of their organic Carbon during the period in which the island was subjected to highly intensive cultivation. The subsequent land abandonment has turned the island from a carbon source into a sink.

Data collected by Eddy Covariance tower (Fig.1) showed that the Island of Pianosa is a substantial sink for atmospheric Carbon.

Net Ecosystem Exchange (NEE) was measured by integrating C flux measurements that were made using the eddy covariance system. In fact in the twelve-months period considered here, a net sink for atmospheric CO_2.

Island's NEE was, during this period, equivalent to 2.64 t C ha^{-1}. Sink activity was the highest during the spring and the autumn months while the island became a net source of C in the central part of the summer period (0.41 t C ha^{-1} for July-August).

Fig. 1 Eddy Covariance tower

This trend will continue until the macchia vegetation will have recolonized the former farmland [6]. The island will continue to be a C sink for several years, if the annual NEE that was observed during our study period will be sustained in the future, Pianosa is a very good analogue of a large portion of the Mediterranean Region, where intensive agriculture activity has been abandoned and it is currently unmanaged. Since 1990, 10 to 20% of the agricultural land in Mediterranean countries was abandoned [7] and this suggests, by simple analogy, that the current carbon sink that can be provided by such land in the Mediterranean could be much larger than previously expected.

References

[1] Riera Font, A. (2000). Mass tourism and the demand for protected natural areas: A travel cost approach. *Journal of Environmental Economics and Management*, 39, 97–116.

[2] Ritchie, J. R. B., & Crouch, G. I. (2000). The competitive destination: A sustainability perspective. *Tourism Management*, 21, 1–7.

[3] Manning, R. (2001) Visitor experience and resource protection: A framework for managing the carrying capacity of National Parks. *Journal of Park and Recreation Administration* 19 (1), 93–108.

[4] R. E. Manning, Parks and carrying Capacity: Commons Without Tragedy. Washington, D.C., Island Press, pp.18-36, 2007.

[5] F. P. Vaccari, R. Baraldi, M.R. Colom, M. F.

Cotrufo, L. P. D'Acqui, "The Pianosa_LAB: An integrated research project to assess the carbon balance of Pianosa island" *Journal of Mediterranean Ecology* vol 5, n. 1, pp. 5-13.

[6] F. P. Vaccari, B. Gioli, A. Zaldei, F. Sabatini, T. Georgiadis, F. Rossi, A. Peressotti, V. Magliulo, F. Miglietta, "Net Ecosystem Carbon Exchange (NEE) of the Island of Pianosa" *Journal of Mediterranean Ecology* vol 5, n. 1, pp. 31-40.

[7] Grove, A.T. & Rackham, O. 1996. Physical, biological and human aspects of environmental change. Medalus II. Final report. Medalus Office, Berkshire, UK, 39-64.

Francesco P. Vaccari agronomist, since 2001 is researcher at CNR – IBIMET

Silvia Baronti forestry engineer, since 2004 with the National Research Council

Ramona Magno forestry engineer, since 2003 with the National Research Council

Sonia Trampetti PhD student on communication and socioloy, since 2008 with the National Research Council

Francesca Giannini, biologist, works for Parco Nazionale dell'Arcipelago Toscano

Antonio Raschi Agronomist, since 1982 with the National Research Council, since 2006 is Research Manager at the Institute of Biometeorology (CNR–IBIMET). Since Is author or co-author of about 100 papers published in scientific journals or as book chapters

Leisure involvement differences in information searching difficulty and wilderness knowledge among hikers

Yu-Lan Yuan, Chi-Chuan Lue

Abstract — This paper draws on findings from recent research to examine the type of information searching difficulty in searching hiking-related information and the relationships between the level of leisure involvement of hikers and their information searching behaviours as well as wilderness knowledge. The information difficulty include their information difficulties as measured by perceived easiness of acquiring four types of hiking-related information, and their channel preferences. The relationships are presented in a proposed conceptual framework of the outdoor recreationist information search process, and tested through two hypotheses using a survey sample. It became apparent in the study that hikers who have higher level of leisure involvement have least difficulty to acquire different types of hiking-related information and have better understanding of Leave No Trace practices. It is also found that there are significant differences in the level of difficulty of acquiring instrumental information and reassurance information. Generally, reassurance information was rated the most difficulty to obtain for hikers. The article concludes by discussing the implications for wilderness mangers that is presented, and highlights the need for further investigation into outdoor recreationist information searching difficulties.

Index Terms — Information searching difficulty, Leave no trace, wilderness knowledge, hiker, backcountry, Taiwan.

