



University of Novi Sad | Faculty of Sciences
DEPARTMENT OF GEOGRAPHY, TOURISM AND HOTEL MANAGEMENT

Monitoring and Management of Visitors in Recreational and Protected Areas

ABSTRACT BOOK

26–30 September 2016, Novi Sad, Serbia



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Introduction

Monitoring and management of visitors in recreation and protected areas is specific and multidisciplinary field of research. The ever-increasing use of protected areas for a variety of activities has led to a growing concern about the limits of their ecological carrying capacities. Areas of high ecological value, such as national parks and nature reserves, experience ever increasing pressures, from tourism at first place. In addition, new technologies make natural areas more accessible, which leads to extensive ecological impacts and to increasing conflicts between their user groups. In order to manage visitor activities and behaviour, one needs to monitor them and therefore deepen the understanding of their expectations, motivations and overall satisfaction. The MMV conference has made the first step in this direction, when it gathered scholars across disciplines and industry experts in Vienna in 2002, who all made contributions to knowledge and practice from their own perspectives. This event was considered a great success due to its multidisciplinary character, therefore the idea for follow-up conferences was supported and the conference now represents a global forum for exchanging ideas and experiences related to monitoring and management of visitors in recreation and protected areas.

There were seven previous MMV conferences held in Vienna, Austria (2002), Rovaniemi, Finland (2004), Rapperswil, Switzerland (2006), Montecatini Terme, Italy (2008), Wageningen, The Netherlands (2010), Stockholm, Sweden (2012) and Tallinn, Estonia (2014).

The 8th MMV will be held in Novi Sad, Serbia 26-30th September, 2016. It is organised by people from Department of Geography, Tourism and Hotel Management, Faculty of Sciences, University of Novi Sad. After more than two years of planning and organisational activities, we are more than proud to announce that we have more than 200 participants from almost 40 different countries from whole world!

We hope to succeed in expanding the MMV community and enhancing both natural environment and social experience.

We are looking forward to be your hosts. Enjoy your stay in Serbia, Novi Sad, and our University, or if you missed the event, please take pleasure in reading this book.

On behalf of MMV8 Organising Board,

Đorđije Vasiljević



City of Novi Sad – Urban Heart of Vojvodina

Novi Sad is the capital of the Autonomous Province of Vojvodina and the second largest city in Serbia. It is the industrial, cultural, scientific, educational, and administrative centre of Vojvodina.

Seen from above, City of Novi Sad reveals itself as a city located in a vast plain, spacious and open to all directions. Fortress of Petrovaradin, a historical site, is situated on the right bank of the River Danube, whereas a tall building of Central Post Office, massive construction of Spens Sports Centre, immense headquarter of Petroleum Industry of Serbia and elegant oval edifice of Banovina (a seat of Executive Council of Autonomous Province of Vojvodina) are situated on the left. What eyes could also perceive are green oases embodied in City parks, with labyrinth of streets and alleys meandering around them and cut across with wide and straight boulevards.

Moreover, there is the Danube as an unsymmetrical, potent axe of the City, embraced with long quay and Štrand, the most beautiful city beach along the Danube.

Nowadays, a widely recognizable symbol of the City is Exit Festival, while in the past, and even so today that place has been reserved for the Serbian cultural institutions: Matica srpska - the oldest cultural-scientific institution of Serbia, Serbian National Theatre, Sterijino pozorje Theatre Festival...

Furthermore, our City, in contrast to many other European destinations, has the reputation, by full right, of a multinational, multicultural and multi-confessional metropolis in which all differences are seen as advantages.



Department of Geography, Tourism and Hotel Management

Department of Geography, Tourism and Hotel Management was established 1962 by academician Branislav Bukurov. During previous almost half century, the Department has grown and developed, which brings it today amongst the most respectable Institutes of Geography in South-East Europe.

The main professional activities of the Department are educational/teaching, scientific/research and publishing. Educational activity is provided through bachelor, master and PhD studying programmes.

Long lasting scientific researches have been conducted through several projects funded by governmental bodies, such as "Geographic research of municipalities in Vojvodina", "Geomorphological map of Yugoslavia", "Condition and developing directions of Vojvodina", "Loess-palaeosol sequences in Serbia", "Demographic transition in Serbia" and "Regional Water Resources Investigations In The Scope Of Sustainable Development" (funded by UN).

The Department quarterly publishes two scientific journals: *Geographica Pannonica* and *Turizam*, and also the *Department's Researchers review* with the longest tradition. Besides geoscience, multidisciplinary activities of the Department also involve research in tourism, sustainable development, marketing, management, etc.

Consequently, quality lectures, adequacy and eminence of the professors and assistants result with prosper and competitive students successfully employed worldwide.

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CONFERENCE PROGRAM

25th September - Sunday

| | |
|---------------|---|
| 18.00 - 20.00 | <i>Welcoming reception and ice breaker cocktail</i> |
|---------------|---|

26th September - Monday

| | |
|---------------|--|
| 09.00 - 10.00 | <i>Registration</i> |
| 10.00 - 10.30 | <i>Opening ceremony and word of welcome</i> |
| 10.30 - 12.00 | <i>Keynote speakers Paul Eagles and Raoul Beunen</i> |
| 12.00 - 13.30 | <i>Lunch break</i> |
| 13.30 - 15.15 | <i>Keynote speakers Duška Dimović and Boris Erg</i> |
| 15.15 - 15.45 | <i>Poster session & Refreshments</i> |
| 15.45 - 18.00 | <i>Parallel sessions</i> |
| | Room 1 |
| | Managing visitor impacts |
| | Room 2 |
| | Stakeholders' approach in management of protected areas |
| 15.45 - 18.00 | Branding and marketing in nature areas |
| | Room 3 |
| | Assessment and evaluation models of protected areas |
| 15.45 - 18.00 | Festivals and events in protected areas |
| | |
| 18.00 - 20.00 | <i>Novi Sad city tour</i> |

27th September - Tuesday

| | |
|---------------|---|
| 09.00 - 11.30 | <i>Parallel sessions</i> |
| | Room 1 |
| | Onsite visitor monitoring systems |
| | Trails and routes modelling |
| | Room 2 |
| 09.00 - 11.30 | Contemporary trends in outdoor activities |
| | Environmental and landscape aesthetics and design |
| | Room 3 |
| 09.00 - 11.30 | Tourist infrastructure in natural areas |
| | Local community and nature management |
| 11.30 - 12.00 | <i>Refreshments</i> |
| 12.00 - 12.45 | <i>Keynote speakers</i> |
| | <i>Maša Ljuština and Marko Slapnik</i> |

| | |
|---------------|--|
| 13.00 - 21.00 | <i>Mid-conference fieldtrips (lunch, refreshments and dinner included)</i> |
|---------------|--|

28th September - Wednesday

| | |
|--|--|
| | <i>Parallel sessions</i> |
| | Room 1 |
| | Use of ICT in nature area management |
| | Use of ICT in nature protection |
| | Room 2 |
| 09.00 - 12.00 (10.30 - 11.00 Refreshment break) | Understanding visitors' preferences and behaviour |
| | Visitor constraints and limitations in natural areas |
| | Visitor motivation and loyalty in natural areas |
| | Room 3 |
| | Nature-based tourism products |
| | Outdoor education and interpretation |
| | Geodiversity and geoheritage |
| 12.00 - 13.30 | <i>Lunch break</i> |
| | <i>Parallel sessions</i> |
| | Room 1 |
| | Use of ICT in visitor tracking |
| | Financial planning and investments in protected areas |
| | Room 2 |
| 13.30 - 17.00 (15.00 - 15.30 Refreshment break) | Visitor motivation and loyalty in natural areas (Continued) |
| | Room 3 |
| | Environmental awareness |
| | Experiential and health values of outdoor recreation |
| 17.00 - 18.00 | Closing session |
| 20.00 - 23.00 | Dinner |

29 & 30 September – Thursday and Friday

Post-conference fieldtrips

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KEYNOTE LECTURES

Developing a National Policy on Training, Education and Research in Visitor Monitoring and Management: Lessons from Canada

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Background

Canada has a long history of creating and managing parks, at all levels of government: national, provincial, regional, and municipal. However, the country lacks policy in two important areas: 1) an accepted strategy on training and education, and 2) a national research strategy.

In April 2016 an initiative began to coordinate policy and operations of all park agencies and non-government bodies in the country. Ideas were discussed at the Canadian Parks Summit held in Canmore, Alberta, at an invitation-only meeting of policy leaders. At this Summit, a policy paper was presented by Paul F. J. Eagles from the University of Waterloo and Christopher J. Lemieux of Wilfred Laurier University, entitled: *Policy on Training, Education and Research: A Call to Action*. This MMV 8 abstract builds on that paper, and the subsequent discussions.

Training and Education

All parks and protected areas require some level of management. The activities can vary from small-scale site monitoring of a local nature reserve to massive, large-scale tourism and resource management of a World Heritage Site. Canada has thousands of people currently employed in various aspects of park planning and management. Their responsibilities can vary greatly dependent upon their location and their level within the hierarchy. In provincial and national parks, forestry and biology degrees are common as a base for employment as managers. At the ranger level, policing and enforcement is common as entry training. Fields not covered in forestry or biology education includes: law, education, political science, policy analysis, governance, planning theory and practice, labour management, economics, finance, pricing, tourism, recreation, and social marketing. Social science research methods are also usually not covered (Eagles and Lemieux, 2016). At the municipal level of parks, recreation training is paramount.

Strangely, there is very little literature that discusses the types of educational training and education that should be held by park managers. There are a plethora of programs at colleges, universities, and park agencies, which provide some aspects of management. Many of these programs simply repeat what the instructors were taught themselves, in earlier decades. None are based on national standards.

The World Commission on Protected Areas (WCPA, 2015) recommends that protected area management become a distinct profession with standards, qualifications and career structure. The WCPA recommends that by 2020 there should be a minimum of five universities world-wide that offer dedicated education programs in park management. Canada does not have a national consensus, research direction,

or curriculum that can serve as the basis for a national educational effort. As a result, there is a perception that the education is ad hoc, rather than strategic (WCPA, 2015).

The country lacks answers to basic questions such as:

1. What should be the scope of knowledge of a park manager?
2. What range of expertise should exist in a park agency?
3. What curriculum elements should constitute professional training for management?
4. How can education and training be delivered to existing staff and to future staff?
5. What should the public know about parks and protected areas?

An international effort to answer these questions will be proposed at MMV 8.

Research

All planning and management actions should be based on up-to-date research. All organizations need to constantly assess future opportunities and risks, and plan accordingly. Parks and protected areas often have substantial amounts of science-based research findings available for use. Are these data effectively incorporated into management decisions? What research data do the decision-makers need?

Research on the actual management processes of parks is sparse. However, the conservation, tourism, and resource exploitation demands made on parks are large and growing.

Eagles and Lemieux (2016) state:

There is widespread concern that Canada's current aspirations in parks exceed its capacity. A large number of park management agencies have low management capacity, too low to fulfill the mandate given by society and outlined in legislation. Many parks in Canada, and especially provincial parks, have little or no staff to carry out even basic management objectives. The level of finance is very low. The requirements placed on current staff often exceed their current educational attainment. The current level of research on planning and management is low, and in many subject areas is non-existent.

The Canadian Council of Ecological Areas (CCEA) reports that there are 7,605 protected areas listed for Canada, with a total area of 108,003,139 square kilometers. This is 10.33% of the terrestrial area of the country and .92% of the marine area in protected areas (CCEA, 2014). However, Canada is a signatory to the Convention on Biological Diversity and is bound by Aichi Biodiversity Target 11 which requires all signatories to dedicate 17% of its land surface and 10% of its marine area as protected areas by 2020. The recently-elected government of J. Trudeau has made fulfillment of these targets a priority.

Given the massive park creation effort underway, it is time to consider the development of a research strategy in park management.

In order to stimulate debate, Eagles and Lemieux (2016) propose five priority research areas that should be addressed in the next decade in Canada:

1. Management capacity and effectiveness
2. Finance and economics

3. Education and training
4. Tourism, public engagement, and visitor management
5. Policy, law and governance

The proposal is for each priority area to be the subject of a federally-funded research chair at a Canadian university. All of these would be coordinated through a National Center of Excellence, also funded by the national government. The total funding proposal is for CDN \$10,000,000 for each chair, and CDN \$50,000,000 for the Center of Excellence.

These proposals are now being vetted in Canada. They should have relevance in other countries, to various degrees. It is hoped these proposal will stimulate debate at MMV 8.



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Innovation in Protected Area Governance: Competing Models and Their Impact in Different Places

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Innovation has become a key topic in the ongoing search for more effective, efficient and legitimate forms of protected area governance. In response to changing circumstances, new management challenges, and failed policies, managers of protected areas are continuously rethinking and adapting their policies and practices and exploring new ones. Over the years it has become clear that the sustainable management of protected areas remains a difficult challenge. The huge diversity of practices shows that protected areas can be governed in many different ways and that approaches should be dynamic. Management practices regularly need to be revised in order to adapt to changing social and ecological circumstances. Managers for example need to deal with increasing visitor numbers, changing visitor' demands, environmental pressures due to recreational activities, budget cuts, or changing organizational beliefs. To some extent such changes reflect wider societal developments, such as emerging trends in outdoor activities, a changing political landscape, or economic ups and downs.

Shifting forms of governance are an important driver for innovation. Traditionally public organizations played a pivotal role, taking the lead in coordinating the different land use activities and designing and implementing a wide range of policies, laws and plans that help in protecting, managing and developing protected areas. In the last decade the role of governmental organizations has changed and increasingly attention is given to participatory and privately initiated forms of governance that give a more important role to citizens and entrepreneurs (e.g. Owley and Rissman, 2016; Van Assche et al., 2016). These shifts in governance are reflected accordingly in the strategies and instruments that actors are using to govern protected areas and manage visitor flows. Traditional hierarchical forms of governance, often focusing on conservation, are complemented and replaced with new forms that focus on participatory forms of planning, public-private partnerships, and place branding strategies. In the Netherlands, for example, we can observe a diminishing political support for strict protection, a reduction of available resources, and a growing emphasis on tourism development and branding. This urged managers of protected areas to look for new approaches, new partnerships, and new sources of income, such as recreation and tourism.

Innovation is also stimulated through the exchange of ideas, experiences and possible management models. A wide variety of models and approaches have been developed in the ongoing search for suitable forms of protected area governance. Scientific research, professional networks, NGOs, and fora such as the MMV all have contributed to a deeper insight in the various challenges of sustainable management, the possibilities and limits of particular management approaches, and they are a rich source of novel ideas and approaches. Much effort is spent on sharing experiences and learning from each other. Within this endeavor one should however

not forget that the effectiveness and legitimacy of particular models and approaches always depend on their implementation in a particular context. Approaches that have been successful in one place do not necessarily produce the same effects elsewhere. The concept of a National Park, for example, is applied in many countries, all over the world, but the ways in which National Parks are institutionalized, the ways in which they are management and protected, as well as their actual impact in various places, largely diverge. The diffusion of particular models and approaches to new places is thus anything but simple. We have for example observed this during our research in the Danube Delta, where several NGOs have been promoting models and approaches that were successful elsewhere, but that once introduced in the Danube Delta sorted a very different effect than expected based on experiences elsewhere, and regularly failed (Van Assche et al., 2011).

The context-dependent performance of particular models and approaches is not always fully taken into account when management models are evaluated and introduced elsewhere. Drawing on examples from a range of different countries we will elaborate on the difficulties that arise when certain models are promoted and implemented in a new context and put forward a perspective that can help to analyze and explain how the actual impact of such efforts are shaped by a diverse set of dependencies (Beunen et al., 2015). Furthermore we will argue that a strong emphasis on innovative projects and initiatives tends to overlook the political, economic, and ecological complexity that characterizes protected area governance. Such an approach not only fails to contribute to sustainable management practices, but might in some cases even undermine these.



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Values and Benefits of Protected Areas as Potential for Sustainable Development

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Demographic change is a challenge for many remote regions in Europe when it comes to the development of long term sustainable development strategies. While large scale investments often suggest new jobs and economic growth, the possible impacts of new regional development projects on natural resources and nature conservation are neglected. As a consequence, the opportunities and threats of regional development as well as the role of nature as a capital for local economies are rarely known. On the one hand the decreasing populations offer more potential for extensive agriculture, wilderness or sustainable tourism arising from additional land-use options and on the other hand the regions are facing the challenges to enhance the attractiveness and economic prosperity. This means that innovative solutions are needed to combine sustainable regional development that builds on the potential of nature conservation and natural resource management within sustainable and resilient local economic.

In order to better understand the ecologically sustainable territorial development the Protected Areas Benefit Assessment Tool (PA-BAT) was used to assess the protected areas in the Balkan ecoregion an area with a rich natural and cultural heritage. The PA-BAT is a new tool developed and tested by Equilibrium Research, WWF and partners. It was the biggest ever participatory assessments of protected areas benefits at the regional level, 60 workshops held in protected areas with more than 1,200 participants. This kind of workshops are an effective way of gathering and focusing public input at the early stage of protected area management planning process, but also motivation for their continued involvement in following stages.

This region within the geographical scope of the Protected Areas Benefit Assessment is recognized as one of the highest biodiversity areas of Europe, with large tracks of natural and cultural landscapes, hosting the full array of wildlife specific to the region. Parts of the region are recognized as having high quality biodiversity features of global importance, i.e. having terrestrial, freshwater and marine habitats listed in WWF's Global 200 Ecoregions. The region hosts large and almost unspoiled forests and healthy populations of large carnivores (bear, lynx, wolf, golden jackal), and very valuable marine and freshwater ecosystems. However, these qualities are under threat due to the current economic crisis and previous socio-political circumstances. The effects of rural abandonment and degradation of the natural environment are having severe impacts on the livelihoods of many rural communities in the region. The potential for tourism is high, particularly so in the coastal areas, but also in the mountains where cultural, heritage and adventure aspects add value to traditional tourism. Tourism has many potential benefits for local development, but unregulated tourism can be a major threat to protected area objectives.

The overall aim of the PA-BAT is to develop new approaches for and demonstrate how local economies can benefit from a combination of nature conservation and new economic activities that help generate green jobs. The PA-BAT aims to inform protected area managers and all relevant stakeholders about the range of values and associated benefits in protected areas, and introduce a participatory process for engaging a range of stakeholders in identifying and communicating issues of local, regional and national importance to protected area managers. WWF now has a database of information about benefits from approximately 50% of the protected areas in the region.

Top identified benefits were: tourism, forestry, water use, jobs in protected areas and livestock. According to the results of Protected Areas Benefit Assessment about 53% of analyzed protected areas have major economic gain from tourism. Within countries it is uneven distribution of economic gain from tourism, mostly to businesses and governments. The concept of ecosystem services was mostly not recognized by the participants during the PA-BAT workshops.

Ecosystem functioning involves a series of complex processes relating to the cycling of energy, water and nutrients: energy capture from the sun; regulation of water flow; soil building and stabilisation; accumulation of carbon etc. The term 'ecosystem services' describes a wide range of benefits that human society gets from functioning ecosystems, and the Millennium Ecosystem Assessment identifies four types: supporting, provisioning, regulating and cultural services. As humans increasingly impact the natural world, the importance of protected areas in protecting and restoring natural habitats is the subject of much academic and policy interest, but lately business sector as well. The concept of business planning for protected areas has developed in recent years as a mechanism to aid long-term sustainable financing for both protected area management and the development of wider community benefits. The business planning for protected areas should focus on conserving its major values.

The PA BAT gives the guidance how to reach effective involvement of local communities in the management plan planning process and how to integrate management plans with local development policies and strategies. The success of the protection and management of the protected areas depends on numerous stakeholders whose actions are connected to nature.

Protected Areas-Delivering on Global Conservation Goals and Targets

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Tourism, conservation of biodiversity and community well-being have proved to be intimately linked processes throughout much of the recent history of nature protection. Admiration for nature and wildland visitation were among the primary reasons for the establishment of first protected areas in the second half of the XIX century, which marked the commencement of the modern era of nature conservation. Ever since, the importance of tourism and recreation in achieving nature conservation goals has steadily grown. Today, tourism is widely regarded an increasingly relevant tool for biodiversity conservation and a key driver of national, regional and local economic and community development. Hence the growing recognition of the role that tourism plays in sustainable management of natural resources and community development.

In an attempt to capture the full complexity of relationships and interlinkages between nature conservation and development, tourism in protected areas has been encapsulated in major global definitions and standards on nature conservation and sustainable development. The International Ecotourism Society (TIES) defines ecotourism as “responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education” (TIES, 2015). The modern concept of ecotourism is based on three main pillars: conservation, communities, and sustainable travel. The International Union for Conservation of Nature (IUCN), the world’s largest nature conservation network, on their part defines a protected area as “a clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values” (Dudley, 2008). Further down the line, IUCN groups all protected areas into six management categories, all of which, except for Strict Nature Reserves, recognise tourism as an important management objective and conservation tool.

Table 1. IUCN Protected Area Categories and their relevance to tourism and visitor use (source: Leung, 2015)

| IUCN Protected Area Category | Primary goal and protected value(s) | Relevance to tourism and visitor use |
|------------------------------|---|--|
| Ia- Strict Nature Reserve | Biodiversity or geoheritage protection (ecological and scientific values) | <ul style="list-style-type: none">· Most visitor use (commercial tourism or recreation visitation) is prohibited· Public access only possible through organised scientific, citizen science or volunteer service programmes |

| IUCN Protected Area Category | Primary goal and protected value(s) | Relevance to tourism and visitor use |
|--------------------------------------|---|---|
| Ib- Wilderness Area | Protection of the natural character and condition of unmodified or slightly modified areas (wilderness and ecological values) | <ul style="list-style-type: none"> Low-density visitor use is often a management objective Restricted public access in terms of amount of use, group size, activity type, etc. Commercial tourism activity limited and highly regulated (e.g., special use permit) |
| II - National Park | Protection of an ecosystem and its large-scale ecological processes (ecological, recreation and community values) | <ul style="list-style-type: none"> Visitor use and experience is often a management objective A range of recreation opportunities are typically provided through zoning, facility development and visitor services |
| III - Natural Monument | Conservation of specific natural features (ecological, recreation and community values) | <ul style="list-style-type: none"> Visitor use and experience is often a management objective Recreation opportunities are typically provided to facilitate feature protection and public understanding |
| IV - Habitat/Species Management Area | Conservation through management intervention (ecological, community and recreation values) | <ul style="list-style-type: none"> Recreation visitation and commercial tourism is usually a management objective A range of recreation opportunities is provided with associated facilities and services Commercial tourism common |
| V - Protected Landscape/Seascape | Landscape/seascape conservation (community, ecological and recreation values) | <ul style="list-style-type: none"> Recreation visitation and commercial tourism is usually a management objective A range of recreation opportunities is provided with associated facilities and services Commercial tourism common |
| VI - Managed Resource Protected Area | Sustainable use of natural ecosystems (community, recreation and ecological values) | <ul style="list-style-type: none"> Recreation visitation and commercial tourism can be a key objective A range of recreation opportunities is provided with associated facilities and services Commercial tourism common |

More recently, tourism has carved its way into several major global sustainable development and nature conservation processes including the UN Sustainable Development Goals (SDGs), Convention on Biological Diversity's (CBD) Strategic Plan for Biodiversity 2011-2020 and the Aichi Biodiversity Targets. All these processes affirm the importance of protected areas in providing solutions to pressing global challenges such as biodiversity loss and depletion of ecosystem services, community development, and poverty alleviation. In recognition of the increasing role of tourism in the protection of natural heritage and sustainable development, the Secretariat of the Convention of Biological Diversity published the Guidelines on Biodiversity and Tourism Development (CBD, 2004).

Some of the most telling examples of benefits from tourism in protected areas stem from their role in generating income and ensuring human well-being. A research conducted in six Biosphere Reserves in Germany between 2010 and 2013 has shown that the gross tourist spending of the investigated biosphere reserves sums up to a total of nearly one billion Euros, which results in 28,000 income equivalents. These figures show that Biosphere Reserves are an economic factor and thus crucial for employment in rural areas (Job, 2013). In Finland, the self-defined worth of health benefits experienced by all national park visitors in 2013 has been calculated at EUR 226 million in total (Kaikkonen, 2014). Other benefits stemming from tourism in protected areas include a range of economic, environmental, social and cultural issues.

Despite numerous opportunities, it is important to note that the development and management of tourism in protected areas is associated with a range of challenges and risks. Some of these are double-edged, such as the importance of reducing negative impacts of development on the natural environment (e.g. avoiding developing in sensitive ecological areas), while maximizing the benefits for conservation (e.g. generating revenue to finance conservation activities, alternative livelihoods for local communities). In protected areas, tourism should not take place at the expense of biodiversity loss, or mean that local people have more limited livelihood opportunities (Leung, 2015).

At the regional level in South East Europe, along with transition toward more market-oriented economies, there is a growing trend of tourism development and visitation in protected areas. Protected areas are increasingly seen as part of national and local economic development agendas, promoted by both the public and private sectors. Yet, the growing pace of nature tourism in protected areas is often not followed by proper management planning, tourism infrastructure, nor there are adequate capacities for interpretation and visitor management with protected area authorities, local communities, and tour operators.

In trying to ensure the highest international standard in sustainable tourism management, several protected areas in South-Eastern Europe have been recently granted the European Charter for Sustainable Tourism in Protected Areas, an initiative led by the EUROPARC Federation, the largest professional network of protected areas in Europe. Other major regional initiatives set to promote responsible tourism in protected areas and sustainable local development include the Via Dinarica, nearly 2,000 km-long hiking trail across the Western Balkans that connects countries and communities along the Dinaric Alps, and the European Green Belt initiative, an ecological corridor aimed at promoting transboundary cooperation and community development along the former Iron Curtain.

What remains to be seen and properly monitored is, how effectively protected area authorities will manage to cope with the increasing trend in tourism and visitation in protected areas, on the one hand, while the public and tourism sectors need to demonstrate their ability to incorporate and implement the state-of-the-art sustainability principles and standards in the programming and implementation of tourism initiatives and activities in and around protected areas on the other.



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Visitor Management and Monitoring in Croatian Protected Areas

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Introduction

Croatian protected areas (PAs), especially national and nature parks are often emphasised as main natural attractions in Croatia. Green Tourism Action Plan sees Croatia as a leader of tourism based on natural heritage and sets several goals for development of sustainable tourist offer within and around PAs (Ministry of tourism, 2016). In addition, different projects on national level have goals to develop tourist offer and marketing of PAs focusing primarily on nature and national parks. In recent years there is also a raise of funds available for PA visitor infrastructure, although many already have educational trails, info centres etc. Even though some PAs have high and some low numbers of visitors, most national parks, with oscillations, show growth (SINP, 2014). Since, there is a growing interest for visiting protected areas globally (IUCN, 2015), we could ask ourselves are we prepared to manage visitation?

In the final draft of the 2016 National Biodiversity Strategy and Action Plan of the Republic of Croatia most of the goals concerning visitation are connected to the overall purpose of raising the level of knowledge, understanding and supporting nature conservation. Still, within the goal of standardization of all aspects of management, a need for integral systems of interpretation and visitor management in PAs is recognized (MENP, 2016).

Management of visitation

To prepare Protected Area Management Authority (PAMA) to evaluate their quality of visitor management CAEN created an evaluation framework through adapting Eagles et al 2014 plan policy categories to the Croatian context. Our preliminary results are based on prior analyses and reports as well as management plans content analyses. We identified five key areas and 30 categories within these areas. Firstly, we identified the importance of assessing their capacity to manage visitation including the visitor infrastructure they have. In assessment of capacity development needs of Croatian PA staff, training in recreation and tourism was recognised as one of the priorities (Appleton et al, 2014). PA staff could mostly acquire these competences through practice. Besides the individual, limited institutional capacities (SINP, 2014) should be considered. Another two key areas were: programs and services for visitors as well as communication and promotion. Most PA management plans have a part dedicated to the development of programs or service connected to

visitation and some channels of communication in place. What is lacking is an integral and systemic approach to these topics and more evaluation (SINP, 2014). In the period from 2012 till 2015, number of concession approvals was slowly increasing and almost 30% of all approvals were connected to tourist services and around 70% for trade or transport connected to provision of services. What could be improved is to have standardized criteria for concession approvals on a systemic level. We also identified recommendations and limits of visitor use and activities in PA as a key area. An existing measure that restricts activities in PAs is zonation. Visiting is prohibited in highly strict protection zone and allowed if regulated by PAMA in the strict protection zone. Other zones do not limit visiting (SINP, 2013). Our preliminary management plan analyses showed that regulation of use is less developed. That could be connected to the lack of control and standardized way of collecting data on visitors. Some PAMAs do not control or charge entrance because of spatial features although they do count visitors that participate in educational programs, events and guided tours or for specific objects. To our knowledge only one institution without entrance control calculated the total number of visitors by another method (Eco counters) (SINP, 2014). Continuous monitoring whether or not visitors have a negative impact on values as well as monitoring of visitor experience was also identified as a key area given that it was stated as non-systemic in prior analyses (SINP, 2014). Additionally, Management Effectiveness Tracking Tool results for 2012 and 2014 showed that as far as the endangering of values of the area by the development of tourist and recreational infrastructure and activities of visitors is concerned, one third of all parks stated a high level of threat. A few parks stated a medium level of concern and most of them see these activities as a low threat to their values (CAEN, 2015). Visitor experience monitoring is done through questionnaires focused mainly on general public. Twelve PAs, mostly the ones with higher pressures and visitor numbers, did some kind of visitor surveys in the last ten years. They questioned visitors to find out about demography, attitude, satisfaction, motivation, needs, time of stay or visited locations, willingness to pay etc. (Dujmović et al, 2015). The final key area was engaging local communities and stakeholders in visitation or tourism management. In Croatia participatory planning is recommended and conducted, but forming a stakeholder body with tourism stakeholders is still an exception, although it was done through several sustainable tourism planning processes, including acquiring charters for sustainable tourism.

Conclusion

In summary this evaluation could help standardize visitor management and monitoring in Croatian PAs and improve PAMAs capacity to plan and conduct visitor management with an understanding that not all categories can be applicable to each PA. One of the key messages from Little Sidney conference was that we should be “using PAs as a powerful tool to create inspiring experiences which will trigger positive emotions with visitors and help to build a constituency for conservation”. This could be achieved only if we have the capacity to manage visitation without endangering the values and visitor experience.



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Interpretation as a Soft Approach to Visitors' Management in the Case of Slovenia's Nature Parks

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My research in the Slovenian protected areas deals with implementation of principles, methods and means of interpretation for the needs of visitors' management.

The main interpretation themes and means used in Slovenian parks have been analyzed, including all Slovenian parks with management: one national park, three regional parks and seven landscape parks. The analysis showed that the basic principles of interpretation for the needs of visitors' management are at least partly used in Slovenian parks with a park management. However, there is still a wide range of unexploited possibilities. In recent years, the park managers have become more aware of quality interpretation, so the latest infrastructure is better designed and used. There is also a number of personal approaches that include quality interpretation – experienced guided walk, living history role-plays and interactive performances are the fastest developing approaches.

Interpretation has developed a lot in the last decades from the viewpoint of communication. In 1957 Freeman Tilden wrote six basic principles of good quality presentation that are still valid today:

1. Any interpretation that does not somehow relate with what is being displayed or described to something within the personality or experience of the visitor will be sterile.
2. Information, as such, is not Interpretation. Interpretation is revelation based upon information. But they are entirely different things. However, all interpretation includes information.
3. Interpretation is an art, which combines many arts, whether the materials presented are scientific, historical or architectural. Any art is in some degree teachable.
4. The chief aim of Interpretation is not instruction, but provocation.
5. Interpretation should aim to present a whole rather than a part, and must address itself to the whole man rather than any phase.
6. Interpretation addressed to children (say, up to the age of twelve) should not be a dilution of the presentation to adults, but should follow a fundamentally different approach. To be at its best it will require a separate program.

Interpretation analysis in Slovenian parks was based on following those six basic principles:

1. connection with a personal experience
2. interpretation as a revelation
3. the art of connecting different fields
4. provocation
5. illustrating the whole
6. interpretation for children is different

The following main interpretation topics emerge in the studied Slovenian nature parks:

- NATURA 2000: People with nature – nature for people.
- Triglav National Park: Learning. Experiencing. Understanding.
- High-trunk meadow orchards.
- Periodic lakes and the richness of karst phenomena.
- The richness of the underground world.
- The habitat of rare and endangered species.
- Life of a river.
- Picturesque mosaic cultural landscape.
- Living cultural heritage.
- Landscape- and biodiversity.
- Glacially transformed Alpine valleys.
- A coexistence of man and nature.
- Traditional production of salt.
- Bird watching, observing of other rare animals and plants.
- Flysch steep cliffs, the highest in the Adriatic.

The interpretative resources are more or less adapted to key topics and are in most cases very informative oriented:

- **visitors centres:** there is a great emphasis on informing, certain interpretation skills are also represented to some extent;
- **museums and thematic exhibitions:** they vary greatly, very few of them are well planned in terms of quality interpretations of key topics;
- **audio-visual means:** some thematic films are well planned and present an interpretive topic, such as Secrets of Soča;
- **web presentation:** they are mostly informative and offer many possibilities for upgrades, which should be based on the principles of interpretation ...
- **thematic paths:** they are mostly more learning than experience oriented, but the latest are better adapted to the interpretive principle;
- **workshops and interactive presentations:** e.g. felt-making and knitting workshops, cooking and baking of traditional delicacies workshop, workshops for the blind and visually impaired, workshops for schoolchildren and etc. offer many options of quality experiences;
- **thematic events:** e.g. Alpine Wildflower Festival, Festival of Kozjansko apples ... can show integration of the topic in a broader context;
- **signs, billboards and printed materials** are often primarily of informative in nature;
- **mobile information point TNP:** mainly for information and occasionally to excite the interest of visitors;
- **postcards, souvenirs, thematic monographs:** there is still great potential for the development of interpretative approach.

The main topics and accompanying interpretation means serve the visitors as well as the park management regarding the place and time scheduling and concrete

suggestions. They also include practical suggestions, also on the subconscious level, to prepare useful activities which are nature friendly and also tempting for local inhabitants.

From the above examples we can conclude that the interpretation with clear aims from the perspective of visitors' management can also be used outside the protected areas. As an example I would like to give a tourist destination Logarska dolina - Solčavsko. The area covers 103 km². More than 80 % of the area is protected by two landscape parks and Natura 2000 network.

A multipurpose center for sustainable development - Center Rinka has been established by the municipality of Solčava. It integrates various activities of sustainable development in tourism and brings new development opportunities for the locals in conjunction with the conservation and presentation of the natural and cultural environment. Interpretation infrastructure, guiding of visitors in nature in relation to the cultural heritage of the area allow genuine experience of the key interpretive themes.

Most of the researched cases of interpretation lack systematic planning, answering the question: what do the visitors learn, what should they feel and what should they do.

A well planned interpretation with clear aims can contribute greatly to visitors' management. This means a great benefit of the quality of experiencing as well as the natural environment conservation.



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MANAGING VISITOR IMPACTS

Monitoring National Park Visitors – Short and Long Term Changes

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Tourism and recreation in protected areas receive an increased recognition among both managers and researchers worldwide. A recent study of protected area visitation globally shows that eight billion visits per year generate approximately US \$600 billion per year in direct expenditure (Balmford et al., 2015). In order to ensure high quality experiences and long-term sustainable tourism operations, protected area managers have to pay attention to the different types of visitors, their attitudes and behaviors (Eagles, 2014). This can be achieved through different visitor monitoring schemes designed and applied in accordance with site characteristics and visitation patterns (Kajala, 2007). The current study compares results from visitor studies at Fulufjället National Park (FNP) in 2001 (the year before the park was established), 2003 (the year after the park was established), and 2014 (12 years after the park was established). In doing so, short and long term national park designation effects can be analyzed. The establishment of FNP marks an important trend in Swedish environmental policy as it is the first national park where planning and implementation explicitly builds on visitor data in order to promote recreation and tourism opportunities.

Visitor monitoring at Fulufjället National Park

FNP is a cross-boundary national park between Sweden and Norway, located in the southern mountain region of Sweden (Figure 1). The Swedish part was established in 2002 and ten years later, in 2012, the park was extended as the Norwegian part of Fulufjället also received national park status. The main purpose of FNP is to preserve an area in an essentially unspoiled condition. Since the Fulufjället is not utilized for reindeer grazing, it has large areas covered by lichen unique for the Swedish mountain region. The area is also known for its wildlife populations, including bear, moose and nesting birds of prey. Fulufjället exhibits extensive outdoor recreation facilities, with 140 kilometers of marked trails, and several cabins for overnight stay. Njupeskar, Sweden's highest waterfall, is a popular tourist attraction in the northern part of the area.

Visitor surveys were done in the summer seasons of 2001, 2003 and 2014 by means of automatic trail counters, self-registration cards and follow-up visitor surveys (Fredman & Wikström, 2015). Visitor data was gathered with the help of self-registration boxes at eight different locations (Fredman et al., 2009). The number of on-site registration cards collected were 6,151 in 2001, 4,107 in 2003 and 3,419 in 2014, and the number of responses to the follow-up surveys were 1,497, 1,245 and 1,425 for each year respectively. In 2001 and 2003, respondents to the on-site registration cards received a follow-up postal survey, while in 2014 the postal survey was replaced by an online electronic questionnaire.

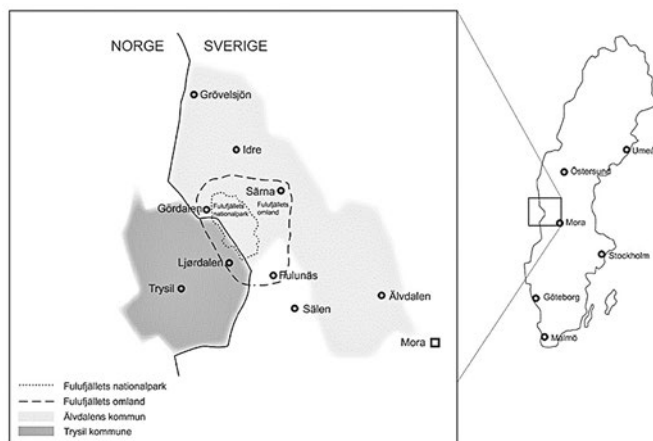


Figure 1. Fulufjället National Park

Short and long term changes

Following the Swedish national park designation in 2002 the area received a 40 per cent increase in visitation, from 38,000 visits in 2001 to 53,000 visits in 2003 (Fredman, et al., 2007). Data from the visitor survey in 2014 show that visitation has dropped since 2003 to levels only slightly higher than the year before the park was established (Fredman & Wikström, 2015). This change is confirmed by counts at the entrance of the FNP visitor center.

Based on data from the three follow-up surveys, the following observations are made regarding changes among visitors at FNP;

- More visitors know FNP in a National Park in 2014 compared with 2003, but fewer visitors consider the National Park status a motive to visit the area.
- The average length of stay decreased between 2001 and 2003, but increased significantly again for 2014.
- The proportion of visitors doing short hikes has decreased, and the proportion doing longer hikes has increased, in 2014 compared with both 2001 and 2003.
- The proportion of visitors that visited the remote part of the park (zone 1 – wilderness zone) increased from 5% in 2003 to 11% in 2014.
- Lack of marked trails is much more of an issue in 2013 compared with both 2001 and 2003. So is also concerns regarding littering and lack of trash cans in 2014 compared with 2003.
- Attitudes toward tourism development in the gateway area are more positive in 2014 compared with 2003. In particular, a higher supply of activities is demanded.

Conclusions

Fulufjället National Park was the first Swedish National Park where recreation and tourism had a considerable emphasis in both planning processes and implementation. Analyses of the three visitor surveys reported here show that visitation in 2014

has decreased to levels just slightly higher than the year before the national park was established. Visitors do, however, stay longer and they visit the more remote parts of the park to a larger extent. The collected data will provide a valuable source of information for further development of the visitor based management and tourism strategies in the gateway area.



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The Program for Visitor Management at Monte Alban, Mexico: A Strategy for Managing Mass Tourism through Junior Volunteers

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A common problem among those grand World Heritage Sites such as Angkor, Taj-Mahal, Great Wall of China, or the Roman Coliseum is the unrelenting pressure of mass visitation, a continuing presence regardless of season or circumstance. Site managers and service providers know few respites and must plan their relationship with visitors as of constant demand. Most cultural and natural sites open to the public, however, experience periodic fluctuations in the flow of visitor traffic, i.e., across a year will have peak, moderate, and low seasons, often quite predictable because they coincide with calendars governing visitor mobility such as school calendars or public celebrations. In Latin America peak periods for domestic tourism frequently coincide with major flows of international tourist traffic, confronting sites with dramatic though predictable swings in the volume of visitors within a relatively short time.

Managing Monte Alban's Visitor Traffic

Monte Alban, a World Heritage Site in Oaxaca, Mexico, confronts the challenge of addressing substantial fluctuation in visitor traffic across the year. With approximately 700,000 visitors each year it struggles to maintain an acceptable international standard for the quality of visitor experience while protecting the vital qualities of the site. Visitor pressures soar during three periods during the year: Holy Week, the Guelaguetza dance festival in the nearby city of Oaxaca in mid-July, and the Christmas – New Year vacations at the end of the year. The state of Oaxaca, one of the poorest in Mexico, nevertheless attracts tourism due to its rich archaeological heritage, vibrant local culture, reputation for grand cuisine, and creative crafts. Thus three times yearly a surge of visitors may increase Monte Alban's weekly count by five-fold or more, continually threatening to overwhelm its limited staff.

One complication is the federal budget process sends the income generated by Monte Alban to central agencies in Mexico City that then return it across the budget year. This means that resource availability does not always coincide with resource demands. And beyond the matter of problems with a budgeting calendar lie the realities that visitor services at Monte Alban must compete with not only other archaeological sites but all of the other demands for federal funds such as education, health care, public safety, and infrastructure. Thus site management cannot count on budget support alone to meet the needs and expectations of eager visitors.

Structural accommodation

One approach Monte Alban's site managers have pursued has been continuing attention to planning and organizational arrangements intended to produce as much value as possible for each peso spent. In 1997 Monte Alban introduced the first site management plan in Mexico, an attempt to rationalize efforts by creating departments of Research, Conservation, Maintenance and Security, Dissemination (which includes Visitor Services) and Administration. Dissemination has focused heavily on outreach and visitor contact, taking responsibility for the site museum, educational services, and coordinating an increasingly-complex Visitor Attention Program which moves into action during the periods of peak visitor traffic in Holy Week, the Guelaguetza, and the Christmas holiday. Structural accommodation seeks to smooth interaction among departments to assure effective services while holding down costs, such as assuring Maintenance alters the schedule for trash removal to align with heavier visitor demand. It also seeks to reinforce visitor protection and wellbeing by creating a temporary medical post staffed by the Red Cross, arranging the temporary presence of local traffic police, and a temporary tourist services desk. During the Christmas-New Year's week visitors sometimes exceed 8000 daily, and total staff on site may temporarily reach 200.

Volunteer Rangers

Structural accommodation reflects an institutional response to the burdens of periodic surges in visitor traffic as Monte Alban address the demands via internal adjustment and collaboration with external actors. But the need for additional support also created an exceptional opportunity to draw on the human resources of neighboring communities and thereby reinforce a sense that Monte Alban belongs to them, not just the tourist trade. To do this Monte Alban created a program referred to as *Custodios Voluntarios*, often referred to as Junior Rangers. It draws on the happy coincidence that the three periods of heavy visitor traffic occurs during school vacations in local communities. Monte Alban seeks out volunteers from nearby schools and different grade levels to spend two weeks directing groups of visitors and looking after monuments. Site archaeologists provide them with basic information and training as well as some equipment and food. The Junior Rangers become a supplementary team assisting with visitor control while nurturing a sense of site ownership and interest. Roving archaeologists provide encouragement, support, and information. Domestic and international tourism alike responds positively to encounters with children protecting local heritage. At the end of the program the Junior Rangers enjoy a party and receive diplomas thanking them for their service.

Conclusion

Structural accommodation offers a way to mobilize internal and external organizational capacity to better respond to variations in visitor demand. The Junior Rangers build links to neighboring communities, create a sense of identification with Monte Alban, and remind us of the importance of the human element in protecting natural and cultural heritage. Both approaches contribute to visitor management in the face of stress.

Dispersed Visitation in Mexico's Mountains: Challenges to Sustainable Management

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Introduction

References to “managing and monitoring visitors” generally bring to mind the grand concentrations of visitors thronging Angkor Wat, the Coliseum of Rome, or Teotihuacan, locations that by their fame and accessibility draw large numbers from around the world. Management becomes in effect synonymous with crowd control, carrying capacity, and dealing with periodic surges in visitation related to seasonal vacation periods or other circumstances influencing visitor flow. Rarely do we think of low or sporadic flows or tourism as presenting their own challenges, particularly when institutional support and management processes themselves confront serious constraints. In this paper we examine challenges to sustainable management under conditions of emerging but minimal, intermittent visitor traffic in mountain sites where historically such visitation has been non-existent.

Methodology

Unlike concentrated, focused visitor traffic to beach resorts or the World Heritage Sites of Monte Alban and Mitla, mountain tourism in the southern Mexican state of Oaxaca is dispersed over a wide area of rugged terrain having the greatest cultural and ecological diversity of any state in the country. Over the past twenty years visitors motivated by the desire to explore such diversity have filtered into the mountains individually or in small groups, influencing communities to consider “bottom-up” strategies for promoting and consolidating visitor traffic. Across this period the authors have worked with communities and organizations to assist planning, organization, and operation of local-level support systems. Between us we have more than seventy years of experience in community resource management and we draw from this experience to discuss two models emerging through both trial-and-error and imitation/adaptation. In a sense we use composite organizational ethnography based on the last twenty years of direct experience with multiple communities as they struggle with the need to create management models enabling them to respond to a critical question: how may they shape management models enabling them to address modest and somewhat unpredictable demand patterns in the face of serious resource scarcity? Thus the paper draws on participant-observation across twenty years to explain the emergence of two community-level approaches to visitor management.

Note the difference in scale and complexity between mass tourism and dispersed tourism settings. The annual volume of tourism in a typical mountain community may be the equivalent of one day of off-season tourism in a major site such as Monte Alban. Consequently management and monitoring consists not of administrative offices with written records and databases but individual memories, scraps of paper

in a drawer, and significant events such as the opening of a museum or construction of a road. Under such conditions the formalities of method give way to the realities of teasing out useful information from community “noise” of ten or fifteen years ago.

As we moved through our organizational analysis we focused on four areas: planning, resource allocation, conflict resolution, and decision-making.

Results

Two management models emerged from our analysis. The *community collaboration model* builds on longstanding traditions of uncompensated service to the community via participation on committees delivering or overseeing the provision of water, education, road maintenance, or other critical needs. Some communities have local museums and the pattern is to assign responsibility for visitor management to the museum committee on the assumption it is most likely to have interaction with visitors. The *community commercialization model* sees visitor management as part of a package of services to be sold to outsiders to generate income, much as communities might sell crops or firewood. This model also sees community control over visitors as a central concern so access is determined through a community body, not private vendors. Both models emerge from pre-existing institutional arrangements rather than by imposition from senior levels of government or other external actors.

Community commercialization is most likely to emerge where communities already have public organizational structures managing commercial transactions with outsiders. For example the Pueblos Mancomunados in the northern mountains of Oaxaca has a history of selling forest products through a community-owned enterprise. As it became evident visitors sought access to the forest for recreational purposes the communities banded together to form Expediciones Sierra Norte, selling access, recreation services, and lodging, keeping profits in community hands. The neighboring village of Santa Ana del Valle, with a community museum centered on its long weaving tradition, assigned much visitor management to its museum committee as the critical point of contact. Visitor management was seen as a service to the community, not as a direct source of income. Committee members are expected to collaborate in attending to visitors because it is their duty as community members.

Based on experience in more than twenty communities the paper addresses the dynamics of community action with respect to visitor management. One critical finding is that neither community collaboration based on traditions of community service nor community commercialization, based on the commodification of non-extractable resources, has proven to be sustainable under current circumstances. The challenge to alter those circumstances or to find a new model continues.

The Actual Situation and the Attitude of Visitors toward Feeding of Wild Animals in the Japanese Suburban Forest

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Introduction

Feeding of wild animals takes various forms from rare species conservation to tourist attractions in all parts of the world (Dubois & Fraser, 2013). Feeding gives joy to humans as a type of the outdoor recreation. On the other hand, effects on ecosystems such as dependence on artificial feed, unnatural expansion of populations, or behavioral change in migratory birds cause concern (Orams, 2002).

Further, feeding bridges the distance between the person and the wild animal, and this can be seen as a negative or positive factor. Some believe that the opportunities for contact with the wild animal brought by feeding are useful for environmental education. On the other hand, evidence that feeding can lead to an animal becoming aggressive toward other animals and humans, because of competition for the feed, and that feeding increases the risk of spread of infectious diseases between man and beast are concerning.

In Japan, the number of local governments prohibiting feeding of wild animals in municipal bylaw has increased recently. Feeding of brown bears, wild boars, and Japanese monkeys for recreational purposes is prohibited in some municipalities.

In Sapporo City, feeding of squirrels and wild birds in the suburban forest is causing concern, and conflict with other visitors is increasing (Aikoh & Wei, 2013). The manager cannot take specific countermeasures, because feeding is not prohibited in the suburban forest. Therefore, it is becoming necessary to understand the attitudes of visitors for feeding.

In this study, we investigated the actual situation regarding feeding of wild animals in a suburban forest, and visitors' attitudes towards feeding activities, proper distance from wild animals, and the necessity of countermeasures against feeding. We aimed to propose suggestions based on our results for the future management of the suburban forest in Sapporo city.

Method and Research Site

In this study, we looked at nature trails in Maruyama Park of Sapporo City where the influence of feeding on small animals and wild birds was causing concern.

We surveyed the nature trail regularly for 60 days for one year from the autumn of 2014 and recorded the frequency of leftover of feed, the kind of feed, the animal that appeared, a number and location of the visitor who fed the animal.

In addition, we distributed a questionnaire to visitors to the nature trails and asked that it be filled and returned by mail. The questionnaire included questions such as personal attributes, attitudes toward wild animals, attitudes to feeding, views on the desirable distance from wild animals, and necessity for countermeasures against feeding.

Regarding the desirable distance from the wild animal, we applied a method to measure the social norm of acceptable change (Kim & Shelby, 2006) and asked respondents to evaluate an illustration showing varying distances between a wild animal and humans. In Maruyama Park, we distributed 500 copies each in June and October and received 548 copies of valid returns.

Result and Discussion

In a periodical survey, we identified leftovers at 7.2 feeding spots of feeding on average per a survey visit (434 spots for 60 days), and 2.25 people fed the animal per a survey visit (90 people for 60 days). Sunflower seeds, walnuts and pumpkinseed made up most of the feed observed. The animals attracted by the feed were mainly squirrels, small birds, and chipmunks.

In the questionnaire survey, feeding of a wild animal was mainly considered negatively. The dependence of an animal on the feed and the aggressive behavior of an animal toward other animals and humans were the issues most often mentioned as concerning. A small number of respondents considered feeding as a fun activity that increased the opportunity for contact with wild animals.

The desirable distance from the wild animal varied according to the species of the animal (Fig.1). Respondents recognized that a distant encounter with a brown

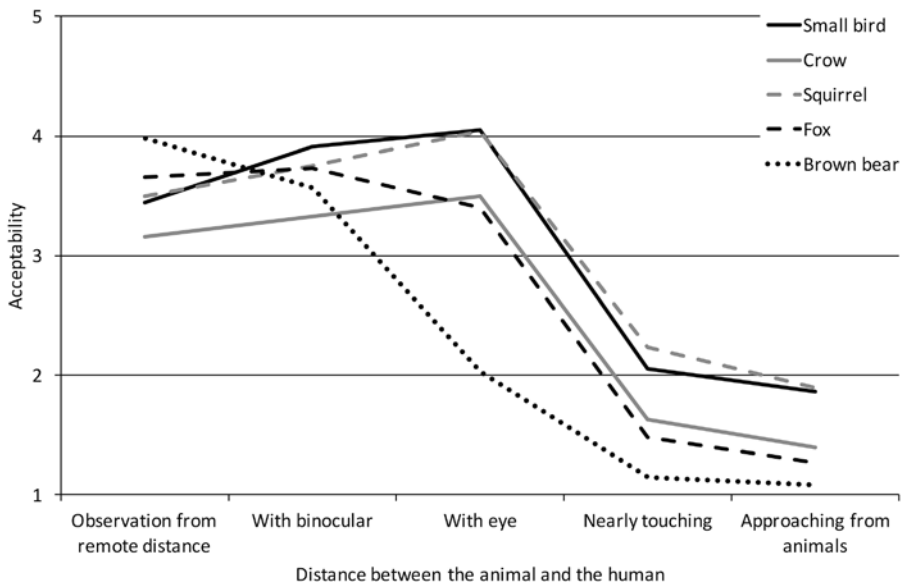


Figure 1. Norm curves for the distance between wild animals and humans.

bear was the most desirable. For small birds or squirrels, respondents recognized that a distance close enough to view the animals with the naked eye was desirable. Acceptance of reducing distances between animal and observer was lower for the brown bear than for the small bird or the squirrel. The norm crystallization for the brown bear was the highest.