TABLE 1

COMPARISON OF HIKER GROUPS ON THE LEVEL OF LEISURE INVOLVEMENT

	Hiker Group[1,2]				
	1	**2**	**3**	**4**	**Overall**
	N=184/sd	**N=31/sd**	**N=293/sd**	**N=195/sd**	**N=703/sd**
Attitude toward hiking	2.2/0.5[2,3,4]	1.0/0.0[1,4]	1.0/0.1[1,4]	2.1/.28[1,2,3]	1.6/0.6
Level of expertise	17.0/8.5[2,3,4]	12.9/5.3[1,3,4]	2.2/1.5[1,2,4]	3.8/1.7[1,2,3]	7.0/7.9

[1]. Comparison between hiker groups was conducted using Oneway ANOVA; both variables were found to be significant (α=0.05) at 702 df.

[2]. Tukey HSD was used to test post hoc differences between hiker groups; [1,2,3,4] indicate a significant difference (α=0.05) was found between the respective groups.

TABLE 2

COMPARISON OF HIKER GROUPS ON WILDNESS KNOWLEDGE, AND INFORMATION SEARCHING DIFFICULTY

	Hiker Group [1,2]					
	1	2	3	4	Overall	
	N=184/sd	N=31/sd	N=293/sd	N=195/sd	N=703/sd	Sig.
Knowledge of LNT practices	76.4/6.5	74.7/6.9	75.3/7.0	75.9/6.8	75.7/6.8	0.282
Information Searching Difficulty	79.7/16.4[3]	81.6/14.2	74.1/18.1 [1,4]	78.4/15.8[3]	77.1/17.0	0.001

[1]. Comparison between hiker groups was conducted using Oneway ANOVA.
[2]. Tukey HSD was used to test post hoc differences between hiker groups; [1,2,3,4] indicate a significant difference (α=0.05) was found between the respective groups.

TABLE 3

COMPARISON OF HIKER GROUPS ON THE FOUR MAJOR DIMENSIONS OF INFORMATION SEARCHING DIFFICULTY

	1	2	3	4	Overall	
	N=184	N=31	N=293	N=195	N=703	Sig.
Dimensions	%	%	%	%	%	
Orientation information	17.0	17.6	15.3	16.8	16.7	0.110
Instrumental information	26.9	27.0	24.7	26.7	25.9	0.001
Educational information	22.7	23.6	21.8	22.6	22.4	0.162
Reassurance information	13.1	13.4	11.4	12.3	12.2	0.000

[1]. Comparison between hiker groups was conducted using Oneway ANOVA.
[2]. Tukey HSD was used to test post hoc differences between hiker groups; [1,2,3,4] indicate a significant difference (α=0.05) was found between the respective groups.

REFERENCES

[1] Hartel, J. (2003). The serious leisure frontier in library and information studies: Hobby domains. Knowledge Organization.30:3, p 228-238.

[2] Norlund, A. and Garvill, J. (2003). Effects of values, problem awareness, and personal norm on willingness to reduce personal car us. Journal of Environmental Psychology, 23, 339-347.

[3] Roggenbuck, J.W. (1992). Use of persuasion to reduce resource impacts and visitor conflicts. In Manfredo, M.J. (ed.) Influencing human behavior: Theory and application. Champaign, IL: Segamore. pp. 149-152.

[4] Stern, P.C. (2000). Toward a coherent theory of environmentally significant behavior. Journal of Social Issues. 56(3): 407-424.

[5] Vining, J. and Ebreo, A. (2002). Emerging theoretical and methodological perspectives on conservation behavior. In Bechtel, R. and Churchman, A., eds. Handbook of Environmental Psychology, pp. 541-558. John Wiley, New York, NY.

[6] Yuan, Y. & Lue, C.C. (2008). Information needs and channel preferences of hikers. The Anthology of the Institute of Landscape and Open Space

Yu-Lan Yuan is assistant professor at the Department of Sport and Leisure Studies, The National Dong Hwa University, 1, Sec. 2,Da Hsueh Rd., Shou-Feng, Hualien, Taiwan, Republic of China.
Email: yoyo@mail.ndhu.edu.tw

Chi-Chuan Lue is professor and director of Outdoor Adventure Laboratory. He is with the Department of Sport and Leisure Studies, The National Dong Hwa University 1, Sec. 2,Da Hsueh Rd., Shou-Feng, Hualien, Taiwan, Republic of China.
E-mail: cclue@mail.ndhu.edu.tw