More than 80% of the respondents thought that a countermeasure to feeding was required. Indirect methods, such as the provision of information, were expected for feeding of small animals and a severe countermeasure such as some penalty was expected for feeding a brown bear or a fox.

Respondents who considered the influence of feeding as favorable felt that closer distance to small animals was desirable and that preventing feeding was not necessary.

Conclusion

Feeding of wild animals was perceived negatively by most of the respondents and countermeasures were recognized as necessary, but attitudes varied depending of the species of the animal. Some respondents were in favor of feeding, and their views on countermeasures were different.

The manager has to examine countermeasures considering these disparities. The manager might start with direct countermeasures to feeding of brown bears and foxes to which visitors are likely to easily agree, whereas it is desirable to take indirect measures such as data collection on the influence of feeding and the provision of information to visitors about feeding of squirrels and small birds. Further studies are necessary for other locations and species in future.

Acknowledgement

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Experimental Long-Term Evaluation of a Campaign to Reduce Freeriding-Wildlife Conflicts of Snow Sports

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Introduction

The appearance of outdoor recreation activities has increased significantly all over the world (Manning & Anderson, 2012) as well as in Switzerland (Hunziker et al., 2011). This development can lead to conflicts, in particular between snow-sports participants and native wildlife populations in subalpine areas (e.g. Arlettaz et al., 2007). The Swiss and Austrian campaign “Respektiere deine Grenzen” so far successfully reduced such conflicts by positively influencing the respective behaviour of people who engage in ski-touring and snow-shoeing by means of information and sensitization (Immoos & Hunziker, 2015).

However, it has been known that one group of snow-sports participants can hardly be influenced by such information campaigns, the so-called freeriders: skiers and snowboarders who use the transport facilities of ski resorts but ride down off the ski-runs (e.g. Zeidenitz et al. 2010). Thus, a specific freerider campaign, called “respect wildlife”, was launched in Switzerland, focussing on this group using its media and language.

Our study aimed at evaluating the effectiveness of this campaign. Furthermore, it aimed at comparing and understanding the influence of different elements of the campaign in order to enable future improvements of visitor-management measures focussing on target groups not accessible by traditional information campaigns.

To reach these aims the following research questions were to be answered:

1. How effective is freerider-specific campaign “respect wildlife” regarding the desired wildlife-responsible behaviour of people who engage in freeriding in ski resorts?
2. What are the significant influencing factors on the desired wildlife-responsible behaviour of the freeriders? What role do they play in the different elements of the “respect-wildlife” campaign? What other factors, beyond the campaign, are also important?

Methods

To answer the research questions, surveys in ski resorts (i.e. handing out questionnaires that were returned by post) were conducted that only included freeriders (selected due to their visible behaviour, equipment and/or by an oral filter question). Thereby, an experimental design was applied, i.e., surveys were conducted in a treatment area where the campaign was active on site as well as in a control area where no on-site measures were taken. In addition, the surveys were conducted in four waves (with increasing treatment intensity in the treatment area) during the skiing seasons 2013/14 and 2015/16:

- The first wave 2013/14 represented a pre-intervention state where no measures were taken at all, neither in the control nor in the treatment area.
- Wave 2, later in the season 2013/14, measured the effect of the first step of the campaign with a video clip shown at divers places in the treatment area (but not in the control area).
- Waves 3 and 4 (early resp. late in skiing season 2015/16) measured, on the one hand, the effect of additional measures taken during this season in the treatment area (further, even more “freerider-attractive” video clips as well as reminding sign-posts at the boarder of wildlife reserves). On the other hand, these two waves also captured the effect of the long-term diffusion of the campaign’s message since it’s start two years before.

Finally, the comparison of the treatment- and control-area measurements allowed to investigate the influence of other factors beyond the freerider-specific respect-wildlife campaign such as general related persuasion work elsewhere.

Results

The analysis of the survey results of the four waves in the treatment and control areas clearly showed that the respect-wildlife campaign positively influenced the (reported) wildlife-responsible behaviour of the freeriders (Fig. 1) as the treatment intensity (waves 1-4) and the location (treatment vs. control) turned out to be significant factors in ANOVA, and as the percentage of freeriders who knew the campaign also differed significantly between these waves and locations.

However, as the reported behaviour as well as the knowledge of the campaign and further factors also improved in the control area, other factors than the perception of the on-site campaign itself seems to have influenced it. Diffusion of the campaign (which is welcome!) might have taken place, but there might have been other influences more. The latter was corroborated by the regression analyses we conduct-

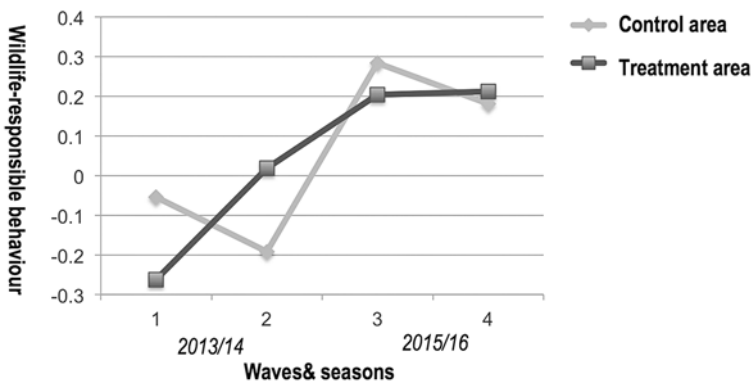


Figure 1. Reported wildlife- responsible behaviour (un-rotated factor based on two variables measuring reported behaviour regarding two respective rules) in the treatment (Laax) and Control (Flums) area in the Swiss Alps in four waves 2013/14-2015/16

ed. They revealed that some predictors of the reported wildlife-responsible behaviour, such as the attitude towards the behaviour, are not directly influenced by the “respect-wildlife” campaign.

Management implications

The results support the value of specific target-group oriented on-site measures. They can influence the behaviour and related influencing factors in the desired way within quite a short period of time (i.e., within a skiing season). At the same time the results also demonstrate the value of general measures such as campaigns in the internet and other media. These are effective not only in a “treated” area but more generally and show rather long-term effects (such as between 2013/14 and 2015/16 in our treatment and control areas). It is therefore highly recommended to apply both types of persuasion techniques, on-site and general ones, of course always in a target-group oriented way.



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Visitor Monitoring in a World Heritage Area – The West Norwegian Fjords *Nærøyfjorden* and *Geirangerfjorden*.

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The two *West Norwegian Fjords*, *Nærøyfjorden* and *Geirangerfjorden*, were registered on the World Heritage List in 2005. The World Heritage Areas comprise narrow, deep and long fjords with steep sided rock walls that are considered archetypical parts of the world's fjord landscapes. Numerous waterfalls and free-flowing rivers run across forests on their way to the sea. The fjords represent unique geological values and offer an outstanding natural beauty. *Nærøyfjorden* and *Geirangerfjorden* also include small communities as well as reminisces of shut down tiny dairy farms supplementing cultural and aesthetical values to the natural fjord landscape. Moreover, the world heritage areas also include protected landscapes and natural reserves according to the Norwegian Nature Diversity Act.

The two fjords are celebrated tourism attractions with high numbers of visitors during the summer season; about 700.000 tourists per year (including cruise ship passengers) visit each of the small local communities *Flåm* and *Geiranger*. The huge visitation potentially creates high pressures on natural values, local communities and crowding problems in peak periods that may also affect the visitors' perception and valuation of the area. In general, unplanned tourism development represents a fundamental threat to the World Heritage tourism destinations throughout the world. If undertaken in a responsible way, however, tourism may be a driver for protecting the natural and cultural heritage, and a vehicle for sustainable development. To achieve this goal, adequate visitor management strategies are required (UNESCO 2012) and visitor monitoring is therefore in this context an essential knowledge base.

The paper discusses the research challenges to organise appropriate visitor monitoring in the Western Norwegian Fjord area, some characteristics of the visitors of the area and their perceptions and assessments of the quality of the World Heritage Area as a tourism destination.

Methodological issues

The survey was conducted in the two fjord areas during the summer period 2015 among 3.204 visitors (1076 in *Nærøyfjorden* and 1394 in *Geirangerfjorden*), including also 418 cruise ships passengers. Trained personnel handed out a two-page questionnaire, which the visitors filled in themselves at various sites and at different points of time in June, July and August. Random sampling problems occur in on-site surveys when the population is unknown. However, the known distribution of tourism visitation in the fjord areas made it possible to employ a stratified sampling procedure, and prevailing accommodation (i.e. hotel and camping grounds) and transport (i.e. cruise ships, ferry, and railway) statistics made this approach feasible. An additional methodical problem arises from the fact that the probability to be included in the sample varies with the tourists' length of stay: The longer a visitor is in the

area, the greater the probability is to be included in the study. Another problem is the large amount of (especially Asian) tourists in the area who are not familiar with the languages used in the questionnaires, i.e. Norwegian, English and German. In the survey, cruise passengers are underrepresented because their itinerary when on land follows a strict time schedule with several activities and excursions and makes them unavailable for the interviews.

Those who filled in the questionnaire were asked to take part in a follow-up internet survey and notify their email address. This approach resulted in altogether 647 complete responses (304 in Nærøyfjorden and 343 in Geirangerfjorden). The response rate of 36 per cent among those who in the first place expressed their willingness to take part in the follow-up internet survey was considered satisfactory. The questionnaire was forwarded to the respondents via email about two weeks after we presumed that their tour was ended. Like in the on-site survey, the form was presented in three languages (Norwegian, English and German), and with three reminders. In this lengthier internet survey, we posed detailed questions about various aspects of the visit to the two West Norwegian Fjords.

Some visitor characteristics

According to the general survey, more than 60 per cent of the visitors were aware of the fact that fjord area they visited had a UNESCO World Heritage status prior to their arrival; whereas more than 20 per cent were ignorant of this fact, (the rest received this information for the first time during their stay). Table 1 shows the influence of the World Heritage Status on the decision to visit the two fjord areas.

Table 1. Did the area's status as a World Heritage Site influence your decision to visit here? (among those who knew about the World Heritage status before visiting)

| | Nærøyfjorden | Geiranger |
|---------------|--------------|-----------|
| Yes, a lot | 19,5 | 19,1 |
| Yes, slightly | 26,1 | 23,3 |
| No, not much | 54,4 | 57,6 |
| Sum | 100,0 | 100,0 |
| (N) | (640) | (924) |

In spite of the fact, that only a minority of about 20 per cent ascribe the greatest significance to this recognised status, many tourists are also visiting other Norwegian World Heritage sites during their trip: For instance, about half of the visitors in Geirangerfjorden visited Nærøyfjorden as well and vice versa. A similar proportion had seen Bryggen in Bergen, and interestingly, the majority had likewise stayed in one or more national parks on the same tour. The apparent round trip travel pattern among both cruise ship, motor and bus tourists reflects the fact that a greater geographical region than the two fjord areas are the main destination. The majority of the many day visitors stay less than two hours in the world heritage area – these circumstances naturally pose challenges to the visitor management of the most visited local sites.

Some visitor perceptions and attitudes

The active geological processes of the fjord landscape represent the outstanding universal values (OUVs) of the area. The internet survey indicates that the tourist experiences of the area is firmly connected to the spatial character of the landscape with its narrow fjord surrounded by steep mountains. Waterfalls, rivers, glaciers and snow patches underpin the impression of an active natural landscape. These sense impressions seem to play a more crucial role for tourists from (distant) foreign countries compared to Norwegian visitors. In addition, the latter category demonstrates a much more critical attitude towards tourism developments of the local area such as pollution on land and sea, visual intrusion of cruise ships and commercial signposting, queues at local sites, and crowding, traffic and parking problems in Flåm and Geiranger. The tourists who have travelled long distances, and cruise tourists in particular, perceive these problems as minor or they pay far less attention to such negative impacts of the mass tourism influx.

There is an increasing number of tourists in the Norwegian Fjord Landscape, and the tourism pressure on the local area will probably continue to grow in the upcoming years. This first generation visitor survey is therefore a baseline study for prospective monitoring and visitor management planning.

Visitor Management in the West Norwegian Fjords – Bridging the Gaps between Disciplines, Sectors and Administrative Levels

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Case description and research purpose

Carrying Capacity in World Heritage Areas

The West Norwegian Fjord landscape was entered on the UNESCO List in 2005. Steep valleys and mountainsides with numerous waterfalls and free-flowing rivers run across forests on their way to the sea. The fjords represent unique geological values and offer an outstanding natural beauty. There are still old farms and dairy farms, many of them now forsaken, but they introduce a cultural dimension to the landscape, which adds to and heightens the value of the area.

The small communities of Flåm and Geiranger have 300 residents and receive 700,000 visitors each year (including cruise ship passengers). Limits of sustainability for nature, the local communities and tourism is a big debate. Each year, the media describe protests against mass tourism, pollution and noise. The Heritage council is working to establish more sustainable practices. (Lykkja and Knagenhjelm, 2014)

UNESCO (2012) considers tourism to be the greatest threat to the World Heritage Sites, while the industry also provides economic opportunities in and adjacent to the sites. UNESCO demands Visitor Management Strategies and regular reports proving the sites are being well maintained. Suitable methods for describing landscape, “sense of place” and “outstanding beauty” have been developed in Norway (Direktoratet for naturforvaltning and Riksantikvaren, 2010). Methods for monitoring and reporting have been developed internationally, but require adjustment to conditions in Norway (Day 2013, Gundersen et al 2011). Our project builds on these methods for the first-generation Visitor Management Plan.

A more informed understanding is needed

A preliminary study revealed a need to develop a method for sustainable and user focused visitor management with a high degree of user participation, suitable for both small and high volume destinations. The Council for the WHS West Norwegian Fjords is the project owner, while management is under the Nærøyfjord world heritage park. Active partners are the municipalities, the travel industry, and local associations. (Lykkja and Knagenhjelm, 2014).

The goal is to find a balance between preservation of important sites and giving visitors a rewarding experience, while at the same time supporting economic development. Achieving this goal will make it easier for the custodians to report to UNESCO, and to maintain the site in a sustainable manner. Research to be carried out includes customer analysis, the customer journey, local value creation and usage stress limits. We collaborate with other research projects conducted in the region.

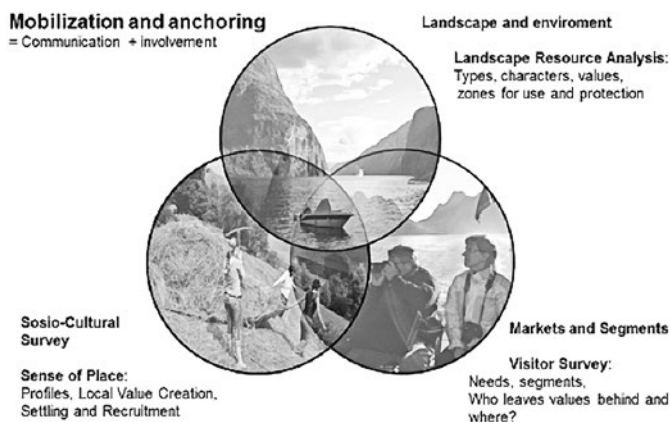


Figure 1. *Practical methods for Sustainable Visitor management*

Through the method, the municipalities will be able to assume a leading role as developers of the destinations for tourism, while guiding a sustainable transformation of the local community. The end product will be a template for visitor management in the West Norwegian Fjords, to be included in plans for protected areas, municipalities, and businesses.

Methodological issues

Management of uncultivated lands in Norway is fragmented. Most of the world heritage area is in landscape being regulated by the Norwegian Nature Diversity Act. Areas of habitation and the points of entry to the heritage sites are regulated through the Planning and Building Act. Visitor Management will therefore need to accord with both municipal plans and the action plans for the protected areas, as well as laws regulating harbors and maritime affairs.

Landscape Resource Analysis and User Participation

Both fjord areas are creating knowledge dissemination plans and collaborating with local resources and businesses. The focus is on a decentralized dissemination where knowledgeable local resource persons can help achieve the potential in unique visitor strategies. Together with all involved parties, we are performing landscape related resource analyses, as well as charting local knowledge. The Method is operationalizing the European Landscape Conventions (ELC) into local and regional planning by including public participation in landscape issues.

Researchers from the Norwegian University of Life Sciences and the Institute for Transport Economics have analyzed current plans and strategies for the areas, and interviewed representatives of municipalities, heritage sites, conservation areas, local communities, and the environmental office of the county administration. They have also met with politicians from the municipality and county level, destination companies, port administrators, the Directorate for Nature Management and the Maritime Directorate (Haukeland et al, 2015). Creating a broad consensus for the need of a Visitor Management Plan is key.

Visitor Surveys and Local Value Creation

Visitor management must include conveying values of importance to the heritage site, disseminating stories about attractions, and providing access to experiences that help visitors explore and learn. There are protests against the volume of cruise tourism and emerging conflicts related to kayaking. The Heritage Council want to ascertain the scope of the problems and stress factors among residents, related to type of tourism.

Workshops and dialog conferences

We are connecting actors by improving the transmission of knowledge and the degree of user participation. This helps connect researchers, administrators, the local communities and the travel industry. We are inviting different administrative and political levels to gather around the table, in order to increase efficiency of interaction (as listed above). Most of these also participate in the meetings of the World Heritage Council for the West Norwegian Fjords.

Preliminary findings

The project is using interviews, public assemblies, regional park meetings, dialog conferences, student theses, expert seminars, and collaborations with other research projects, seeking to involve as many actors as possible. Findings from visitor studies are now being charted against landscape resource analyses, and will be the subject of new gatherings and workshops in 2016 and 2017.

Securing buy-in at all levels is an important part of the process. This approach is, according to Innovation Norway (Official Agency for Innovation, Tourism and Trade) the most holistic planning project they have come across so far. The project has incorporated an R&D strategy for the heritage site. The two fjord regions are complementary and provide an excellent basis for exchanging experiences and communicating research across disciplines, sectors, levels of administration, regions, and even national boundaries.



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Social Carrying Capacity at a Brazilian Protected Area

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Introduction

The modern societies reencounter the nature's social representation in protected areas. Thus, there is a new enchantment with natural environments and concepts' redefinition (Borrie 2012). According to this social archetype, the protected areas assume this main goal of biological diversity protection and ecosystems process maintenance (Dudley 2008). But even the most conscious visitors leave marks of their presence.

A possible management action to protect resources and improve the visitor experience is to limit the number of visitors by calculating the social carrying capacity. This concept it refers to the number of visitors that can be accommodated in a protected area at the same time ensuring a satisfactory experience (Boullón 1997).

The objective of this paper is to present the social carrying capacity of a high visited site in a Brazilian Park.

Methods

Study area

The Serra da Tiririca State Park (PESET) is a protected area of Rio de Janeiro State (Brazil). The Atlantic Rainforest occupies a mountain range and so, the PESET's topography is very diverse. The Itacoatiara Rock (IR) is 233m height (Cova & Pimentel 2013). It is one of the Park's visitation hot spots and the belvedere at the top has an area of approximately 1179m². The number of visitors is rising year by year and it has been observed an increase in their numbers due to international events as Soccer World Cup and the next Olympic Games.

The People-at-one-time methodology and the Interviews

The People-at-one-time (PAOT) methodology was adapted from Manning et al. (1995) and Zacarias et al. (2011). An area with the largest circulation of visitors was chosen on IR. This area was photographed and measured with Garmin GPS unit. Then a series of five images was created simulating visitors increasing amounts (from 0, 15, 30, 45 to 60 people - Figure 1). From March to August 2015, 374 interviews were carried out. Visitors were chosen in a non-probabilistic sample. The interviewees were asked to rate how much the amount of people showed in photos, would affect the quality of their visit, on a Likert scale that varied from (+ 4) to (- 4) and included a neutral point (0). After the end of the interviews, the average scores for each photo were used to produce a norm curve (Jackson 1965) where the neutral point is the minimum acceptable condition by visitors and therefore, the PAOT of the area.



Figure 1. *The five created images for PAOT methodology. (a) The belvedere provided by Ita-coatiara Rock with no one; (b, c, d, e) Manipulated images showing 15, 30, 45 and 60 people respectively in an area of 377 m²*

Results

The PAOT found in this research, was about 28 persons related to a 377m² area, as showed in the images presented to the interviewed visitors. To get the PAOT for all the IR's area, it was necessary to extrapolate the result for 1179m² which is the total area where visitors normally are concentrated to appreciate the view provided by the belvedere. The obtained number was about 88 visitors at the same time at IR's top.

Discussion

It was observed that visitor satisfaction tends to decline when the number of people increases. This result corroborates with the study of Manning et al. (1995), made in Arches National Park in the United States, where the social norm curve is also decreasing. Despite the high score given to the photo with anyone, an average of 30% of respondents argued that this picture did not look nice for different reasons, as to convey a sense of loneliness or danger, but also considering it unfair because other people should have the opportunity to visit the site. This result is according to the one shown in a survey on a beach in Portugal (Zacharias et al. 2011). In this study the image with no one visitor received a score of -0.5 in contrast to the notes more than four times higher than the picture with 50 people. It is expected that these results

serve as a theoretical basis to argue with these visitors that the Park's staff should control the number of people to protect the environment and maintain or improve visit's quality. Management of the number of visitors is a priority action for the current administration.

Conclusion

It is the first time in Brazil that a scientific research uses the PAOT methodology. This proved easy to apply and generated concise and relevant results. The number of visitors found that could be at the same time in IR with minimum impacts on visitor's perception was about 88 people in relation to the study area and also to the average estimated time for the visit. However, as there are times with higher number of visitors, such as early morning and late afternoon, there is a tendency of these periods become more problematic for the management of this indicator. It is suggested that the Park's management apply the social carrying capacity found in this study in order to improve the quality of the visit but also to minimize the physical and biological impacts. However, this correlation has to be yet established by the trail physical impact data.



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STAKEHOLDERS' APPROACH IN MANAGEMENT OF PROTECTED AREAS

Backbone Leadership and River Recreation Corridors: The Mon River Valley Coalition

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Public leadership has emerged as a critical component of regional protected area management and sustainable tourism (Ansell & Gash, 2008). The skills of bringing diverse stakeholders to the table as well as sustaining interest and participation requires the intervention of a multi-faceted person or organization. This paper will explore the deeper meanings and applications of leadership as it has emerged in a collaborative, regional initiative known as the Mon River Valley Coalition (MRVC). The MRVC is a regional and community-based economic revitalization program that promotes economic and environmental sustainability by capitalizing on the outdoor recreation and nature-based tourism potential of the Monongahela River (Baxter & Malik, 2013). Results from this research will be informative to protected area managers and tourism planners engaged in collaborative, regional initiatives.

Leadership within the MRVC will be examined through the conceptual lens of recent scholarship on collaborative governance, collective impact, and backbone leadership emerging from the environmental management, public administration, philanthropy, and public health disciplines. A synthesized draft model of backbone leadership will be drawn from this literature emphasizing backbone leadership roles/tasks as well as capabilities/resources. Essentially, what backbone leaders do and what they bring to the table. The following research questions are addressed through this research study. How important has backbone leadership been to the success of the coalition? What roles or tasks have the backbone leaders taken on? What type of capabilities or resources do backbone leaders bring to the coalition? How would a change in leadership affect the coalition?

This research employed an embedded case study approach recommended by several tourism researchers (Dredge, Hales, & Jamal, 2013; Wray, 2015). The author was familiar with the Mon River Valley Coalition having served as a program coordinator with the Monongahela River Town Program for two years. After stepping down from the program coordinator position, the author was able to use personal knowledge, social networks, and accumulated program material to conduct this embedded case study research design (Yin, 2009).

Methods

The case study research used a multiple-methods approach to address the research objectives. Data collection included stakeholder interviews, document analysis, and personal observation. Documents analyzed included MRVC meeting minutes, agendas, and website; newspaper articles; and MRVC reports and publications. Using a criterion-based and snowball sampling methodology, community and regional leaders of the MRVC were interviewed as well as several independent regional leaders familiar with the MRVC. Semi-structured, open-ended interviews were completed during the spring and summer of 2015 with study respondents, averaging 45 minutes

in length. In total, 10 MRVC action-team leaders were interviewed. Interviews were audio-recorded and professionally transcribed verbatim. Data was hand-coded and sorted into meaning analytic units using NVivo 10.

Results

Study results will be presented at the MMV8 conference under four integrated themes: Importance of backbone leadership, backbone leadership roles and tasks, backbone leadership capabilities and resources, and achieving collective impact. An emergent model of backbone leadership will be specified.

Backbone leadership, in the case of the MRVC, has been indispensable. Backbone leaders fill key capacity-building and alignment roles in this regional initiative with a number of low capacity communities. Backbone leadership is essential for many regional protected area management and sustainable tourism initiatives. Future research should incorporate social network analysis and multiple case study designs to more deeply understand backbone leadership in a protected area management and sustainable tourism context.



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The Contribution of Proximity-Based Analysis to Outdoor Recreation Management

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Managing outdoor recreation requires close coordination between stakeholders. This leads to a more complicated situation, because the majority of stakeholders involved do not know each other well. Better integration of visitors into the management process calls for a fundamental change in the way, conceptual and practical models are designed. To this end, we propose an original analytical framework, inspired by the fields of economics and geography, based on various definitions of proximity.

Analytical framework: the multiple sides of the proximity concept

Proximity to recreational areas

Proximity is present in the literature on outdoor recreation. Numerous works have studied the effects of distances to recreational assets on people's practices, such as the frequency of visits (Hanley, Shaw et al. 2003). More recently, additional works adopted a more relational perspective by considering the special attachment that people may develop to particular places (Entrikin, 1991), the latter being not necessarily correlated with spatial proximity. Despite their undisputable contributions, these studies have tended to focus on the behaviors of individuals, while neglecting the social relationships that exist between them.

Proximity between recreational users

Our second definition of proximity comes from a complete distinctive field of research. From an economic geography perspective, several authors have demonstrated that the relationships between individuals are based on a variety of factors, rather than just monetary considerations. They highlight three different types of proximity between stakeholders: geographical, organizational, and institutional proximity. Geographical proximity refers to the physical distance between individuals. Organizational proximity refers to the sharing of common productive practices or routines; while institutional proximity refers to the sharing of a common system of representations, a set of beliefs and values. Such an analytical framework has not yet been tested on outdoor recreation management (Torre & Zuideau 2009), though we believe that it could be proved to be relevant in this particular field. We propose to couple both analytical frameworks to study the management of recreational uses in forests.

Empirical application: forest recreation in South West France

Study site and methodology

Our previous research has shown that many attempts to regulate use conflicts in the selected areas failed because they gave little (if not) consideration to the visitor's perspective (e.g. the "demand side"). To gain a clearer understanding of how these users could be included in management schemes, we ran several surveys that brought together both quantitative and qualitative techniques (500 & 60 obs. resp.). A brief summary of the results is provided below.

Results

For the first definition of proximity, we observed that the effects of the distance on visitor's behavior were not as obvious as would normally have been expected: for example, 22% of the interviewees who declared that they lived "in a forest" in our quantitative survey (e.g. 26 out of the 118) did not use it for recreational purposes. More generally, people living in the vicinity of a forest are statistically different from the other participants in a number of ways: activities, forests attributes, etc. Furthermore, our qualitative surveys show that people are able to describe the values they attach to the forest. These values help us to understand the relationship with the forest and its appropriation via a certain way of life (Tuan, 1990). Despite their limited knowledge of forest regulations, they share indirect common interests with other local stakeholders, including private owners.

Regarding the second definition of proximity, our quantitative survey confirmed that the majority of visitors do not fully understand basic regulations and property ownership rights, nor are they able to identify the specific areas they visit either. To a certain extent, this contributes to the lack of organizational proximity. At the same time, we show that visitors tend to share specific practices, preferences and values in relation with forest-based recreation. One may suggest that some form of institutional proximity could be at least part of the way towards correcting some of the identified organizational failures. The effect of geographic proximity (i.e. living in the same area) on organizational and institutional activity is not obvious. As a matter of fact, many of the usual spatial patterns (i.e. rural versus urban) did not show up in our surveys, except the "Département" and "massif" scales for which some preferences were expressed relating to specific landscapes.

This last result leads us to say that the interaction between these three previous forms of proximity (geographic, organizational and institutional) is scale-dependent. In contrast with the preferences expressed at larger scales, the preferences expressed by people that live in the vicinity of a forest tend to focus on more specific details, such as the sentimental values purveyed by certain pine trees, contact with fauna, and open and varied underbrush depending on the season. Such values are coupled with dedicated (not necessarily intensive) practices. Though our work is still at an explanatory stage, we believe that coupling the above-mentioned definitions of proximity may greatly improve the analysis of the territorial dimensions of outdoor recreation management.



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Monitoring Recreational and Educational Services Provided by Mediterranean Wetlands: How Natural Capital Impact Human and Social Capital?

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Context and objectives

Since 2011, the Mediterranean Wetlands Observatory (MWO) is a wetlands management tool of the MedWet regional Initiative (1991) working under the umbrella of the Ramsar convention (1971) and managed by the Tour du Valat Institute for Research and Conservation of Wetlands (TdV). MWO is developing its first indicator on cultural ecosystem services as an “impact” indicator to be integrated in the DPSIR (Driver-Pressure-State-Impact-Response) conceptual model adopted by MWO. The overarching objective of this indicator is to develop additional advocacy based on sound scientific work among local and national decision-makers as well as planners involved in development options achievement and territorial management. This indicator also intends to help site managers to adapt their services to recreational and educational visitors. It aims concretely at measuring how ecosystem services biophysical value and function of wetlands provide human and social advantages to societies.

Methodology

Preparatory phase

The MWO indicator group decided by 2010 to develop an indicator on “the cultural services” that are provided by Mediterranean wetlands. Monitoring would take place in sites proposing recreational and educational structures and services, based on the collection of essential data on visitor attendance. This indicator would be based both on data availability and operational feasibility among the 27 Mediterranean countries involved in MedWet initiative.

Developing an “impact indicator”: the MWO preliminary action was to develop first assumptions and key criteria to elaborate this indicator. The indicator should be easily understandable to decision-makers, scientifically sound, and based on reliable data that would be possible to collect in all countries in a sustainable way.

Between 2011 and 2014, nine site studies took place in protected wetland’s sites among four countries (Algeria, France, Morocco, and Tunisia). The methodology included the interview of a total of 688 recreational and educational visitors, using open questionnaires based on individual perception and social representation of wetlands (Saïdi M.R, 2012; Rivière-Honegger A., Cottet M. & Morandi B. (2014). Sampling was based on the diversity of visitors’ profiles in order to catch the highest diversity of perceptions and representations. Essential data included also site man-

agers' information, like the number of site visitors during the last 10 years (2002 - 2012).

In 2015, a synthesis on the main results within the nine sites was done by the TDV and The Mediterranean Agronomic Institute (IAM) of Montpellier, giving the key following results that were considered important for elaborating the indicator of cultural service in protected wetlands:

- In North Africa, the number of visitors depends more on external factors than on site managers' efforts of to promote and develop their sites;
- Wetlands attract mostly visitors coming from less than 35 km distance;
- Main criteria influencing the visitors' decision to visit wetlands sites are: the distance and access characteristics, the site manager promotion strategy, the natural and cultural attractivity of the site, the quality and diversity of visitor infrastructures and the services and facilities proposed by site managers, and lastly, the side-effect of near well-known sites.
- 30 levels of interest were reported by recreational visitors when selecting a site visit; quietness, nature, discovery, birds, socialization and recreational are the main common reasons for the visit;
- The representation of the wetlands natural capital for the visitors can be divided into three main types, from highly integrated "landscape and nature aesthetics and integrity", to "general ordinary biodiversity" and less integrated "emblematic elements, such species, cultural sites and site notoriety".
- The key dimensions of attraction during the visit are driven by landscape harmony, structured by vegetation, water and birds elements, and by the quality and diversity of the key facilities provided by the site manager and expected by the public at large to enjoy their visit.
- With about 60% of visitors having acquired new knowledge during their visit, wetlands protected sites are favoring environmental awareness and education. Effort and means of information developed by site managers are essential to explain the efficiency of the transfer of knowledge during the visit.

Indicator conceptual phase

Several steps are necessary to build the proposed "Mediterranean wetlands recreational and educational indicator".

The main challenge in this conceptualization phase is to switch from much diversified qualitative cultural results obtained from the series of social studies to an impact indicator that can be easily measured in all sites. In 2016, TdV and IAM started brainstorming on ways to develop such indicator, reflecting on its conceptualization and how to test its sensibility. If successful, the indicator will be validated and monitoring operation may start in 2017 in potentially 200 sites.

Based on the outcomes of this brainstorming period and on the review of a large bibliography, it was decided to base the indicator building process on the conceptual model developed by Ten Brink (2015) in articulation with the one developed by Kumar et al for Ramsar (2011). Both of them incorporate key elements to bring in the elaboration of this indicator, like the ecosystem services, the various capitals, the well-being, the livelihoods and the institutional and political dimensions. The

choice was made to develop a composite index indicator based on the multiple capitals, based on the following assumption: a Natural Capital, when accessible, can provide human and social advantages through recreational and educational entries.

We opted for of an indicator that would then be structured by the following components:

1. A natural dimension: the *ex ante* natural capital perception of visitors which refers to the site “natural quality”, in terms of attraction and aesthetic;
2. The accessibility dimension: accessibility is essential to get advantages during the visit; this dimension refers to the capability model developed by Sen (Sen, 1985); it addresses external and internal accessibility together with visitors’ facilities. This component is used as a filter, informing on public and site efforts to promote wetlands sites to the public. If accessibility is zero, no positive impacts can be gained from the visit.
3. The impact of the visit on human capital.
4. The Impact of the visit on social capital.

The graph 1 summarizes the cultural service indicator’s structure. A preliminary scoring table is currently being tested using the data of the nine studied sites. Main results will be developed during the session.

| Natural capital | Accessibility Filter | Human capital (KH) | Social capital (KS) |
|---|---|--|--|
| <i>Based on the visitors' perception; with three levels</i> | <i>Site capability and facilities; with three levels</i> | <i>The improvement of the visitors KH; with three levels</i> | <i>The improvement of the visitors KS; with three levels</i> |
| <ul style="list-style-type: none"> • High landscape and nature integration • Medium nature integration through ordinary biodiversity • Low integration with emblematic elements of the site (LI) | <ul style="list-style-type: none"> Material and security capability (external access, site facilities) • Economic capability (site fee) • Institutional capability (school and green club contracts) | <ul style="list-style-type: none"> • Production of knowledge • Transfer of knowledge • Acquisition of knowledge | <ul style="list-style-type: none"> • Partnerships with civil society • Creation/organization of specific events in the site • Multiplier effects through visitors |

Graph 1. The MWO Cultural Services Indicator Structure



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Effectiveness of Consensus-Building Methods Using Sustainable Tourism Indicators in the Collaborative Management of Japan's National Parks: A Case Study of the Oku-Nikko Area in Nikko National Park

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Introduction

Japan's national parks are organized based on a regional land designation system that is not tied to land ownership or limited to the public use of the area. These areas are home to a significant number of people (600,000 people across 32 parks). Therefore, it is necessary for park management to accommodate the local residents' daily living, economic activities, and the natural areas' protection and use. Based on these circumstances, managing national parks appropriately requires building a consensus among and striving to win the cooperation of a variety of stakeholder organizations and individuals. This is not limited to only park officials, but also residents, businesses, and visitors. In Japanese national parks, there are venues to examine individual issues and conduct liaison and coordination functions. However, these venues are extraordinarily limited with regard to which have been established as places in which the greater park system's stakeholders can come together (Tsuchiya, 2014).

Conversely, research continues to identify the indicators for sustainable tourism, particularly abroad (Miller and Twining-Ward, 2005; Griffin et al, 2010). Sustainable tourism indicators (STI) are monitoring tools that measure certain conditions in a tourism destination, such as local resource statuses, the area's sightseeing use, the local economic situation, and the local community's mindset (UNWTO, 2004). Various stakeholders' participation and consent is desired during the STIs' introduction process. As such, there are great expectations for the indicators to serve as a management method that would work effectively with the national park system's collaborative management. However, there is currently little research and experience on this topic in Japan (Nakajima and Shimizu, 2013).

Therefore, this paper aims to evaluate the potential of implementing STIs as consensus-building tools to collaboratively manage Japan's national parks. By attempting to apply this method to the Oku-Nikko area in Nikko National Park, we will evaluate the introduction process' effectiveness and challenges.

Study Area

In 1934, Nikko National Park was designed as one of Japan's first national parks. It is situated approximately 120 km from Tokyo. The Oku-Nikko area is located within the park and is blessed with an abundance of natural resources: mountains, lakes and marshes, wetlands, waterfalls, and hot springs. It has long been developed as a

tourist destination that has received many visitors. The area averages 700,000 lodging guests per year. The majority of the 600 residents are involved in tourism-related industries, with approximately 130 tourism-related offices. However, in recent years, the Oku-Nikko area has seen decreases in mid-to-long-term visitors, population, and local businesses.

Methodology

The STIs were implemented and evaluated in the study area via the following processes.

1. Understanding the situation in the Oku-Nikko area and building a favorable relationship with local stakeholders
2. Discovering and motivating key talent
3. Establishing a discussion venue
4. Conducting discussions with stakeholders and developing the STI Oku-Nikko Model (draft)
5. Collecting and analyzing data
6. Providing feedback to local stakeholders

Results

1. Understanding the situation in the Oku-Nikko area and building favorable relationships with local stakeholders

In the Oku-Nikko area, we gained an understanding of the condition of local resources and the status of various relevant organizations by reviewing literature, conducting on-site observations, and interviewing a variety of stakeholders; this included neighborhood associations, local governments, hotel associations, restaurant associations, and transportation firms. We thereby built positive relationships with stakeholders.

2. Discovering and motivating key talent

Through our interviews, we discovered key talent in the community. With the expectation that they would play key roles in future consensus building, we invited these individuals to join us in a public forum as representatives of the Oku-Nikko area. It was our intent to make them aware that they were key to promoting understanding of the study.

3. Establishing a discussion venue

Next, we established a place in which the stakeholders could gather. However, in Oku-Nikko, there were already several meetings and conferences. Therefore, even if we created a brand new official place for stakeholders to gather, we understood from a preliminary assessment that there was a strong possibility that people would not meet. Therefore, we used a venue with a relaxed atmosphere, established with the encouragement of local government staff and locals who wanted to improve Oku-Nikko.

4. *Conducting discussions with stakeholders and developing the STI Oku-Nikko Model (draft)*

With local stakeholders, we examined the vision for this area's future and the specific steps necessary to attain it (the indicators) from four perspectives: visitors, residents, business people, and local resources. We then developed the STI Oku-Nikko Model.

5. *Collecting and analyzing data*

We found data sources for each indicator. For values in which it was necessary to acquire new data, we obtained measurements by surveying visitors, residents, and business people connected to the tourism industry. We believed that by taking time to use the survey consider everyone's questions and objectives, we could obtain more proactive responses. Therefore, we also conducted meetings and interviews with local stakeholders during the study item planning process. If there was an item that the stakeholders wanted us to address, we incorporated it in addition to the questionnaire items. We also recruited local residents and business people to participate in conducting the survey and involved them in the fieldwork.

6. *Providing feedback to local stakeholders*

We held a debriefing session for local residents, business people in the tourism industry, local governments, and others. The participants were enthusiastic about attending and were very positive during the question-and-answer session.

Conclusion

By introducing STIs, we achieved the following results:

- Stakeholders obtained and shared quantitative and objective understandings of the local situation.
- The area's objective was identified.
- Stakeholders engaged in a small amount of consensus-building.
- Stakeholders adopted a more positive, forward-thinking attitude.

The application of STIs can therefore be considered as effective consensus-building tools for the national parks' collaborative management.

When using STIs, the important points to remember are: find key talent with resolve and motivation; listen to input from a variety of members; communicate frequently; progressively work toward your goal by starting with small initiatives; pay attention to your verbiage, and use vocabulary that is easy for locals to understand; involve stakeholders in a variety of activities; share the results; assume an attitude that focuses not only on the indicators you are measuring but also on your future responses and countermeasures; develop close relationships with local experts; and conduct fundraising.

This project is still ongoing. In the next stage, we will need to review the indicators based on results, establish target ranges, and consider countermeasures.

Table 1. The STI Oku-Nikko Model (draft)

| | Ideal visions for the Oku-Nikko area | Indicators (STI) *as an example |
|-----------------|---|--|
| Visitors | Visitors enjoy their stays | Level of visitors' satisfaction |
| | Visitors are fans of the area | Percentage of repeat visitors |
| | Visitors stay for a long time | Length of time spent in the area |
| | Visitors commune with nature | Length of natural walk time |
| | The area is easy for anyone to visit at any time | Level of visitors' intentions in winter |
| Residents | Locals are attached to the area | Percentage who are proud to live in the area |
| | The Oku-Nikko area is comfortable to live in | Local satisfaction level with area's comfortable living |
| | The population is being retained | Population |
| | Tourism has a positive influence on daily life | Local satisfaction level with tourism |
| | Locals are participating in community activities | Local participant level with community activities |
| Business people | Business people are satisfied working here | Level of business people's satisfaction |
| | Business people are attached to the area | Percentage who are proud to do business in the area |
| | The labor market is vibrant | Average age of employees |
| | Business people experience stable sales | Tourists' expenditures per person per day |
| | Business people accept a variety of visitors | Average age of visitors |
| | Business people cooperate with companies inside and outside of the area | Percentage of participation in meetings inside and outside of the area |
| Local resources | Water is beautifully maintained | Level of lake water quality |
| | Original biological diversity is maintained | Level of feeding damage created by the deer |
| | Beautiful scenery is maintained | Litter amount |

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Stakeholders to the Rescue Biosphere Reserve in the Chilean Andes

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Introduction

In 2011 the Biosphere Reserve in the Andes Mountain Range in central Chile called *Nevados de Chillán-Laguna del Laja*, which covers approximately 6000 ha. was formally incorporated in the UNESCO Biosphere Network. About 8.000 people live in seven local settlements with one enjoying an important tourism development due to growing accommodations and a skiing resort.

In accordance with the Man and Biosphere Program the Reserve is has three different zones: The Core consisting of three Protected Areas all National Parks, the Buffer Zone: consists of 395.010 ha, which equals 70% of the territory and the Transition Zone where various sustainable activities may be executed covers 73.954 ha. Following the legal framework for Biosphere Reserves a Committee of eight members from the Regional Government is in charge of the management and monitoring responsibilities and additionally a Counsel of 28 public and private stakeholders has the task to supervise the fulfillment of the Management Plan. According to the Regional Government important challenges both in the fields of production, investigation, education, and the environment must be met in the area. In terms of tourism although 800 thousand visitors arrive annually to the region and 57% comes motivated by natural and wilderness attractions, they stay for a short time due to the lack or deficient quality of tourism services and a increase in that number is wished for and declared in the National Tourism Strategy.

A multi-stakeholder approach with particular emphasis on the involvement of local communities were to be implemented that should foster dialogue; integrate cultural and biological diversity, and demonstrate sound sustainable development practices and policies based on research and monitoring; and finally the area should act as a site of excellence for education and training.

Now five years after the declaration, formal public assessment and monitoring of the management efforts hasn't been put in place, hence this presentation of an **Impact Evaluation** that aim to produce an overall evaluative judgment about the significance of the declaration of the Biosphere Reserve in addition to descriptions of possible changes will be reported.

Method

This inquiry aims to explore observable *changes* in relation to the declared goals or benefits for the Biosphere Reserve as it should be a *site of excellence where innovative sustainable development approaches are tested that combine scientific knowledge and governance modalities with a view to reducing the loss of biodiversity, improve*

livelihoods and promote social, economic and cultural conditions for the sustainability of the environment.

The theory of change was used to explain how the observed activities could be understood as contributing to a chain of results (short-term outputs, medium-term outcomes) able to produce the ultimate intended or actual impacts. It included positive impacts (which are beneficial) and negative impacts (which are detrimental). While many theories of change are represented as a simple, linear process, most development interventions have complicated and/or complex aspects, which are important to acknowledge and address. (Glouberman and Zimmerman 2002). Accordingly the evaluation distinguished between simple, complicated and complex aspects of *interventions* and their associated Impact focus:

- Simple: ‘Known’ Standardized – a single way to do it
- Impact focus: did it work or is it still working?
- Complicated: ‘Knowable’ Adapted – need to do it differently in different settings
- Impact focus: what worked for whom in what ways and in what contexts?
- Complex: ‘Unknowable’ Adaptive – need to work it out as you go along
- Impact focus: what is working in the current conditions? What is the best way forward at this point in time?

To this end data was gathered from municipalities, park administrators, small and medium tourism services and operators, other local businesses and tourists as well as online advertising, documents from ecotourism students thesis work, interviews with three local tourism operators were conducted.

The stakeholder information was registered counted and organized according to type of stakeholder, type of events and type of participation in the events whether promoter, active or passive assistant. The interviews were recorded, transcribed and coded to categories related to community development, satisfaction with performance from public agencies, nature based tourism and visitor management.

Observant participation was undertaken in local events such as Festivals, Fairs, Community Walks, Sports competitions and Mountain Clean Ups, where videos and recording helped register interactions.

Findings

Table 1. Chain of Input-Outcomes-Impact Results

| DATA SOURCES | Activities | Leadership | Outcomes/ frequency | Impacts (on) |
|-------------------------|--|--------------------------------------|---------------------|--|
| Local Community | Festival for Avellana (Native tree Nut) | Neighborhood Committee. Municipality | Yearly | · Social, economic and cultural conditions |
| Local Community | Mountain Clean Up Campaign | Local Environmental NGO | Yearly | · Social, economic and cultural conditions. · Sustainable development |
| Regional Urban Visitors | Free Guided- Nature walks | Ecotourism Operator | 12 | · Nature Awareness and Environmental education |

| DATA SOURCES | Activities | Leadership | Outcomes/ frequency | Impacts (on) |
|------------------------------------|--|--|--|--|
| Local Community | Natural Music Festival | Young residents | Yearly | • Social, economic and cultural conditions |
| Ecotourism Operator | Sustainable infrastructure | 1. Manager 2. Director 3. Private person | Operators Office, Science Center, House | • Sustainable development |
| Local Tourism Branch | Sustainable Tourism Seminars | Local Tourism Branch | 2 cases | • Environmental education. • Sustainable development |
| Ecotourism Students | Investigations about Ecotourism | University | 21 Scientific works | • Scientific knowledge |
| Ecotourism and Geology Students | Investigations about the Biosphere Reserve | Science Center | 19 Scientific works | • Scientific knowledge |
| Hotel and Cabin Owners | Tourism Quality Scheme | Regional Tourism Agency | 20 in process | • Sustainable development |
| Local Ecotourism Managers | New Ecotourism Operators | Ecotourism Operators | 2 | • Sustainable development |
| Small Business owners | Sustainable Businesses | Young new residents | Coffee Shops, Ski and Bicycle Rentals, Yoga Center, Healthy Foods, Bakery, | • Social, economic and cultural conditions. • Sustainable development |
| Ecotourism Managers | New Ecotourism Services | Ecotourism Operator Ecotourism Students | Eco-Park, Trekking Routes, Bicycle Routes, Horseback Riding, Bird-watching | • Social, economic and cultural conditions. • Sustainable development |
| Local Ecotourism Managers/ Parents | Summer camp in the forest | Ecotourism Operator | 3 summers | • Nature Awareness and Environmental education |
| Regional University | Outdoor Fieldtrips | Ecotourism Graduate Program | 6 four day field trips a year | • Nature Awareness Environmental and leadership education |
| Tourists/National Park Manager | Visits to National Park | Ecotourism Operators Tourists | 1.843 persons in January-February 2016 | • Nature Awareness and Environmental education |
| Biosphere Management Committee | Meetings | Regional Government | 2 yearly | • No impact |
| Local Tourism Branch | Enforcement of Tourism Standards | Regional Tourism Agency | 1 | • Negative Impact on • Social, economic and cultural conditions. |

Conclusion: Summary of Research Findings

In terms of categories of stakeholders we found that the “local community” has changed its composition incorporating other components that didn’t exist before or didn’t play a relevant role, such as:

- Emergence of foreigners who has come to settle in the place
- Professionals who have left their activity to come to live and work in the reserve
- Young students bringing various conservation initiatives
- New institutions or undertakings of a different kind to what was known in the place (an ecologist group; a private research center oriented to the reserve; an eco-park and an alternative school)

Due to the influence of these new actors a set of changes have been detected which are oriented in the sense of developing modalities of tourism which fall within the principles of sustainability and local development brought about by the MAB. This is expressed in events such as:

- Emergence of new activities in the field of nature tourism: Randonnee ski; rackets; Trekking; hiking; horseback riding; etc.
- Initial investigations by graduate students regarding other potentialities of the territory for the realization of Ecotourism (Geotourism; tourism with Magnifier: fungi, mosses, lichens; bird watching and photography of nature, etc.)
- New products and new services such as bicycle rental; Rental of skis, snowshoes; emergence of supermarkets; cafeterias, etc.

It may be relevant to mention that all these changes have not been product of explicit objectives set out in a management plan. In fact, so far there is no management plan for the reserve.

However, these new actors incorporated into the local community, in a conscious or unconscious manner have been invited and have guided its action by the stated objectives and the criteria established for the biosphere reserve that have been pointed out in this paper. These new orientations, not without some resistance though, have been gradually transferred to the original residents.



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Supporting Georgia's Protected Areas: Linking Conservation and Local Development

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Introduction

According to Aichi target 11 of the Convention on Biological Diversity, the global network of protected areas (PAs) shall be extended to cover 17% of all terrestrial areas by 2020. Internationally, progress has been achieved, with PAs now covering 12.5% of all terrestrial land. Challenges remain: Notably developing countries still lack both capacity and financial resources to adequately set up and manage PA systems, a gap that requires continuous commitment of international donors (di Minin & Toivonen, 2015).

In this regard, approaches that aim to reconcile conservation and poverty reduction have been increasingly common in recent years: Between 1980 and 2008, almost three quarters of the total international aid allocated for biodiversity conservation was targeting “mixed” projects that explicitly addressed both ecological and economic objectives (Miller, 2014). This contribution presents one such project, the Support Programme for Protected Areas in Georgia (SPPA), and introduces the local context and existing challenges.

Background: Georgia's protected area system

The Caucasus region is recognized as being among the 36 global biodiversity hotspots defined by the Critical Ecosystem Partnership Fund (CEPF, 2016). Georgia specifically is known for its extraordinary rich biodiversity and high diversity of landscapes, and is home to a number of threatened species, many of which are endemic to the region.

The first strict nature reserve in the Caucasus region was founded in Georgia in 1912. More protected areas were established during Soviet times; yet, at the dawn of Georgia's independence in 1991, the 15 existing strict nature reserves accounted for just 2.4% of the territory (Zazanashvili, et al., 2009). Over the past 15 years, Georgia has set up an ambitious programme to strengthen and enlarge its national PA system, supported by international partners and despite mounting pressures from commercial land-use for agriculture, logging, water consumption and energy production. The country's PA network now comprises 84 PAs of different management categories. In total, these areas cover 524,026 ha, or 7.5% of the country's territory. This number is still far below the Aichi 11 target of 17%, but plans to further enlarge the system exist, both in terms of expansion of existing protected areas and the establishment of new ones.

Yet, challenges persist, both at the political level as well as in terms of land-use conflicts. Notably economically marginalized remote rural areas are characterized

by a high dependency on natural resources, e.g. for agricultural purposes, firewood, or hunting. Thus, consolidation and further development of the PA system appears to depend largely on the successful integration of conservation and socioeconomic local development goals.

The Support Programme for Protected Areas

SPPA is a five-year programme (2014-2019) co-funded by the German development cooperation in the Caucasus through KfW Development Bank. It is implemented under the “Eco-regional Nature Conservation Programme (ENCP)” in the Southern Caucasus Region, launched by the German Federal Ministry of Economic Cooperation and Development (BMZ) in 2001.

The purpose of SPPA is the enhancement of natural resources and PA management, providing support to four selected PAs, while at the same time improving the socio-economic situation of the adjacent rural communities. A total of 8.25 million EUR is being invested in the development of the four partner PAs and their support zones – the areas in the periphery of or enclaves within the PAs, which have direct influence on the PAs through natural resource use, land tenure or traditional land use rights of the respective population.

Thus, the programme seeks a balance between two equally important and mutually reinforcing objectives:

- Improvement of natural resources and protected area management of the selected PAs; and
- Improvement of the socio-economic situation of adjacent rural.

Specifically, the programme is divided into the following outcome areas:

Table 1: SPPA outcome areas

| Outcome Area (Area of intervention) | Expected outcome/result |
|--|--|
| Planning for PA Development | Selected PA have available all necessary planning documents for their development and the promotion of the adjacent communities |
| PA Management | Selected PA are recognized and have a functional PA management |
| Support Zones | Adjacent communities of the selected PAs benefit from investments in the socio-economic development of the support zones of the PA |
| System Level | The national PA system is strengthened in particular topics according to international standards |
| Sustainable Financing | Sustainable financing of the national PA system is supported |

Conclusions: Challenges and lessons learned

The diversity of expected outcomes makes SPPA a complex endeavour. So far, numerous activities have been implemented or are under way, from baseline studies as basis for management planning, benchmarking and monitoring, to infrastructure planning, local stakeholder involvement and co-management structures through the establishment of PA friends associations and regional advisory councils, and the

implementation of socioeconomic support measures by means of a Financial Participatory Approach (FPA). Experiences so far are encouraging both on the side of reforming PA administration structures as well as in terms of local stakeholder involvement and initiatives, e.g. through the joint elaboration of small-scale projects at village-level and funding through FPA. Such initiative is not self-evident in a country with a long tradition of top-down decision making during the Soviet era, and widespread scepticism among rural local communities toward the central government. Future challenges include the sustainable continuation and development of the established instruments, in order to make PAs in Georgia genuine drivers of local development as well as biodiversity conservation.



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A New Concept for Sustainable Natural Resources Management in Uzbekistan: The Case of the Lower Amudaryastate Biosphere Reserve

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The Lower Amudarya State Biosphere Reserve (LABR) was established in 2011 by the initiative of the Government of Uzbekistan and with the support of the UNDP/GEF programme on the basis of the former *Badai-Tugai* state Strict Nature Reserve (zapovednik) established in 1973. The territory of LABR consists of a core zone (11.568 ha), a buffer zone (6.731 ha) and an economic zone (50.418 ha). LABR was established with the aim to preserve the biological diversity of the flood-plain tugai forests in the Amu-Darya river delta in Uzbekistan, as well as to ensure the sustainable use of natural resources; the social and economic development and protection of cultural values in the region. Once widely spread across Central Asia, nowadays the unique *tugai* forests are under desperate pressure due to an intensive land use and over exploitation of forest resources. Thus, the establishment of LABR demonstrated the governmental commitment to a new management model for protected areas and a step towards preserving the unique *tugai* forests by involving the interests of local communities. The new functions such as the development of sustainable land use practices, cooperation with local communities and environmental education were assigned to the administration of the biosphere reserve. Yet, an innovative for the country, the concept of biosphere reserve and relevant changes in management still require a wider understanding and acceptance among the stakeholders in the region.

The Project “Ecosystem based land and forest management of the tugai habitats of Amudarya river for improving livelihood of local communities and as adaptation strategy to climate change (Uzbekistan/Turkmenistan)” financed by the German Federal Ministry of Development and Economic Cooperation (BMZ) is implemented between 2015 and 2017 by NGO KRASS in Uzbekistan and research institute under the Ministry of Nature Protection in Turkmenistan in partnership with the Michael Succow Foundation for the Protection of Nature (Germany). The project addresses a sustainable, climate- and site-adapted management of natural resources in the Amudarya River, thereby improving the livelihood of the people in the target region and the environmental capacity of the floodplain natural space.

Planned project activities

In the context of the development of LABR, the following activities are envisaged within the framework of the Project.

- The capacities of the LABR administration will be strengthened through continuous training for a better preparedness to perform the new duties of educators and multipliers. The capacities for the development and implementation of ecosystem-based adaptations and required communication skills will be strengthened as well. The commitment of the administration for eco-tourism development in the area will be backed up in line with environmental and conservation issues.
- An environmental education center will be established and the communication strategies for promotion of the concepts of the biosphere reserve management and sustainable resource use will be elaborated.
- Local population will be involved into sustainable land use and forest management. Awareness raising activities will aim at an improved understanding and stronger identification with the biosphere reserve.
- Cross-border cooperation in nature and biodiversity conservation will be strengthened through experience exchange and partnership with the *Amudarynski* Strict Nature Reserve in bordering Turkmenistan.

Current status of the Project

Whereas the described activities are currently underway, it is expected to reach the following aims towards the Project' completion in the end of 2017:

- Developed and implemented land use concepts lead to a restoration of saline soils, reduction of water consumption and the improvement of biodiversity protection;
- The local population is able to obtain information about the relationship between resource use and quality of life and to take appropriate measures to adapt their economies;
- The biosphere reserve fulfills its function as a model region for sustainable land uses practices and is communicated appropriately in line with environmental and conservation issues.

Attitudes of the Government and Non-Government Sectors Towards Development of Ecotourism in Protected Natural Areas in Autonomous Province of Vojvodina (Serbia)

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Introduction

Each country tends to create a tourism policy and thus leads the planning and management of tourism development. Researchers opinion on the economic impact of the global ecotourism economy are different and some of them believe that ecotourism is developing faster than the tourism industry as a whole, and that this proportion is more than 20% of the world tourism market. When it comes to the development of ecotourism most responsible factor is the government that provides the funding and the ability to create favorable circumstances for the control and knowledge of how the private sector could work effectively. The development of ecotourism in Vojvodina should be aligned with the expected results of the Twinning Project SR07-IB-EN-02 - Strengthening the administrative capacity of protected areas in Serbia - Natura 2000. The ultimate goal of the project was to create an ecological network of NATURA 2000 in the Republic of Serbia. That would improve the preservation of endangered species and their habitats and raising awareness on the protection of natural heritage as well as increasing the capacity to implement legal standards for the protection of nature.

The role of government in the development of ecotourism in APV

Government must play a leading role in providing the necessary finance and budget, adequately management circumstances which would allow the private sector running smoothly and efficiently. This means that the government should:

- facilitate the efficiency of private sector activity,
- Provide a favorable macro-economic environment,
- guarantee respect for law and order, as well as dispute resolution,
- provide the necessary and adequate infrastructure,
- ensure the development of human resources,
- protect the public interest without obstructing the activities of the private sector with more regulations,
- promote private sector activity and confirm the role of small enterprises and facilitate their business.

The type of NGOs dealing with ecology and environmental protection in APV

With the aim to examine the attitudes of non-governmental organizations and managers of protected natural resources in Vojvodina about their possibilities of development of ecotourism in protected sites, authors were sent questionnaires to all organizations dealing with ecology and environmental protection.

From a group of 84 non-governmental organizations the following types of organizations that deal with ecology and environmental protection in the territory of AP Vojvodina could be singled out:

- Eco-centers,
- Eco movements,
- Eco Society,
- Eco associations,
- Eco-teams (in schools and other organizations),
- Green initiatives and network,
- Volunteer centers (for young people, the unemployed, the elderly),
- Student scientific associations in scientific institutions and faculties,
- Society for a healthy diet,
- Association for environmental green energy (renewable energy sources),
- Association for the Promotion of tradition and cultural heritage.

Conducting research and methodology

In addition to the government in the system of nature protection non-governmental organizations (NGOs) and operators have a strong role in the preservation of natural resources but also in the promotion and organization of ecotourism. The research for the needs of "Feasibility study of development of ecotourism in protected areas Vojvodina" was conducted primarily among the interested potential visitors of protected natural areas on the territory of AP Vojvodina. Also, there were investigated the statements of representatives of the NGO sector and handlers of protected natural areas in Vojvodina ($n = 24$). From a total of 84 non-governmental organizations from the municipalities on which territory protected natural assets extending only 24 of them responded to the survey. The goal was to provide an opinion on the possibilities for development of ecotourism in Vojvodina's protected natural areas. The instrument used in the study was closed questionnaire, which consisted of questions divided into six parts. For the processing of data were used descriptive statistical analysis, t-test for independent samples, and factor analysis of variance ANOVA.

Results

- The largest percentage of organizations considered that the nature of the Vojvodina is not sufficiently protected and preserved, and that it is given little attention to these issues.
- Non-governmental organizations believe that nature is degraded to a greater extent compared to the managers of protected natural areas.
- Controls and non-governmental sector protected areas are considered attractive for tourism development (especially ecotourism), though organiza-

tions believe that protected areas do not have all the necessary conditions for the provision of tourism services.

- Controls to a greater extent, believe that tourism is one of the primary sustainable activities in protected areas, although non-governmental organizations to a greater extent, protected areas are considered attractive for tourism development.
- Non-governmental organizations and managers believe that local governments in small measure support actions to protect, which is very negative. And they also believe that the locals are very few trained in the protection of protected natural resources and that they are not motivated to engage in eco-and-rural tourism.
- When it comes to local government, managers believe that the greater attention is going on the protection, while NGOs believe that more attention is focused on promotion campaigns.

Conclusion

The research results indicate the existence of different views of the respondents and provide the basis for further steps towards the improvement of ecotourism. As a threat, stands out the lack of human resources in organizations that manage protected natural areas and which should work on issues of development of eco-tourism. Also, as a threat stands out the unwillingness of handlebars to treat tourism as a real opportunity. In any case, both remain important stakeholders who are interested in developing ecotourism in Vojvodina. As a good example, among the managers can be emphasized the special nature reserve Stari Begej-Carska Bara and special nature reserve Zasavica. When it comes to the NGO sector, some organizations are very involved and can be a significant support in the development activities of eco-tourism.



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BRANDING AND MARKETING IN NATURE AREAS

Tourism Markers for National Parks – The Case of the Netherlands

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In the Dutch nature conservation tradition and the management of National Parks, the focus has mainly been on nature protection, education and research. In other countries the NP's have much more economic value for consumers and entrepreneurs (Van der Windt, 2012). Especially well established parks attract overnight visitors which spend money on accommodation and food in the surroundings of the national Park (Mayer et al, 2010). So tourists who are on holiday and visit a National Park in a particular country, are of economic value for the management of the protected area and local residents and gateway communities (Thomas, Huber & Koontz, 2015; King et al, 2012). In many regions National Parks and other protected areas have become an important attraction and play an important role in destination development (Reinius and Fredman, 2007). Such attractions are very important for the development of a tourism destination and the major motivator for tourists to travel to a certain destination. Effective marketing of the heritage values of the attractions will enhance revenue streams from tourism (King et al, 2012). A technique to build visitor awareness about the heritage values, is to present the tangible and intangible elements of the National Park prominently, consistently and repeatedly throughout the customer journey. This is not only important for the visitor experience but also for building positive beliefs and behaviours among decision makers, local inhabitants and tourism businesses (King et al, 2012).

The role of markers in the customer journey of National Park Visitors

A tourist (and potential visitor of a National Park) takes a customer journey and is confronted with the label NP several times during this journey. According to Egger & Maurer (2015) and ETC & UNWTO (2008), the customer journey is comprised of several phases; the inspiration phase, the planning, information searching before departure, the actual visit and post visit phase. There has to be at least one generating marker in order to become motivated to go on a trip. Markers are also able to manipulate the activity selection of the tourist during the trip (Leiper, 1990). Positive connotation to the label National Park can result in motivation and satisfaction of the tourist. Maps and road signs can be identified as markers, which help finding the nucleus (they help visitors finding what they look for). Souvenirs are considered as markers, since souvenirs help visitors to remember the tourist's experience (Leiper, 1990).

Observations on the customer journey were done in several National Parks in The Netherlands (Hoge Veluwe, Biesbosch, Lauwersmeer and Weerribben Wieden). For each of the different stages of the customer journey the markers were observed

with help of observation sheets. The type of marks, the function and the values which are communicated through the markers were analysed. Besides this a questionnaire was conducted in National Park Lauwersmeer and Weerribben Wieden, asking customers about the role of markers during their visit and their perceptions about the National Park.

Results

Preliminary results suggest that within The Neterland the brand National Park is hardly communicated with international visitors before their trip. No markers about the National Parks were found at the airport of Amsterdam Schiphol or at other major transportation hubs. Information is present on the official websites but is hardly available in English. Visual aids are an important feature on internet sites. Important values on official websites are doing activities while on social media (post trip phase) visitors tend to report back on spending time together with family and friends rather than undertaking activities.

The findings suggest that more systematic marketing is needed in order to make the public and visitors aware of the existence of national parks. More research is needed into the motivations and demands of (inter)national visitors in order to match.



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The recreational value of German national parks – consumer surplus analyzed with travel cost models

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Introduction

National parks (NLP) provide several ecosystem services like biodiversity and habitat protection, but also regulating and supporting services as well as cultural services like recreation and spiritual functions. Existing research about cultural ecosystem services of German NLP often focus on economic impact studies proving their role as major tourism attractions in rural areas (Job et al. 2016, Mayer & Job 2014, Woltering 2012). However, these studies only offer an incomplete view of the willingness to pay for recreation in NLP as they rely solely on the onsite expenditures of visitors while the travel and time costs to reach the parks are not considered. This paper presents the preliminary results for the recreational value of 14 out of 16 German NLP. The recreational value is determined using travel cost models (TCM). Although well established and criticized for years (Ward & Beal 2000), these are its first applications to German NLP.

Methods

The TCM are based on economic impact studies in 14 German NLP conducted between 2004 and 2015 (Job et al. 2016, Mayer & Job 2014, Woltering 2012). These representative studies use the same methodology allowing us to use 24,548 detailed interviews for the calculation of our TCM. However, extensive data preparation work was still necessary.

The travel distances between the visitors' origin and the parks were calculated as follows: Based on the five-digit postal code of visitors' municipality of residence we used GIS to determine the straight-line distance. Relations between these distances and shortest road/railway distances were determined based on mean values from Bavarian Forest NLP (Mayer 2014) and samples for each visitor group. The same procedure was undergone for the travel time. The population figures of the zones were determined on a county level. The very low shares of foreign park visitors were excluded from the TCM in most parks because these visitors were not asked for their place of residence.

We calculated the mean travel cost rate for cars using statistics differentiated according to car type published by the ADAC. We used only the operating costs and divided these car cost rates by the average group sizes in the parks. For visitors travelling by train and bus, information by bus operators and from the Deutsche Bahn website were used. Weighted with the shares of the park visitors' means of transportation and adjusted for inflation but also for price variation using official price indices, average travel cost rates range between €0.0374 and €0.1181 per person and km.

The opportunity costs of travel time were only taken into account for self-employed visitors, using the average gross/net income per working hour as a proxy. Following the recommendation of Ward and Beal (2000) to set a third of the wage rate for the opportunity costs of time, the estimated consumer surplus has to be raised by 7.5 to 24.2% or 4.9 to 15.7%. We dealt with the multiple-trip bias by assigning the full consumer surplus to the visitors with high NLP affinity (Woltering 2012) and half of the consumer surplus to the group of visitors partly motivated by the park. Visitors not motivated by the parks were excluded from the consumer surplus aggregation. Based on these assumptions, reaction functions were estimated for each park for zones of mostly 30 km width as double-log regression models.

Preliminary results

In total, the lower bound consumer surplus (CS) (100 € truncation; multiple-trip-bias; opportunity costs of time net wage rate) of recreation in German NLP surpasses EUR 350 million while an upper bound value (200 €, gross wage rate) is higher than EUR 610 million. The highest per visitor day CS are calculated for Müritz, Jasmund and Bavarian Forest (lower bound) respectively Jasmund, Müritz and Vorpommersche Boddenlandschaft (upper bound) NLP. These parks all have in common relatively high shares of visitors with high NLP affinity as well as comparatively high mean distances due to high shares of vacationists.

The following factors influence the recreational value of German NLP while model specifications and assumptions remain constant for all parks:

- The number of visitor days per NLP: Similarly to the economic impact studies the maritime NLP in the Wadden and Baltic Sea are strongly dominating (>80%) over the smaller forest NLP with a usually weaker tourism orientation.
- The mean distance to visitors' residences: This factor is again influenced by the attractiveness of the destination for vacationists, i.e. the visitor structure, as well as by the geographical location in Germany. In that way the maritime and alpine peripheries cause the higher travel distances compared to more centrally located destinations like Harz NLP.
- Travel costs: As inflation in Germany was relatively low and carbon fuel prices varied in both directions the parks differ mostly in terms of means of transportation. Ferries required to access islands and high shares of railway users lead to higher travel costs compared to destinations with high shares of car transport and bigger travel party sizes.

Outlook

The considerable recreational value of German NLP most likely exceeds the already impressive economic impact of tourism in German NLP (9.51 million visitor days with high national park affinity per year, EUR 252.1 million income, Job et al. 2016: 25). However, these results are not directly comparable as economic impact creates jobs in the park regions while recreational value merely constitutes paper benefits not leading to concrete payment flows. Therefore, these figures should be treated with caution. Nevertheless, the recreational value of the German NLP transports three important messages: First, the parks generate enormous values for the German so-

ciety as a whole by providing highly valued recreational opportunities. Thus, our results provide further arguments in favor of NLP because they reflect societal benefits not expressed in monetary flows. Second, the recreational value allows a better comparison of German NLP in terms of their attractiveness for recreation as the travel costs per km are more or less constant all over Germany and not influenced by e.g. price levels. Third, the TCM allow predictions about the sensitivity of park visitors with regard to changing travel costs (e.g. parking fees, carbon tax).



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Protected Areas in the Function of Tourism Improvement in Western Serbia

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The basic condition for tourism development is healthy and unpolluted environment with its natural and cultural values. Opportunities for tourism development in a certain area are more favorable in conditions when environment is better preserved and more attractive. On the other hand, there are polluted, degraded and devastated landscapes that cannot be returned to primarily state. In recent years, in many developed countries across the Europe, the great attention has been devoted to sustainable development of tourism and the preservation of the environment at the same time. It is assumed that integration of protected areas and their role in the tourism offer of Western Serbia will be improved on the basis of examples, experiences and knowledge of developed countries. The concept of sustainable development implies a balanced economic, social and cultural development without compromising the environment. So, it can be concluded that sustainable tourism has a long-term benefits and effects.

The subject of the research includes definitions and scientific explanations regarding the relevant indicators that might affect the further development of tourism in protected areas of Western Serbia. Special attention will be directed to the importance and the role of protected areas in tourism offer of Western Serbia, the analysis of turnover in tourism and providing the assumptions, potential solutions and determining the guidelines for further development of tourism that could serve as a basis for increasing the tourism offer to a higher level. Tourism in protected areas (National Park "Tara", Parks of Nature "Golija" and "Šargan-Mokra Gora") represents the most significant segment of tourism offer within the Western Serbia which, thanks to the natural, social and anthropogenic tourism values, allows the development of selective forms of tourism (such as excursions, health tourism, event tourism, rural tourism, sport tourism, cultural tourism etc.). The main goal is to raise the awareness of population about the importance of tourism and their involvement and active participation in order to achieve significant contribution to the development of this economic activity.

The paper used the methods of analysis and synthesis, as well as mathematical-statistical and comparative methods. Five groups of EU comparative indicators for sustainable development of tourism (economic, tourist satisfaction, cultural, social and environmental indicators) are analyzed. These indicators demonstrate the actual situation and the potential for tourism development of a certain area in accordance with three main principles of sustainable development: ecological, socio-cultural and economic. Marginal values are defined for each indicator and tourism

situation could be assessed as critical, containable and sustainable. The usage of indicators is based on the coding system by introducing the three zones: red, yellow and green zone. Results are represented in the form of tables and charts.

The level of development of tourism and the quality of tourism offer in protected areas within Western Serbia is marked as containable and it belongs to the yellow zone. National Park “Tara” and Parks of Nature “Golija” and “Šargan-Mokra Gora” are well positioned and recognized as tourism destinations. However, for sustainable tourism development in protected areas of Western Serbia it is necessary to achieve the balance between economy and ecology development goals by using the integrated approach in its planning and management. The results can be applied by tourism organizations, local governments and commercial entities in tourism promotion, but also in defining the subjects, objectives, tasks and implementing the projects and studies related to protected areas. All stakeholders of tourism offer, based on the research results, could make changes and improvements of tourism offer in line with the needs of the modern market, based on the allocation of advantages and disadvantages of researched area.

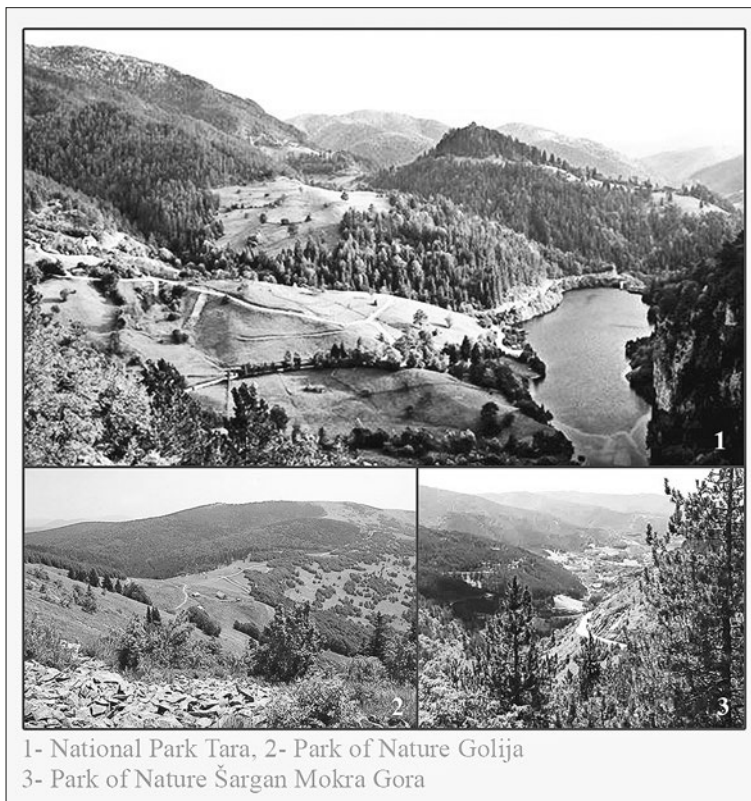


Figure1. *Protected areas in Western Serbia*
Source: Authors

National parks are going social? An exploratory study of former Yugoslav countries on Facebook

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Introduction

Millions of people are using social network sites (SNSs) as they serve a number of functions in online and offline life, such as information search, providing emotional and social support and creating and maintaining ties to other people (Pempek et al., 2009). Furthermore, characteristics of SNSs dramatically changed how travellers plan and consume travel related products as SNSs are becoming increasingly important in travel planning, during the travel, but also in post-travel activities (Chung, Buhalis, 2008). At the same time, an increasing number of visitors and public are discovering protected nature directly or through their friends and family on SNSs. Likes, posts or comments are new language that should be adopted by national parks (NP) managers in order to communicate their mission and messages in digital era.

Nowadays having presence on Facebook, as a most used and most influential SNS, is a prerequisite for social media promotion activities. Unlike individuals who use Profiles (webpages containing user's information) to present themselves on Facebook, companies mostly use Facebook Pages. This option allows businesses, brands and all types of organizations to create a free presence on Facebook. Users can interact and affiliate as a fan of an organization's Page in the same way they interact with other Profiles (Cooper, 2010). Once a fan of a company on Facebook, users can "like", "share", "comment" posts actively expressing an engagement with the posting.

Many national parks (NP) and other organizational structures for environmental protection recognized growing popularity of Facebook and this topic is gaining importance since it is attracting more and more academic and practitioner attention. Still, this process is uneven in different parts of the world. This paper examines level of adopting and current practices of Facebook usage by the NPs in former Yugoslav countries (Bosnia and Herzegovina, Croatia, FYR Macedonia, Montenegro, Serbia and Slovenia) to seek for common practices, good examples or pitfalls.

In most cases, NPs can be seen as tourist destinations and consequently, parts of parks' managing structures can act as destination management organizations (DMOs). Therefore, this research proposes and adopts the use of common method-

ology for assessing destination management organizations' Facebook Pages in order to explore the level and form of acceptance among NPs.

Methodology

The proposed approach used for data gathering is based on a systematic process of meaningful and open selection of variables, with technically low-demanding procedures usually used in research of DMOs. Based on the review of the contemporary studies of Facebook and advances in Facebook usability variables were chosen. These characteristics are not conclusive, but are offered to spark consideration and to add to the constantly open debate which is necessary concerning the dynamic nature of this social medium.

In general, Facebook Pages were analyzed in terms of general usage and Page popularity. In addition, within a selected timeframe, all published Facebook Page posts were analyzed in terms of post characteristics and engagement of users.

The data collections were gathered in two ways. The data for Pages were collected manually and using the customized requests, based on the Graph API Explorer, a low-level HTTP-based API for reading and writing the Facebook's Social Graph (Facebook Developers, 2015). Facebook's Social Graph is a graph data structure that represents social interaction and consists of nodes and connections between the nodes (Russell, 2013). The authors used Graph API Explorer v2.4 to query information, such as the number of users who like the Page, Page fans' countries, whether the page is verified, etc. For those information when automated approach was restricted by Facebook privacy policy (such as number of tabs and applications, review values, etc.), authors used manual data gathering. The data for Page posts was gathered automatically using page data module of Netvizz v1.25 tool. This Facebook tool extracts data from different sections of the Facebook groups and pages (Rieder, 2013). Extracted data include information such as: Facebook's post classification text of the post, picture URL (if a picture is attached to the post), publishing date and time, number of likes, comments, shares, etc.

Results and discussion

Presently, most of NPs in the region have Facebook Pages (see Table 1). Most Facebook Pages are created in 2012 and 2013. First NP Facebook Page in the region dates from 2008, and two new ones are created in 2016.

Table 1. Number of NP Facebook pages in former Yugoslav countries up to May 1st, 2016.

| Country | Number of NPs | Number of FB Pages |
|------------------------|---------------|--------------------|
| Bosnia and Herzegovina | 3 | 3 |
| Croatia | 8 | 8 |
| FYR Macedonia | 3 | 3 |
| Montenegro | 5 | 1 |
| Serbia | 5 | 5 |
| Slovenia | 1 | 0 |

Preliminary results show that NPs in this region recognized Facebook as a communication channel but still have problems in realizing how to use it, that is, how to find effective strategies for managing existing Pages.

This paper demonstrates applicability of common methodology used for assessing DMO Facebook Pages in case of NPs. Furthermore, the results provide valuable insights into the regional practice of using Facebook Pages in former Yugoslav countries. The approach employed stresses the importance of determination of NP Facebook practice in regional settings by pointing out structural problems. In that sense, knowledge of the common Facebook usage standards can help NPs to evaluate their position in the region and adjust their practice. The findings of this paper could contribute to the existing research of the use of SNSs by NPs, specifically Facebook, by giving them guidelines for establishing good practice.



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ICT in promoting and interpretation in protected areas – example of Serbian national parks

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In recent years, the role of information and communication technologies (ICT) in the environment protection and promotion has attracted great attention. ICT can improve the understanding of environmental issues in humans, as well as their political implications. In research, ICT application is generally considered as a way to use this technology for the benefit of the environment. Today, communication processes are strongly associated with the use of Web 2.0 tools, working on desktop computers and mobile devices. Such advantages and challenges of modern ICT's are quite relevant for large protected areas (e.g. national parks). Nonetheless, destination success depends on its capacity to create and promote the competitive tourism product according to preferences and requirements of potential and existing demand. For these purposes, in addition to ICT's, geographic information systems (GIS) play an important role.

When it comes to tourism offer, a good quality GIS may be significant for management and decision making. On the other hand, for tourism demand in particular can be important Web site based on the GIS use with a high level of interactivity. Tourists may use GIS to make travel decisions, for travel planning, gathering information about the destination, easier navigation, etc.

The possibility of obtaining information is of interest for the tourist demand. Therefore, the use of technology and the presence on the Web has significance in the national parks management, as tourist destinations that have multiple roles - pro-

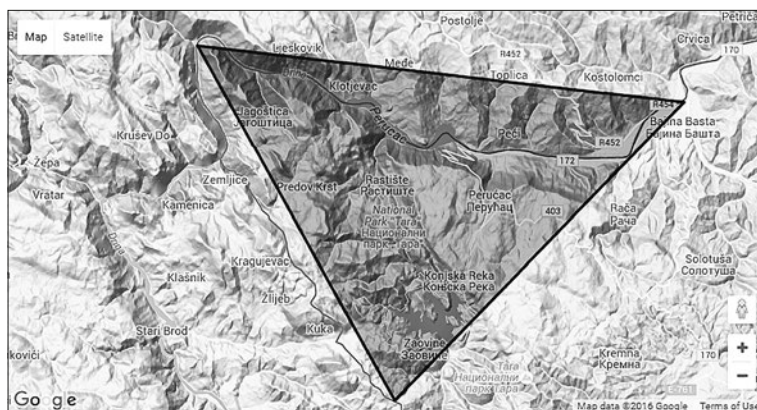


Figure 1. Google map as a part of the national park Tara website
Source: <http://www.nptara.rs/np-tara-online/google-mapa.html>

viding tourist services, education and protection of natural and cultural resources. The presence on the Web and provided information, constitute an integral part of tourism product and influence the visitor experience quality acquired before, during and after the visit to the national park. Regarding this, one of the research goals is to determine how tourists perceive the importance of GIS in national parks and to what extent the use of geographic information systems affect visitor satisfaction. Also, the study will analyze how much the improvement of Websites through the use and integration of geographic information systems, provide an opportunity for additional informing, education about national parks and improving the travel experience. The initial hypothesis in the paper reads as follow:

- GIS application on the Serbian national parks Websites enhances tourism offer and positively affects the visitor satisfaction.

Some researchers () believe that protected areas are still not fully used the potential of modern information and communication technologies. Therefore, another research goal is to evaluate the national parks websites. The results may be useful for managers in planning activities and implementation of innovative technological changes. This analysis has shown that the use of ICT in the protected areas can be of great importance in the scientific community, but also can play a key role in the context of the business sector.

ASSESSMENT AND EVALUATION MODELS OF PROTECTED AREAS

Management strategies for outdoor recreation in Central European high-mountain national parks

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High-mountain ranges are unique features of the landscape in Poland, Austria, Czech Republic, Germany, Slovakia and Slovenia. They are also one of the main tourism destination in the respective countries. Traditional outdoor activities i.e. mountaineering and alpine skiing are extremely popular there although in the last two decades new forms of outdoor sports and recreation have gain significant importance, e.g. ski-touring, rock climbing, mountain biking and other (see Zinser 1995). There is a broad knowledge of tourism impact on mountain environment in general (e.g. Rixen, Rolando 2013) but various management strategies and regulations are applied in response to this impact (Eagles et al. 2002, Manning, Anderson 2012, Mason 2005).

In the Western Carpathians and in the Giant Mountains (the Bohemian Massif) the entire area above timberline is protected within national parks as well as the other protected areas such as Natura 2000 sites or UNESCO Biosphere Reserves. It relates also to the most of the high-mountain ranges in the Eastern Alps (e.g. Julian Alps, High Tauern, Bavarian Alps). Level of restrictions differs in respective mountain ranges however value conflicts between nature conservation and outdoor recreation are observed in all of them (see Prato, Fagre 2005).

The study area encompasses 8 national parks (category II in IUCN classification) in the high-mountain ranges of Central Europe. These are: Tatra National Park (Poland and Slovakia), Karkonosze National Park (Poland and Slovakia), Low Tatra National Park (Slovakia), Berchtesgaden National Park (Germany), High Tauern National Park (Austria) and Triglav National Park (Slovenia). All of these national parks are visited by a vast number of tourists, exceeding 100 000 visitors per year. The aim of the study is to analyse efficiency of applied management strategies as well as determinants for managing outdoor recreation in respective national parks. These are: forms of outdoor recreation and number of visitors, characteristics of the environment and environmental impact of various recreation forms, legal basis as well as social and economic issues. Management plans, access rules and strategies for nature conservation of respective protected areas were analysed. Additionally, interviews with national park administration and opinion leaders representing various stakeholders groups as well as query of social media and discussion forums were carried out.

Various restrictions are implemented in national parks as a part of management strategies. These are spatial, temporal, quantitative and qualitative limitations. The first are the most common and consists in limiting particular activities to designated areas, trails or objects. Seasonal closures are usually applied to protect wildlife and are generally accepted by visitors. Qualitative regulations are relatively rare and are related to concept of carrying (ecological) capacity of environment. However, it

is hard to establish precise number of visitors allowed to enter trail or area. Thus, it is often considered to be arbitrary. Additionally, wide range of detailed regulations is established in studied national parks. These may response to environmental impact but also to risk management.

Table 1. Selected outdoor activities in Central European high-mountain national parks – rules and regulations

| | Ski-touring | Climbing | Caving | Mountain biking | Paragliding |
|-------------------------|---|---|--|--|--|
| Tatra NP (Poland) | only on marked trails, seasonal closure – protection of marmots | only in designated areas, regulations on placing bolts, obligatory auto-registration | only in designated caves, must be a member of speleological club, obligatory auto-registration | only on few designated trails below timberline | forbidden |
| Tatra NP (Slovakia) | only on marked trails; above timberline – only on 10 designated trails and in 1 ski-touring area | only in designated areas (some of them only in winter), must a member of mountaineering club | only in designated caves, must be a member of speleological club | only on designated trails below timberline | 4 designated places for departures, allowed from 9AM to 4PM |
| Giant Mts. NP (Poland) | only on marked trails | only in 2 designated areas (in winter), individual permit must be obtain | - | only on few designated trails below timberline | 1 designated place for departure, individual permit must be obtain |
| Giant Mts. NP (Czechia) | only on 8 designated trails above timberline, seasonal closures | rock climbing – in few designated areas, ice climbing – only in one area, daily limit of climbers, obligatory auto-registration | - | over 400 km designated biking trails and downhill slopes | designated places for departures and landing, designated flying corridors |
| Low Tatra NP (Slovakia) | on marked trails and in 2 designated skitouring areas, seasonal closures (also due to avalanche risk) | only in few areas, seasonal and temporal closures | only in designated caves, must a member of speleological club | only on designated trails | designated places for departures and landing, designated flying corridors, seasonal closures |

| | Ski-touring | Climbing | Caving | Mountain biking | Paragliding |
|----------------------------|--|------------------------------|---------|---------------------------|--|
| Hohe Tauern NP (Austria) | allowed | allowed | allowed | allowed | designated places for departures and landing, designated flying corridors, seasonal closures |
| Berchtesgaden NP (Germany) | only on designated trails above timberline | regulations on placing bolts | allowed | only on designated trails | forbidden |

Analysis of case studies from Central European national parks indicates that stakeholders' participation in management process is a key-factor to ensure its efficiency. Otherwise, attitude toward regulations is strongly negative and applied restrictions are commonly flouted. Additionally, educational and informational actions as well as visitors' monitoring are crucial to build trust and establish co-operation between national parks authorities, rangers and various groups of visitors.



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Monitoring of disturbances in the natural environment on Pohorje Mountain (Slovenia)

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Slovenia is due to its picturesque nature and unique natural resources identified as a country with great potential for the development of green, responsible tourism. Protected areas offer visitors to experience nature qualitatively; at the same time, tourism and recreation increasingly affect these areas. Preserved natural areas attract people, so visits to these sites are becoming more frequent and numerous. It is in most cases impossible to leave these areas to nature conservation only; therefore, it is necessary to actively regulate visits or guide the visitors away from the most vulnerable natural areas to areas, which are less sensitive and less valuable from the point of nature conservation importance.

Research into movement of visitors in natural protected areas is essential if we want to zone the space so that it regulates visitors' activities in a way that minimizes its effect on nature but at the same time still preserves the attractiveness. Data gathered from the field (recording with counters, observation of visitors, etc.) should be meaningfully incorporated in the planning of visitors channelling (construction of new trails, the relevant information and interpretational infrastructure, construction of classrooms in nature, etc).

This paper deals with the monitoring of disturbances (motorized vehicles, snowmobiles, bikes) in the natural environment on Pohorje Mountain range (Slovenia) and presenting implemented activities dealing with visitor management in the area. Activities were carried out through the project SUPORT - Sustainable Management of Pohorje area (EEA Financial Mechanism and Norwegian Financial Mechanism 2009-2014 in Slovenia; EEAG 4300-346/2014; Y2015-2016) and transferring management planning process into ongoing project LIFE TO GRASLANDS - Conservation and management of dry grasslands in Eastern Slovenia (LIFE 14 NAT/SI/000005). The project focused towards efficient management and monitoring of Natura 2000 sites. One of the work packages of the project included zoning of space on the appropriateness of human activity in the natural environment. With Ferro-magnetic sensors, we have monitored disturbances in the natural environment. The sensors tracked the frequency of disturbances in the natural environment and on forest roads, where traffic is only permitted for forest management.

Based on collected data, a pattern of use of forest roads has been established (40 markers positioned on the tables of the Natura 2000 entry into the quiet zone, 50 road signs with time-limited visit and raised up 5 road blocks).

The analysis has also included monitoring of traffic on hiking trails and pathless areas. Analysis of interference showed that the maximum value of journeys was detected during the wintertime. Standing out were the months of February and March

2016 especially during night period (between 20 pm and 6 am in the morning). At this time of the day we can predict with a high certainty (especially due to visual trail in snow) that snowmobiles were the major cause of the disturbance (a location near tourist centres with the accommodation capacities). Between 20 pm and 6 am in the period between 1. 10. 2015 and 31. 3. 2016 observed data has showed that a fifth of all journeys has occurred during the mentioned night period. In the autumn dominated cross motorcycles, quads (ATV) and off-road cars and during the winter (especially the period of snow cover - February, March) the snowmobiles. The datasets are necessary tool to aware local and state governance to take additional measure for lowering illegal activities in nature environment.

Analysis of disturbances were carried out since the September 2015 lasting until the end of March 2016. In autumn time (September, October, November 2015) the number of drives increased on all forest roads ("mushroom season"). In the winter period, the information on individual sites strongly differ, because the roads had not been ploughed (period January-March). Winter period 2015/16 (December-February) was characterized with the snow cover of the observed forest roads from mid-January until the end of March 2016. For this period, we expect that the road transport was taken by the snowmobiles. New datasets were the base for setting up additional measures for establishing zonation regimes in order to protect high valued natural areas.

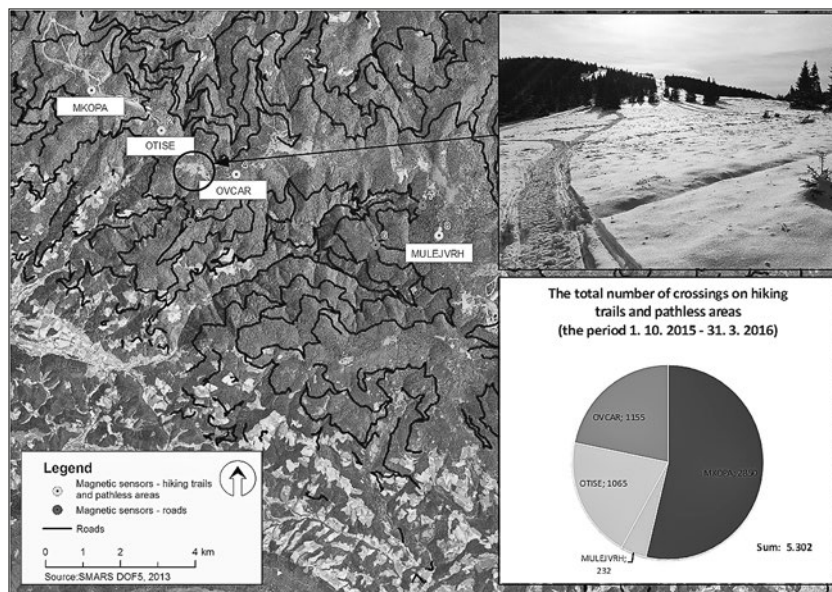


Figure 1. The monitoring results of traffic on hiking trails and pathless areas



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Towards a carbon-neutral university: Assessing the recreational value of a university forest and the tradeoffs with other ecosystem services

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Introduction

Climate change has become one of the six sustainability problems amongst deforestation, loss of biodiversity, population growth, poverty and scarcity of drinking water (Schaltegger&Csutora 2012). In 2015, the Paris-Agreement was reached to limit the temperature rise to 1.5°C from pre-industrial level. To realize this, investments and concerted actions towards low carbon future are crucial. As such, many academic institutions worldwide are becoming aware of their carbon footprint and are voluntarily moving towards low carbon pathways to become carbon neutral.

Ernst-Moritz-Arndt University Greifswald (EMAU) in North-East Germany also planned to become carbon neutral and sought several carbon reduction measures to neutralize its carbon footprint (~8,900 CO₂e/year-1) arising from three major emission sectors viz. electricity, heating and official travels. Almost half of the carbon footprint was reduced through the use of renewable energies, energy efficiency measures and environmental friendly mobility. In order to compensate unavoidable emissions, the EMAU sought carbon offset measures on its own forests. For historical reasons, the EMAU owns and manages ~3,000 hectare forests scattered around Greifswald, which offer a possibility to enact local carbon offset strategies. The carbon offset necessitates implementation of an improved forest management compared to a business as usual management to enhance and sustain the carbon sink. The improved management, e.g. by changing rotation lengths, tree-species composition or intensity of thinning operations might influence forest development over time and lead to tradeoffs and synergies between forest ecosystem services. Several studies showed tradeoffs and synergies between biodiversity, carbon sequestration, timber production and forest recreation across different forest types and management regimes (Duncker et al. 2012, Edwards et al. 2012). The public preferences on Polish forests showed that older stands with vertical layering, irregularly spaced trees and higher number of tree-species were preferred (Giergiczny et al. 2015). Therefore, understanding tradeoffs and synergies to address multiple benefits for an optimal forest management strategy is a key challenge for forest managers and decision makers.

In our research, we aim to assess tradeoffs and synergies between major forest ecosystem services for designing a decision support tool that provides an optimal forest management strategy to offset unavoidable carbon emissions of the EMAU

(Figure). As tradeoffs between forest recreation and carbon offsetting were largely unknown for the EMAU forests due to lack of information on public preferences, it was necessary to conduct visitor monitoring and recreational preferences surveys. Here, we mainly highlight the recreational value of the EMAU owned forests with following specific objectives:

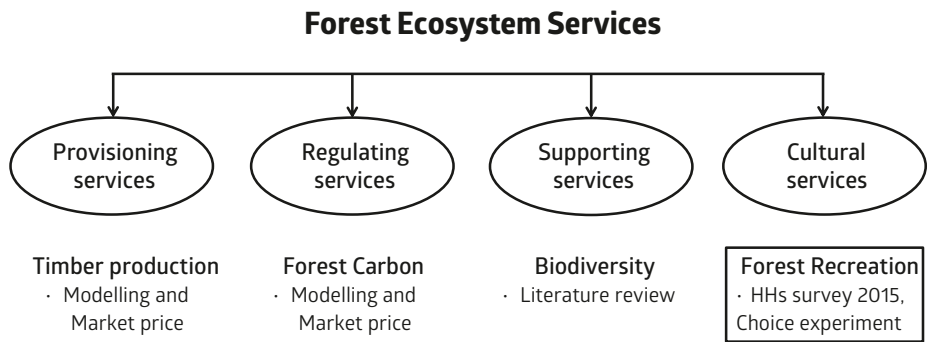
1. Monitoring visitors at Eldena forest, owned by EMAU, and
2. Modeling recreational preferences of people living in Greifswald based on marginal utility of forest attributes under different managements.

Visitor monitoring

Eldena forest, a nature reserve (~411 ha) since 1961 is one of the most frequented forests near Greifswald. There was no official visitor data until 2015, when we carried out a first visitor survey. Manual visitor counting was conducted at seven major forest entrances on randomly chosen days, i.e. working days, weekends, public and school holidays. The visitors were counted between 9 am and 7 pm from May–Nov 2015. Simultaneously, for automatic visitor counting, an eco-counter was installed in one of the most frequented entrances (Jan–Dec 2015) and three infra-red cameras at other entrances.

The manually counted visitor data from all entrances was first extrapolated to 24 hours by adding-up the percentage visits for the missing hours between 7 pm and 8 am. Thereafter, a good or bad weather day was predicted for a year from daily temperature, sunshine hours and precipitation data of Greifswald. Then, four day type categories were defined depending on i) good and bad weather, and ii) holidays/weekend and working days for yearly extrapolation (Job et al. 2009), which estimated ~76,000 visitor days to Eldena forest in 2015.

There was 12% deviation on total visits using the manual and automatic counting methods; this might be due to over/under estimation during extrapolation. Thus, we report a threshold between 66,800–76,000 visitor days to Eldena in 2015.



Source: Own draft adapted from United Nations Millennium Ecosystem Assessment, 2005

Figure 1. Assessing tradeoffs and synergies between major forest ecosystem services at EMAU forests.

Modeling forest preferences

An online household survey was conducted in Oct-Nov 2015 where ~11% of the Greifswald population was approached through a stratified random sampling based on the election areas and population data. A choice experiment was used for modeling forest recreation preferences as it has advantages over the contingent valuation method (Boxall et al. 1996). Two versions of the experiment were developed with different payment vehicles, i.e. travel distance and travel cost. Each design had six attributes with respective levels as below:

1. Forest type: even-age young, even-age old, uneven-age;
2. Deadwood amount: low, medium, high;
3. Deadwood structure: only lying, standing and lying;
4. Carbon: low, medium, high;
5. Biodiversity: low, medium, high;
6. Travel distance (km): 2.5, 5, 7.5, 10, 15, 20 or Travel cost (Euro): 0.75, 1.5, 2.25, 3, 4.5, 6.

Altogether there were 36 choice sets and each respondent faced one block with six choice sets. Furthermore, responses on environmental attitudes, recreational behavior and socio-economic characteristics were collected.

The choice experiment was restricted to those who indicated to visit forests for recreation; there were 262 completed responses for the distance and 236 for the cost questionnaire versions. A preliminary analysis using multinomial logit models showed that the results were as expected for different forest attributes. The marginal utility of uneven-aged forest, high carbon and high biodiversity were positive and significant for both versions, whereas the travel distance and travel cost were negative and significant, indicating that there is less likelihood to visit a forest if distance or cost increases.

Conclusion

Any forest carbon offset strategy for enhancing the carbon sink should take into account tradeoffs of offsetting the carbon with other forest ecosystem services. A decision support tool that integrates multiple forest ecosystem services including visitor's recreational preferences could provide wider acceptance and help forest managers in making careful compromises between the forest services and to choose an optimal forest management to achieve a win-win situation.



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Modelling the recreation demand for natural areas in the Czech Republic

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The contribution aims at modelling of recreation demand for large natural areas in the Czech Republic using a discrete choice model based on McFadden's random utility framework. Our application encompasses 27 recreation areas, including national parks and large protected landscape areas. The main interest of the analysis is to determine which environmental attributes of recreation sites (such as land cover, type or structure of vegetation or forest type) drive the demand for outdoor recreation; employing the recreation demand model, it is further possible to disentangle the implicit recreation value that visitors associate with particular sites and particular environmental characteristics of the area.

Data and methodology

The source of data is a cross-sectional micro data set obtained within the scope of project funded by the Ministry of Agriculture of the Czech Republic "Monetary valuation of recreational and aesthetical function of forest in the Czech Republic". The data have been supplemented with natural characteristics of the recreation areas, employing geographic data on Corine Land Cover categories for year 2006 by the European Environment Agency. Also, data on the travel cost have been collected using an objective measure of distance and time (see Kaprová, 2015). Since trip costs are also included as one of the characteristics of the trip, the model implicitly captures trade-offs between money and levels of natural characteristics (Parsons, 2003).

To model the recreation behavior, we use a travel cost model based on McFadden's random utility framework (McFadden, 1974). Random utility modelling in travel cost method aims at estimation of probability that the visitor chooses one recreation site among other substitute areas.

Results

The following table shows the results of a multinomial travel cost random utility model using a set of 884 observations.

Table 1. Results of the multinomial travel cost random utility model

| Variable | Estimate | Std. err. | Est./s.e. | Prob. |
|--------------------|----------|-----------|-----------|-------|
| Short-trip utility | | | | |
| TC | -1.037 | 0.020 | -52.451 | 0.000 |
| Artif_% | -0.145 | 0.021 | -6.934 | 0.000 |
| Pasture_% | 0.002 | 0.004 | 0.534 | 0.593 |
| Forest_br | 0.692 | 0.151 | 4.584 | 0.000 |

| Variable | Estimate | Std. err. | Est./s.e. | Prob. |
|---------------------|----------|-----------|-----------|-------|
| Forest_con | 0.517 | 0.063 | 8.241 | 0.000 |
| Forest_snat_% | 0.016 | 0.002 | 7.553 | 0.000 |
| Wat_body | 0.344 | 0.057 | 6.038 | 0.000 |
| Ln_area | 0.177 | 0.041 | 4.347 | 0.000 |
| No-trip utility | | | | |
| Constant | 9.236 | 0.393 | 23.489 | 0.000 |
| University | -0.993 | 0.052 | -18.960 | 0.000 |
| Fulltime | -0.374 | 0.043 | -8.806 | 0.000 |
| Family_no | 0.131 | 0.024 | 5.448 | 0.000 |
| Family_1 | -0.531 | 0.075 | -7.075 | 0.000 |
| Age | 0.002 | 0.001 | 1.447 | 0.148 |
| Hours | -0.127 | 0.004 | -30.607 | 0.000 |
| Hiking | -0.459 | 0.043 | -10.661 | 0.000 |
| Mean log-likelihood | -20.09 | | | |
| No. of cases | 884 | | | |

As expected, the travel cost is negatively related to the probability of visiting the site. The coefficient is significant even at 1% significance level. Most of the variables describing the site that are used to model the short-trip utility are also highly significant determinants of the choice; only the percentage of pastures in the area does not have any effect on the probability of visiting the area. All variables have expected signs - the only variable with a negative coefficient is percentage of artificial areas in the recreational area, which is also intuitive. The variables explaining the no-trip utility (i. e. the decision to stay at home and not to participate in any short trip to nature) are also almost all significantly related to the probability of choice; only age does not seem to matter.

Summary and conclusion

The article presents modelling of recreation demand for large natural areas in the Czech Republic using a discrete choice model based on McFadden's random utility framework. The application is based on a cross-sectional micro data set gathered off-site from Czech population and information on past visits of respondents to 27 large recreation areas.

Most of the variables in both parts of the random utility model are successful in explaining the choice of the respondent. As the next step, we would like to employ the results of the recreation demand model to analyze the impacts of marginal changes in the model parameters on the recreation utility of visitors to Czech natural areas. The results of the welfare analysis may be further implemented in the decision-making on the natural areas and for evaluation purposes of changes in the areas.

Acknowledgement

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Is PPGIS always an effective management tool?

Reflections based on the Tatra National Park case study.

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Public Participation GIS (PP GIS) defined both as 1) a field of geographic information science (ref. Tulloch 2008) or 2) the use of variety of GIS methods and techniques to increase public participation in decision-making processes (ref. Sieber 2006) may result in contradictory interpretations. While science-based processes are to be fully consistent in terms of the adopted methodology, management-driven initiatives are expected to be more methodologically flexible to better capture a broad spectrum of information potentially useful for the managers.

The presented study, realized within the LINKAGE (LINKing systems, perspectives and disciplines for Active biodiversity Governance) project between November 2014 and February 2015, aimed to identify landscape values of Tatra district in Poland. The whole project was to improve biodiversity governance in Poland and Norway by developing innovative protocols and technologies for biodiversity governance. In order to meet that challenge, we used the same carefully designed Internet-based PP GIS application in the socio-ecological context of three national parks: Jotunheimen and Saltpjellet–Svartisen NP in Norway and Tatra NP in Poland (Brown et al. 2015). Both the case studies and adopted methodology were selected to maximise possibility of further comparisons of the results – all the sites were of high-mountain character and protected as national parks. The PPGIS application was based on a tool already widely-used worldwide (see landscapevalues.org for further references) which additionally suggested its broad applicability. The tool uses points as spatial representations of the measured variables. Thus, the mapping exercise required from the respondent to place several markers on the provided basemap to inform about a) landscape values, b) preferred activities and c) unpreferred activities connected to certain places. The task was identical in both Polish and Norwegian applications.

Unexpectedly, the results obtained in the Polish study sites turned out to be much less informative compared to the former applications of the tool elsewhere. It was due to a very low return-rate of the survey which has reached only 1.2% despite deepened and broad recruitment process adopted for the research: we used 1) a ran-

dom sampling, directed only to the residents of the Tatra district (n=3000), based on a profiled mailing service, and 2) a voluntary sampling, that used public media and other channels of public information, directed both to residents and visitors of the district. Although common response rates for similar PP GIS studies which use random sampling are not high, they are still an order of magnitude higher (10-20%) compared to our studies (ref. Brown, Pullar 2012). Thus, it was only the engagement of respondents who voluntarily accessed the survey (with a total number of all participants = 287) that made spatial analyses possible to be performed.

This suggests not only an urgent need to rethink methods of recruitment for future similar studies, especially in specific social contexts in terms of respondents willingness to participate in PPGIS processes. It also generates an imperative to take a broader use of variety of PPGIS methods and techniques and in order to reduce their vulnerability to the sample size (see – fig. 1. for visualisation of the problem based on the results of the original study). The following presentation provides description of alternative PPGIS research processes realized within the same project afterwards, as well as some post-factum specific improvements to the original point-mapping study. We deeply believe that a fully critical and flexible approach better addresses management needs of the Tatra National Park – one of the potential beneficiary of the study results.



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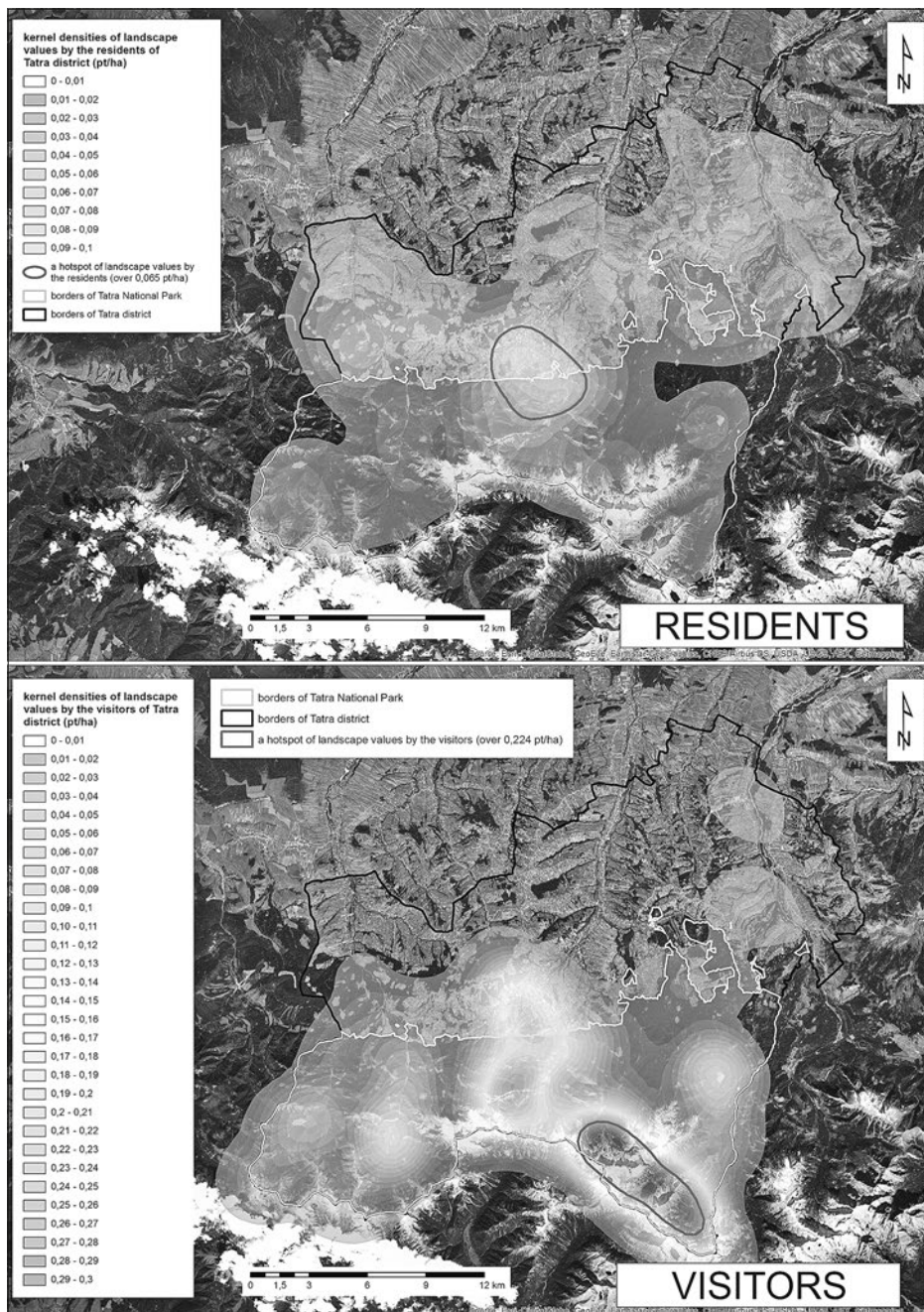


Figure 1. An illustration of the point-mapping technique's vulnerability to the sample size. Kernel density analyses presented on the figure were performed for responses of a total of a) 67 residents and b) 191 visitors recruited for the study.

Spatial-planning aspects of tourism development in the protected area Jasen

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Protected area Jasen has remarkable attractive tourist resources that are starting basis for different spatial-planning activities related to tourism development, and in function of its identification and creation as tourist area. Tourism development in protected area Jasen should be one of the most important integrative spatial and socio-economic values. Its main characteristic in this area is expected to be as accelerator of development that will bring together the different values in direction of protection and their use. The importance of the spatial integrative function of Jasen means that tourism as socio-economic activity will include different segmented activities, mainly from service sector where tour operating, hospitality, transport, crafts service and trade are most important. The abundance of natural and cultural values in Jasen is very important basis for tourism development in this area, that wouldn't be valorized without tourism and will remain only as potential.

The characteristic of Jasen in the past period was its relative isolation in its use which had a double meaning. In this way the area was preserved with its excellent natural and anthropogenic values, and on the other hand, the lack of access to this area didn't enable its optimal use. By undertaking activities of spatial planning these conditions should be resolved. Through planning, the elements that characterize the protected area Jasen should find their place. Tourism development of Jasen has remarkable spatial-planning importance because it is within the spatial areas of the Republic of Macedonia that have particular meaning, and it enables use of spatial values without destroying them. Spatial-planning activities related to tourism in Jasen have to be in accordance with the Spatial Plan of the Republic of Macedonia, Spatial Plan of Skopje Region, where Jasen belongs, the National Strategy for tourism development and National Strategy for sustainable development of the Republic of Macedonia, at least. It is important that, the proposed spatial-planning solutions should be consistent with the adopted documents for tourism development, because their implementation will contribute to increased possibilities for creating different tourist offer through sustainable use of natural and cultural values.

The spatial-planning projections for tourism development of Jasen are based on systematic approach in defining of tourism types that can be developed by using the existing potentials, implementing measures for tourism development and protection of the area, identifying locations and tourist activities (table1). This research approach of the authors will enable to present potentials of Jasen for developing of eco tourism, mountain tourism, alpine tourism, speleological tourism, lake and river tourism, and hunting tourism.

The aim of this paper is to present the spatial-planning aspects for tourism development of protected area Jasen, that is multipurpose area, and has potentials different tourism types, through identifying the following: specific characteristics of tourism and geographical position of Jasen as a tourist value, and as a factor of tourism development; differentiation of locations with specific developmental resources that can be included successfully in the tourist offer; place and role of Jasen in tourism development of Republic of Macedonia; interactive connection of Jasen with other tourist area on national and international level; principles, criteria and indicators of sustainable development of tourism, and differentiation of different types of tourism and activities that can be developed in relation to the spatial and functional characteristics of Jasen and its differentiated localities.

Table 1. Systematization of protected area by types of tourism

| Type of tourism | Attractive resources | Measures for tourism improvement and protection | Locations | Tourist activities |
|------------------------|--|--|---|---|
| Eco-tourism | Multipurpose area with regulation of visitors access , and protected area | Improvement of standards for the use of the area, and adoption of Law for declaring mountain Jakupica as National park | Mountain Jakupica | -Outdoor activities -Birdwatching -Schools in nature -Camping |
| Mountain tourism | Appropriate relief configuration and possibilities for creation of mountain trails | Adoption of detailed plans for creation of mountain trails | Kula Boro Pole | -mountaineering -hiking -mountain biking |
| Alpine tourism | Mountain sides with high denominations | Marking of sites and peaks | Urnat Kamen Milenkov Kamen Kozlak Matka Canyon | -Peaks climbing -Extreme sports -Trainings |
| Speleological tourism | Caves and pits | Environmental trims , establishing platforms at entrances | 12 caves 14 pits | -speleological activities -trainings -education |
| Lake and river tourism | Rich hydro-graphic values | Arrangement of the area, signalization | Kozjak, Matka, Treska, Sveta Petka | Fishing, Rafting, water sports, swimming |
| Hunting tourism | Rich hunting fund and diversity | Law on controlled hunting, controlled hunting, feeding | Hunting ground Jasen1(Ivanje) Hunting ground Jasen 2 (Selishte). | Elite hunting tourism, Photo safari Hunting culinary specialities |

Source: Authors'

Wildlife and flora and the valuation of green places: a comparison between local and national green places in the Netherlands

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Recent decades have shown a growing interest in the role of wildlife and flora in tourism and leisure in green places. A clear example is the rise of wildlife tourism, which can be defined as tourism in which visitors encounter wild animals (Ballantyne, Packer and Sutherland, 2011). Consequently, in the marketing of nature-based tourism destinations, mega-fauna, such as dolphins, elephants, and gorillas, are often used as 'flagship species'. Increasingly it has been acknowledged that not only charismatic mega-fauna, but also charismatic mega-flora such as trees and forests (Hall, James and Bairda, 2011) or smaller flora species such as orchids (Pickering & Ballantyne, 2012) can play a significant role in nature-based tourism. Thus far, most research has focused on large iconic wildlife as main attraction of nature-based tourism destinations. It remains unclear how wildlife and flora play a role in the way people value green places nearer home that are used for leisure purposes. For spatial planners, and leisure and tourism managers, insight into the extent to which wildlife and flora contribute to a higher valuation of green places, and for whom, may be useful in developing attractive green places.

My study examined the importance of wildlife and flora as a reason for finding local and national green places attractive, and to what extent wildlife and flora add to the valuation of these green places, among the general Dutch public. Data from a large online survey, the Dutch Hotspotmonitor (HSM) version 1.2, were used (N=2602, see De Vries et al., 2013). The HSM provides insight into social landscape values of the general Dutch public, by monitoring the valuation of green places at various spatial scales, as well as investigating reasons why people find these places attractive (De Vries et al., 2013). Respondents could choose from favorite places which are dominated by green, water, and/or nature: which I refer to as 'green places'. My study included green places at local and national spatial scale. Local green places (< 2 km from home) are important for everyday leisure, whereas national green places correspond highly with the main holiday destinations (De Vries et al. 2013). The respondents were asked to value the attractiveness of their favorite green place, on a scale of 1 to 10 (i.e., from very unattractive to very attractive). Moreover, respondents had to indicate the reasons why they find that place attractive (a closed question) and what recreational activities they undertake there (a closed question) (see Table 1).

In my study, wildlife and flora were defined as all species that can be encountered in the Netherlands. From another version of the Hotspotmonitor (version 1.9, in Folmer, Haartsen, Daams and Huigen, in press), it was found that locally, relatively common animal species are found attractive (e.g. Highland cattle, deer, waders, hedgehogs, ducks, frogs, dragonflies, rabbits, fish), whereas nationally, charismatic,

and large wildlife are mentioned most often (e.g. wild boars, foxes, seals, and badgers). With regard to flora in local and national green places, the differences are less profound; locally, trees are mentioned most frequently, whereas nationally, heather is on first position. For both green places at local and national level, plants, flora, flowers, and more specifically orchids, are also mentioned as reason for attractiveness (Folmer et al., in press).

Compared to the Dutch population, the respondents were relatively young (67% versus 53% younger than 50), and highly educated (56% versus 31% bachelor degree or higher), with an equal representation of gender and urban or rural place of residence (Statistics Netherlands, 2015). Locally, respondents who regarded wildlife and flora as a reason for attractiveness were slightly older (> 35 years or older) and more often male, compared to respondents in general. Their level of education, place of residence, and nature image did not differ from respondents in general. Nationally, they were older (50+), more likely to be male, and more highly educated, which corresponds with the profile of traditional nature-lovers: 55+ and well-educated (e.g. Curtin, 2008; Pickering & Ballantyne, 2013).

I carried out a binary regression analysis with 'valuation of attractiveness' as dependent variable. This variable was divided into (0) a valuation of 8 or lower, (1) and a valuation higher than 8. I had chosen to carry out a binary regression analysis instead of a multiple linear regression analysis, as it yielded similar, but more distinct differences in the relationship between the valuation of green places and the independent variables. As independent variables I included reasons for attractiveness, place characteristics, sociodemographics, and nature images.

The results demonstrated that, although wildlife and flora form a relatively unimportant reason for attractiveness (9.3%), they do increase the likelihood of a high valuation of *local* green places (see Figure 1). Respondents who regarded wildlife and flora as reason for attractiveness, were 1.7 times more likely to value their local green place above 8. This makes wildlife and flora the second most important reason for attractiveness, after respondents' personal bond with a local green place. Concerning national green places, it was found that wildlife and flora as a reason for attractiveness (16.4%) do not increase the likelihood of a valuation above 8, while observing birds and observing flora do. On the contrary, observing wildlife decreases the likelihood of a high valuation of national green places. This may be related to a perceived lack of wildlife visibility. In the Netherlands, many people are drawn to large protected areas to see wildlife such as red deer and wild boar, but a quarter of visitors have never seen them, about half have seen them once in their lives, and only 16% see them once a year (Buijs & Langers, 2014). This may lead to dissatisfaction and explain a lower valuation of national green places among people who visit especially to observe wildlife.

Last, it was found that at local scale, wildlife and flora are more important for broad segments of the population, while at national scale, they are more important for relatively old, and highly educated people, whose profile fits with traditional nature lovers. This means that locally, wildlife and flora can be important in increasing the attractiveness of green places for broad segments of the population.

Management implications

The findings suggest that more eye for geographical scale and nearness is needed in improving the roles which wildlife and flora can play in leisure and tourism. The presence of attractive wildlife and flora can increase the valuation of green places, and people's health and well-being, among a broad public. More specifically, it is recommended to improve the attractiveness of local green places by:

- increasing awareness of the presence of ordinary wildlife and flora, by creating more opportunities to see and enjoy local wildlife and flora;
- stimulate the enrichment of local biodiversity, for instance by placing bird-houses or planting certain flora species.

To enhance national green places, it is recommended to offer facilities which improve the visibility of charismatic wildlife and flora for a broader public, and to focus on the special wishes and demands of more specialized wildlife- and flora- observers.



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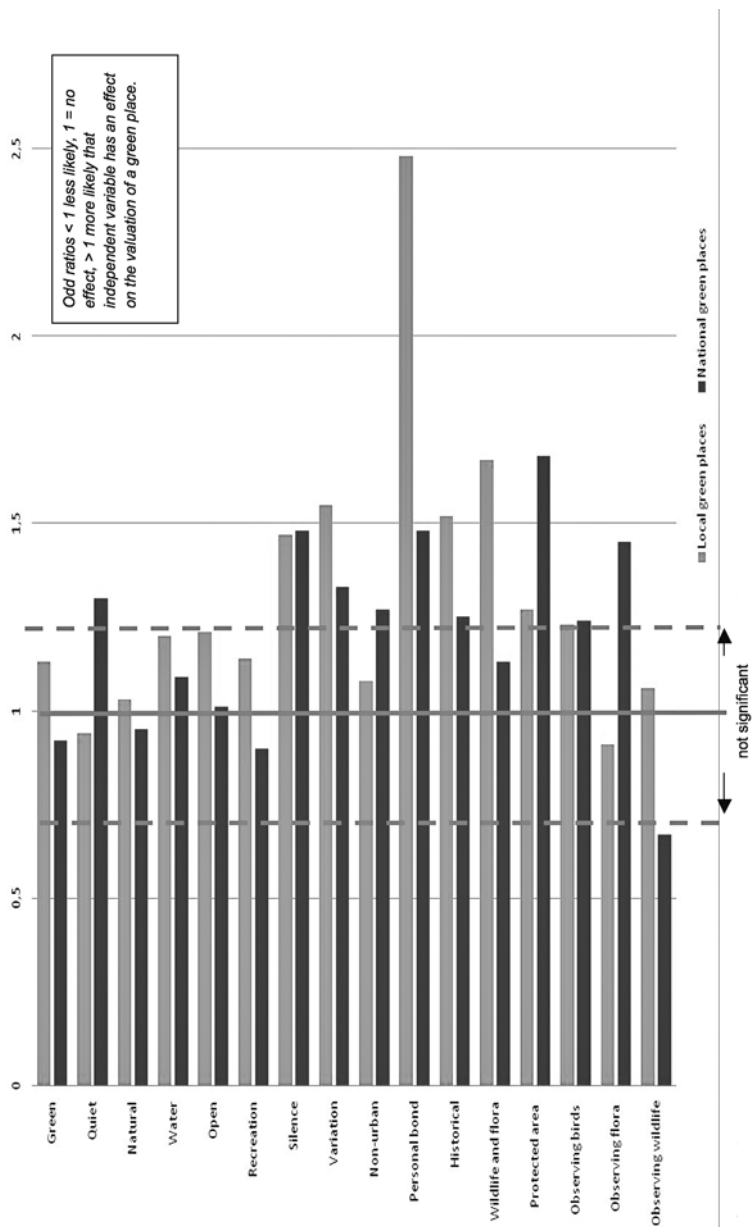


Figure 1. Likelihood of reasons for attractiveness, protected status, and recreation related to wildlife, and flora, to contribute to a valuation higher than 8 for local and national green places (in odds ratios).

Figure 1 only includes reasons for attractiveness, protected status, and recreation related to wildlife, and flora. Personal characteristics of respondents are left out for presentation purposes.

Statistics of the binary regression model for respectively local and national green places: Nagelkerke $R^2 = .095$; $-2 \log likelihood = 2270.2$; 2867.8 ; Chi-square 114.5 ; 182.8 . The odd ratios are not significant inbetween the dotted lines, and significant at $p < .05$ outside this area.

Evaluating Youth Conservation Corps Trail Improvement Projects: Sampling & Data Collection Protocols

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Introduction & Purpose

Conservation Corps in the United States offer opportunities to engage participants in service projects, job training, and academic programming through service on public and tribal areas. Evaluation of such programs documents the impact of corps experience on participants' community and environmental engagement, leadership, and communication skills, as well as broader social, health, and economic benefits. The tool developed in this study is unique from other program evaluations, as it focuses on ecological assessment to complement existing participant assessments. The range of activities and habitats in which corps work limits the applicability of traditional evaluation methods, creating the need for an innovative measurement tool. This project, a collaboration between the Public Lands Service Coalition (PLSC) and NC State University, is developing standard evaluation protocols for conservation corps' trail and habitat improvement projects across the United States. This project engages corps from California, Hawaii, Montana, Oregon, Minnesota, Iowa, and others to assess common corps activities including repairing trail infrastructure, installing erosion and water control features, clearing debris, and removing invasive species. Evaluation will provide assessments of projects focused on improved ecosystem health, increased accessibility and usage of public lands, and enhanced visitor experiences.

This poster highlights the project's first phase: development and implementation of a standardized trail assessment. This tool employs accessible measures appropriate for participants who may have limited data collection experience, is applicable to a diversity of landscapes worldwide, and is adaptable to other types of programs besides conservation.

The tools developed through this collaboration are being implemented by corps members and staff during and after improvement projects. Using a comprehensive and standard methodology, the evaluation will provide corps and their partners with valuable information to use in communicating their outcomes, identifying opportunities for program growth and improvement.

Protocol Design

Indicator Development

These measures are intended to equip participants with data collection experience that will enhance their knowledge and skills, as well as provide corps with specific and measurable data illustrating the value of their work. Therefore, the measures used build upon counts of ‘miles/kilometers’ and ‘acres/hectares’ toward more indicators of trail sustainability and recreation function.

Based on an assessment of trail monitoring guides and indicators in the scientific literature, nine categories of trail indicators were identified as relevant to the types of trail work most commonly encountered by corps:

- Natural hazards/debris (Verlič, Arnberger, Japelj, Simončič & Pirnat 2015)
- Drainage feature damage (Hammit, Cole & Monz 2015)
- Structural damage (Verlič, Arnberger, Japelj, Simončič & Pirnat 2015)
- Erosion features (Moore, Leung, Matisoff, Dorwart & Parker 2012; Marion & Leung 2001)
- Increased tread width (Eagan, Newman, Fritzke & Johnson 2004; Marion & Leung 2001)
- Root exposure/damage (Moore, Leung, Matisoff, Dorwart & Parker 2012; Marion & Leung 2001)
- Bedrock exposure (Hammit, Cole & Monz 2015)
- Muddiness/standing water (Moore, Leung, Matisoff, Dorwart & Parker 2012)
- Running water on tread (Marion & Leung 2001)

Project & Plot-Level Data

To connect overall project goals with detailed site-specific measures, a ‘Trail Project Summary Form’ was developed based on existing data collected by corps, such as hours and length of trail worked. The Plot Assessment Form captures specific trail damage, or ‘events,’ and the resulting effort by the crew to correct the problem. Illustrated below is an example trail event, defined as work or activity performed that

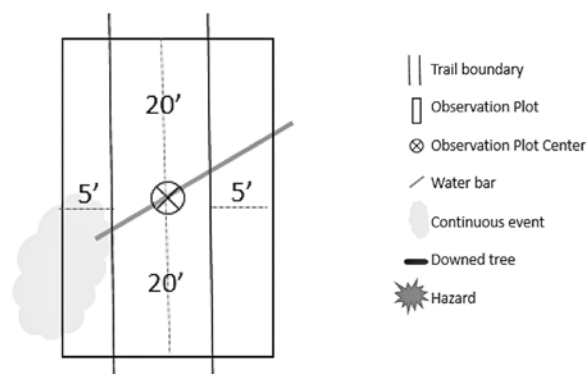


Figure 1. Illustration of trail event within plot boundary, for collection of indicator data

addresses recreation function, natural debris/hazards, and/or erosion/flood control (Figure 1).

Corps Engagement

Training

To prepare crews for successful data collection and promote data reliability, training materials were developed and disseminated at a national meeting and online. Materials included interactive modules, videos, quizzes, and practice data collection efforts.

Preliminary Results

Project and plot trail data is being collected between April and August 2016. The poster will present indicator development, training examples, preliminary findings, participant feedback, and lessons learned. Developing a set of indicator measures that could be applied to any ecosystem or recreational trail was challenging, but addresses a need to capture the environmental impact of conservation corps' work and is relevant to international land conservation efforts. The outcome is a trail assessment protocol that gathers consistent, comparable data. Furthermore, descriptive data that show in detail the significance of the maintenance performed by corps could result in increased support for this integral group of conservation and public lands stewards.



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GIS Technology and Spatial Analysis of Geo-cultural heritage in the Municipality of Prokuplje (Serbia)

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The idea to protect the geo-cultural heritage of Serbia dates its institutional beginnings in the 1950s. In the middle of nineties, start systematic valorization of cultural heritage and Natural objects. The special place of conservation and geo-cultural protection belongs to the municipality of Prokuplje. The municipality of Prokuplje situated in the south region of Central Serbia, surrounding by mountains of Jastrebac, Radan and part of Kopaonik. Populations, manufacturing capacity and com-

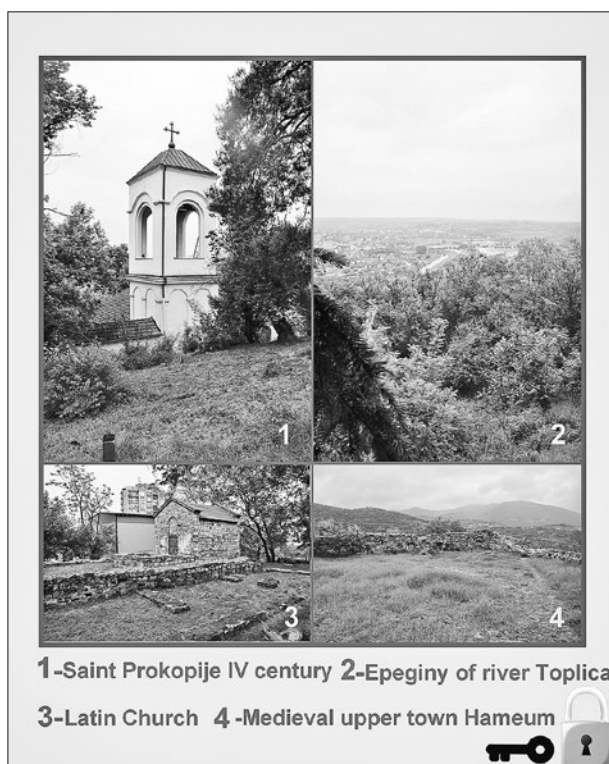


Figure 1. Geo-cultural heritage of municipality of Prokuplje (A. Valjarević)

munications are concentrated in the valley of Toplica (in the town of Prokuplje), but mountain hinterland still lost demographic potential. These are the main reasons of not enough affirmation in the area of a municipality. The surface area of the municipality of Prokuplje is 759 km², which is only 0,8 % of the total area of Serbia.

In this paper were marked most important geo-sites (epigeny of river Toplica, pseudo-cave Pasjacko kale) and objects of cultural heritage (Church St. Prokopije, Latin Church, and the medieval upper town Hameum). With using GIS technology we determined the dispersion of cultural objects on the territory of the municipality. The special view can be in creating virtual web map of geo-space. The analysed results represent a quality basis for data storage in digital form which in significance and more detailed touristic valorization of the geo-cultural potentials of the municipality in the future period.

FESTIVALS AND EVENTS IN PROTECTED AREAS

Recreational use in Natural Protected Areas: Adventure Races

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Adventure Races are an endurance multisport composed of several physical activities. Races may endure hours or days, featuring outdoor expeditions. Natural protected areas opened to the general public, such as National and State Parks, are common settings for Adventure Races (BARTOLETTI & MAGRO, 2015). Thus, the increasing flow of visitors (athletes and spectators) in natural protected areas and the pressures they may impose on ecosystems due to recreational activities raise concerns that despite the positive effects on local micro economy brought by recreational use in natural protected areas, such use might also bring negative effects (NEWSOME et al., 2011). Specifically in the case of Adventure Races the long extension in time and space of the events added to increasing popularity among participants and spectators demands evaluations regarding ecosystem impacts and management so that recreational use in this particular form might continue in a sustainable manner. This research aimed to analyse Adventure Races' rules as well as to interview races' organizers and athletes in search of trends in Adventure Races' organization in Brazil. It also sought whether or not, and to which extent these organizers and adventure sports' consumers took into consideration environmental issues and not only logistical and financial factors when choosing the location, date and rules for a race. Finally, national park managers were too questioned about their professional perceptions towards the positive and negative impacts that Adventure Races had or may have on their work areas. Based on the information gathered from these three stakeholders the final goal was to aid the establishment of better management actions focused on developing Adventure Races so that they will better meet the demands in public use and the objectives of conservation in natural protected areas.

Methods

The data was obtained through the use of three structured questionnaires including yes-or-no questions, Likert scale and more open questions that allowed personalised answers. Questionnaires targeted Adventure Race's athletes and organisers in general (not linked to a specific event) and National Park managers. Data was collected during two months through a website designed specifically for this purpose. We were able to work with a sample set of 62 questionnaires representing 19 athletes, 8 races' organisers and 35 park managers.

Results

The results discussed within this study refer mainly to the perceptions that demonstrate whether or not the respondents believed that Adventure Races may cause environmental and social impacts.

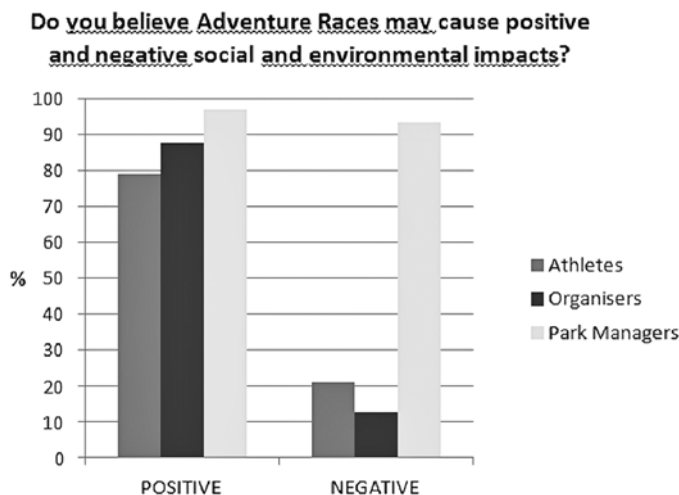


Figure 1. Most of the interviewees declared they believe Adventure Races cause positive impacts

When asked the question “Do you believe Adventure Races may cause positive and negative social and environmental impacts?” respondents from the three groups reported that (figure 1).

It was noticeable how athletes and races’organisers in the sample interviewed seemed to believe Adventure Races only cause positive impacts. A few explanations may arise for this finding. It is possible that these people believe that compared to other uses of land Adventure Races are mostly non harmful, it is possible they really have never been brought to think about negative impacts related to recreational use in natural areas, and also that they have been aware of these impacts but preferred not to admit so in a scientific questionnaire in order to promote a better image of their business, in the case of races’ organisers.

Regardless of the reasons this is indicative of the need for enhanced communication strategies to educate both races’ organisers and athletes about the possibility of negative impacts related to Adventure Races so that events may be planned accordingly to prevent and minimize them.

From simple solutions such as providing water in specific points through the race for athletes to fill their own bottles or hydration bags instead of providing plastic water bags to planning races so that they won’t happen in the same period as endangered species reproduction, or in the same period local communities use the land for cultural purposes, a lot can be done to enhance the quality and sustainability of adventure sports events as long as the people involved in this form of public use are aware that it might also bring negative impacts.

After all another interesting finding of this survey was that all athletes interviewed raced for leisure and the main reason to do so, even more important than the physical challenge, was happiness and pleasure followed by being in contact with nature.

And it takes being aware of one's potential to harm to care and prolong a happy relationship with nature.



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Touristic events as generators of visitations increase and tourism sustainability of Nature parks

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Increased demand and interest in outdoor recreation is an ideal opportunity for tourism development in protected areas, but also a challenge for park management to attract more visitors, meet their needs and expectations. Satisfying the needs as well as the expectations of the visitors, mostly lead to achieving a higher level of touristic experience which brings multiple benefits for the visited protected areas, such as increased spending, longer stay, return, recommendation etc. Seeing that the revenues from traditional government sources are decreasing, tourism provides a vital source of revenues for park agencies. It also provides a key means for protected area agencies to realize their objectives relating to visitor appreciation and enjoyment (Bushell, Eagles, 2006). Anyway, the tourism development in protected areas brings not only benefits, but also the expenses, from the ecological, economical and sociocultural point of view. Ensuring that tourism contributes to the sustainable management of protected areas, it will require enhanced cooperation and partnerships among the tourism industry, governments at all levels, local communities, protected area managers and planners (Eagles et al., 2002).

Most protected areas constitute a prime tourist attraction and can, therefore, benefit from this fact. Indeed, many protected areas have successfully achieved their conservation objectives, thanks to the financial resources that have been obtained through tourists'/visitors' expenditures (Bushell, Eagles, 2006). On the other hand, some parks and park systems are poorly funded because of inadequate tourism development or insufficient income derived from tourism. The fact is that some parks are having insufficient visitation and therefore insufficient income to cover the costs of management. So, the lack of funding will influence on future developments and maintaining existing protected areas and tourism is therefore fundamental to developing a public and political constituency for parks and protected areas (Bushell et al., 2006). It concludes that, despite the pleas of environmentalists, the establishment and continued existence of protected areas will depend largely on market forces (Dharmaratne, 2000). Opportunities for tourism sustainability of parks and protected areas are vaguely seen, with strengthening infrastructure and substructure, creating accompanying facilities, as well as organizing different attractive touristic, sports and recreation events and others which can create desire in other potential group to visit such area.

Events are an important motivator of tourism, and figure prominently in the development and marketing plans of most destinations. Planned events within tour-

ism are of increasing importance for destination competitiveness (Getz, 2008) and an effective enhancer of destination image (Hall, 1992). Events play an important role in making significant contributions to tourism, travel, leisure and lodging industries by becoming a creator of a strong tourism demand. They are an important tool to catch the various economic, social and environmental aims and to make benefits for the communities and destinations (Arcodia and Robb, 2000). In addition to this, events do not only serve a destination to attract tourists, they both help to protect and develop social identity at the same time (Derrett, 2004:39). There are so many advantages of event tourism for the destinations such as attracting tourists (especially in the off-peak season), creating new sources of revenue for the regions, increasing the awareness and attraction of destinations, making the new infrastructure and services or develop the current infrastructure and services, encouraging visitors to make a re-visit to the destination etc (Getz, 1997).

In Croatia, according to the Nature Protection Act (NN, 80/13), there are nine different categories of protected areas, of which only the National parks and Nature parks were effectively used for tourism purposes. Nature parks are a lower rank of protection opposed to National parks, but are more numerous and their surface occupies more than any other category of protected areas. Nature parks in Croatia are faced with big problem of sustainability, especially in economic terms, therefore it is necessary to valorize the touristic resources more adequately as Law permits greater economic opportunities in using resources opposed to National parks. Seeing the whole picture, it is necessary to seek ways of more intensive tourism development, so far there are still insufficient touristic developed areas of Nature parks. Considering the great incapability of Nature parks in attracting a bigger number of visitors, events could be seen as a possible solution of increasing visitations.

In order to improve the recent situation, this paper will conduct an empirical research with the purpose of determining the possibilities and the limitations in developing and holding events, as the core of visitations increase and the sustainability of Nature parks. The main aim of the paper is to establish the perception of Nature park management, their willingness, but also the main obstacles of holding touristic events. Besides this, attitudes, willingness and obstacles of the tourism policy management in supporting events in Nature parks will be established. In order to collect primary data on a convenient sample, the method of in-depth interview will be used.

In the empirical part of the paper results will be given of an original research done on Nature park Papuk management and tourism policy management at the local and regional level, which is in its final phase at the moment. It is to expect that the theoretical level of the paper will provide better understanding of the role of touristic events in strengthening of Nature park sustainability. On the conducted level will assure the increase of number of touristic events which will acquire a better position on tourism market and achieves sustainable and more competitive development of Nature parks.



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Organized mountain biking events within peri-urban protected areas. How many are too many?

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Introduction

Recreational activities within Protected Areas (PA) are growing in use intensity and diversity with special emphasis in those close to metropolitan areas. This fact is related not only by the increasing numbers of practitioners but also due to modern life-styles where out-of-doors activities are, among others, almost synonymous of healthy lifestyles.

Such demand and consumption of recreational activities within these areas has opened space to several leisure typologies, from touristic tours to local sport events that can attract “extra” several dozens to a few thousand visitors/practitioners within very short periods (from a few hours to a few of days) to these PA. In Arrábida Natural Park, like in other PA in Portugal sport events like Mountain Biking (MTB), Trail Running, Orienteering or Open Water Swimming races that can easily attract up to 1000 users plus staff have become popular events within the last decade. Due to the management plan in action all sport events required a formal authorization from the Natural Park. Being usually organized by local or regional entities and strongly supported by local municipalities seeking the fulfillment of its youth and sports policies, they raise no major concerns besides the final definition of the race route vs. the zoning plan, and depending on the event type, the total number of participants that should be allowed.

In this paper we discuss some of the aspects that could be taken into account in order to deal with such events, with special emphasis on extra use intensity that these races can represent taking as an example the development of an organized MTB event that involved 750 participants and over 150 staff members.

Material and methods

Study area

Arrábida Natural Park (with 12,391 ha of terrestrial area) is located within Lisbon metropolitan area (with 2.8 million inhabitants), nearly 1h south from Lisbon. It holds 7410 residents, which represent 3% of the total population of Sesimbra, Palmela and Setúbal municipalities. MTB within the park has been monitored with TRAFx counters since 2010 and present results have estimated 60~72000 users /Year. Daily averages are of 160 mountain bikers with peak uses that can reach 1100, and Weekly averages of 1345 for the entire area of the Park. Sundays followed by national and local holidays, and Saturdays are the most used days of the week, and 2/3 of these uses happen between 8h00 and 13h00.

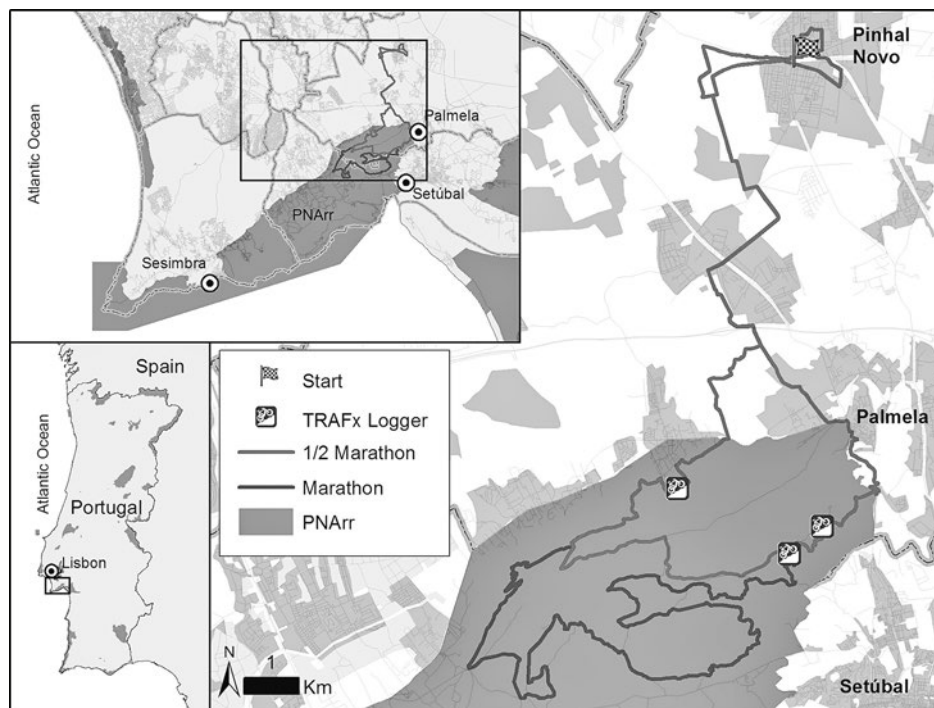
X BTTascaDuXico Marathon

On April 17th 2016, X BTTascaDuXico Marathon took place in Pinhal Novo (within Palmela municipality) organized by a local MTB club involving 700 bikers, split by 2 distances with 41.7 and 60.7 km, with 597 and 103 participants respectively. Route race for both distances started 14.1 km off the park limits and has crossed the park for 11.3 and 31.2 km (shortest/longest distance) through the Park road network, followed by 15.3 km back to Pinhal Novo, in a round trip. TRAFx counters set to record timestamps were installed in the race track at km 15.9, 43.6 and 45.0 (equivalent to 25.9 km for the shortest distance) as it can be seen in Figure 1 to measure time displacements in order to measure use intensity.

This race is not part on any official calendar of the Portuguese Cycling Federation and it also included guided tour that didn't reach the park limits that gathered 50 participants.

Final time for each biker (available by the organizers) was used to infer Park crosses displacement and residence locations was used to measure the race attractiveness (residents v.s. visitors from other places in Portugal).

An on-line questionnaire regarding Arrábida and MTB with 30 Questions was sent to a random selection of 400 participants received 139 valid submissions was used to profile biker's preferences, behaviors and expectations.



Results and Analysis

The race was concluded by 22 Females and 678 Males (21F/576M for the shortest distance and 1F/102M for the longest with an average speed of 14.1 and 16.5 km/h for the women and men respectively.

According to the collected questionnaire's average speeds of the race in both distances were slightly higher (1.5 km/h faster on average) when compared with the "perfect" MTB ride (inferred from the questionnaires) suggesting that the race by itself is just another excuse for a normal ride. Despite some faster racers more committed with their personnel achievements, 52% of the bikers run at their averages MTB speeds.

Other important issue regarding the use intensity that this event might represent is that according to the questionnaires 56% of the participants are regular bikers of Arrábida. 60% of the race participants live within 25 km from park limits – a distance suitable for most users to ride their bikes directly from home. Participants that live within a circle of 25 to 50 km that also often ride in Arrábida are other 20% suggesting that what could at been taken as an "extra" amount of use of 700 bikers actually represents only 200~250 more bikers that what could be expected for the same day without the race. From these, 118 participants live more than 100 km away from the park.

Regarding use intensity, the race concentrates users on the race trail, but it also relieves use in other more sensitive areas. While entrance in the park limits is concentrated in two peaks of 30 and 40 minutes (for the marathon and the half-marathon respectively), differences on speed averages among participants relive the pressure at the end of the park crosses to over 2,5 hours according to the Counters data.

Conclusions

Management of race and sport events within PA should consider environmental/conservation/security but also social aspects in order to deal with users' demand/expectations. For many practitioners these events are just another recreational moment. Use intensity, in terms of MTB/hour can multiply the maximum records depending on the total participants, but starting away for the park limits, performing the race in small groups, following the road network instead of using single tracks and avoiding raining seasons could minimize such impacts. On other hand these events are perfect awareness and surveys opportunities, which could help to manage recreational uses within every PA. Nevertheless, attention should be given to the current dissemination of unofficial or informal sport events spread around social networks, such as Facebook that can attract over 150 participants, challenging the park managers and local authorities in terms of conservation, security and social aspects.

Acknowledgements

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ONSITE VISITOR MONITORING SYSTEMS

Physical and social aspects of forest recreation – approaches to a comprehensive monitoring

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Forest monitoring normally either focuses on physical aspects such as tree species, stand structure, vegetation cover, etc. or on social aspects, namely forest recreation and the relationship of people with the forest. However, especially regarding forest recreation, both the physical characteristics of the forest in which recreation takes place as well as the social aspects such as visitor preferences and behaviour play an important role. A clearer understanding of the interactions of society and forest and in particular better knowledge of the interrelation of physical forest characteristics and forest recreation would allow better managing of the forest with regard to societal needs. Physical forest characteristics are often assessed by forest inventories, for which data is normally collected from sample plots on a systematic grid across the country (Tomppo et al., 2010). In order to assess the social dimension of forest recreation, nationwide surveys are conducted in several countries on a regular basis to provide valuable information about the relationship of the population with the forest, usage patterns, motivations for forest recreation, etc. (Sievänen et al., 2008). However, there is no spatially explicit link to the physical forest, or forest characteristics are dealt with in a minor way, e.g. by using photographs without underlying physical forest data. The question arises whether National Forest Inventories (NFIs) and socio-cultural forest monitoring (usually nationwide questionnaire surveys) could be combined to explain and possibly even predict forest recreation patterns from forest-related and visitor-related data.

In order to achieve this, two approaches are possible. The first approach is to take (parts of) the questionnaire from a household survey and use them in a forest visitor survey at NFI sample plots. We developed and tested this method combining the Swiss socio-cultural forest monitoring (Hunziker et al., 2012) with field assessments of the Swiss National Forest Inventory (Brändli, 2010) at selected plots at or near forest roads and footpaths. Visitors were asked to rate the visual attractiveness of the NFI-plot and the surrounding forest. They were also questioned about their activities in the forest, visit frequency, forest preferences and their socio-demographic

background. NFI-data were collected from 4 systematically arranged 50x50 m plots, covering the forest area visible to visitors from the footpath. Multi-level modelling combining both plot-related inventory data and visitor-related questionnaire data showed that forest attractiveness is determined by both social and physical factors. Undertaking forest visitor surveys at a subset of NFI sample plots could therefore be a viable way of conducting a comprehensive forest recreation monitoring across larger areas, for example a whole country.

The second approach is to take visualizations, e.g. in form of photographs, of NFI sample plots with underlying forest data and use them in a survey. We used this method in an online survey in the whole of Switzerland. Photos from the Swiss NFI taken in all four cardinal directions from the centre of sample plots were integrated in the questionnaire and respondents were asked to rate the visual attractiveness of the forest depicted. In addition, they were asked about their expectations concerning ecosystem services of urban forests, cultural ecosystem services associated with the forests on the pictures, activities, forest preferences and their socio-demographic background. Because the photos are not congruent with the sample plots, physical forest data were derived from the photos according to NFI-criteria. Regression models and multi-level modelling will be used to combine physical forest data and questionnaire data to predict visual attractiveness and recreational usage of forest. First results of this study will be presented and compared to the results of the field survey. Ultimately, an evaluation of the results of both approaches can provide indications to how a comprehensive forest recreation monitoring including both physical and social aspects could be conducted effectively.



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Social media dynamics affecting differences between online and on-site surveys: First findings from a case study in the Tricity Landscape Park, Poland

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Introduction

Managers of parks and forests have to optimize the allocation of resources to provide new recreational infrastructure and maintain the existing one. In order to successfully manage recreational areas and to gain realistic view on actual visitation levels as well as visitors' needs and expectations, it is necessary to find reliable and effective tools and methods for visitor data collection and analysis (Kajala et al., 2007; Cessford, Muhar, 2003). In recent years, the use of online surveys in outdoor recreation research as complement to traditional survey methods (on-site, mail and telephone surveys) has been significantly expanded. Comparability of data gathered from traditional paper interviewing and from online surveys is a subject of discourse in many fields of social science research (Namhun, Xiaojuan, Zvi, 2013; Dolnicar, Laesser, Matus, 2009; Yetter, Capaccioli, 2010). Personal interviews on-site survey and online survey may involve respondents with different sociodemographic profiles because of the different mode. Furthermore, both approaches differ in place and time of interviewing. On-site surveys take place during a trip in a forest and the online survey at a random moment while browsing the internet. In this setting other influencing factors may play a significant role. In outdoor recreation research sampling biases and the influence of social media dynamics on participation in online surveys and representativity of results have not yet been sufficiently researched.

Study area

The total area of forests owned by the State Forests of Poland is 7.6 million hectares and covers approx. 24% of the country area. The State Forests plan to develop standardized visitor monitoring procedures to improve current knowledge related to for-

est recreation. The aim of the research project is to test and evaluate various data collection methods in several pilot study areas. The focus of this paper is a comparison of on-site and online interview techniques in the Tricity Landscape Park (TLP) with the focus on differences affected by social media dynamics. The study area is situated in northern Poland in close proximity to the Baltic Sea and the three cities of Gdansk, Gdynia and Sopot, hence the name "Tricity". In 1979 the majority of forests administrated by the Gdansk Forest District became a designated protected area Tricity Landscape Park (IUCN Management Category V – Protected Landscape). Currently, the landscape park comprises about 20,000 hectares and serves as an important destination for outdoor recreation of the inhabitants of the three cities.

Methodology

In order to explore the socio-demographic, psychographic and behavioral profile of forest visitors two parallel interviewing techniques have been applied: on-site interview and online survey. For the on-site interview the traditional paper and pencil interview technique has been chosen. At five locations in TLP, during eight sampling days (distributed over one year) interviews based on standardized questionnaires have been being conducted in autumn 2015 among randomly selected visitors. For this paper data from the first collection day (Oct 24) has been used for the initial analysis ($N = 141$).

The online survey has been prepared using the LimeSurvey application. The URL link to the survey has been published via the Gdansk Forest District homepage, local media and distributed via Facebook groups. While the online survey remained active over many weeks, response activities were always correlated to advertising actions in the media or discussion activities in social media. For this paper 621 complete records were used for analysis. Statistical analysis of the collected data (on-site and online) was conducted using IBM SPSS Statistics.

Results and Discussion

Based on the first gathered data the following observations have been made.

Difficulties to control samples of respondents resulting from activity of social networking websites

The URL address of the online survey was published mainly by the Gdansk Forest District (website and Facebook) as well as via local media. However, we observed active sharing of the survey link by members of Facebook groups. The biggest of these communities were local bicyclists and opponents of logging in the Tricity Landscape Park. The phenomenon of sharing information by specific groups causes decrease of the respondent sample's randomness of the online survey.

Differences in respondents' sociodemographic characteristics and opinions

Both groups of respondents differ significantly in terms of gender, age, occupation status and place of residence. In terms of opinions, a lower satisfaction with the recreational infrastructure and forest management was observed among participants of the online survey. Particularly, answers related to perception of forest management

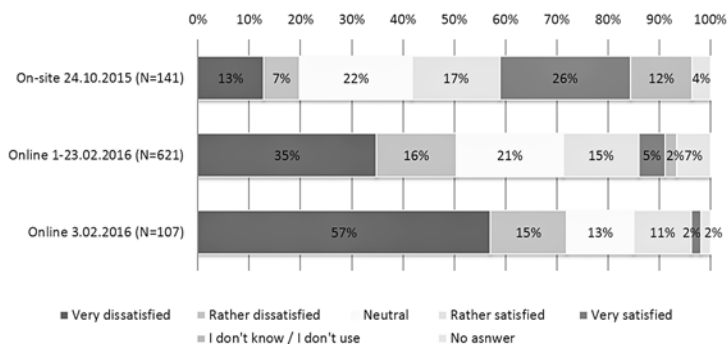


Figure 1. Level of satisfaction with forest management in the Tricity Landscape Park resulting from surveys: on-site; online (all records); online (records from a day with high Facebook activity)

from the period of high Facebook activity (survey link sharing) were more frequently negative (Figure 1).

Opinion-forming process on-site and online

Respondents of the on-site survey had a possibility to ask questions or start a discussion on the most controversial issues. A talk with a competent person (often staff of the forest district) could help respondents to form their own opinions and a friendly atmosphere of on-site interview could cause more positive opinions. In terms of the online survey, members of Facebook groups the most interested in the subject often expressed a negative attitude towards forest management in the Tricity Landscape Park what was willingly shared via social media.

No interest in the online survey among people who do not visit the Tricity Landscape Park

Although a set of questions addressed exclusively to people who do not visit the Tricity Landscape Park was prepared, a very small number of non-visitors to the forest took part in the online survey. The reason can be a high popularity of the Tricity Landscape Park among city inhabitants. It is probable that a large part of them visited the forest at least once in their life. Furthermore, people interested in the subject played an active role in sharing the online survey link via social media, what increased a number of respondents of the online survey who visited the Tricity Landscape Park.

Conclusions

The on-site and online survey techniques are complementary tools that can be used to explore socio-demographic profiles, needs and expectations of forest visitors. Both techniques have a bias related to the mode of conducting interview. Furthermore, publishing the online survey link by local internet media allows respondents to share the information with groups of interest and to create positive or negative view of the content. However, a combination of both the on-site and the online survey brings benefits by targeting various samples, thus allowing to gather a broader

spectrum of information supporting management decisions in recreational areas. When planning openly accessible online surveys it is indispensable to also provide for a monitoring of discussions in social media.



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Online visitor monitoring in Dutch nature reserves and National Parks

John van den Berg, senior recreation and tourism policy advisor Staatsbosbeheer, the Netherlands.

Introduction Staatsbosbeheer & the Netherlands

The Netherlands is a delta area and is a haven for a large share of the European habitats. Out of roughly 200 European habitat types the Netherlands houses almost 50 habitat types on just a very small part of Europe that is densely populated.

- 42.000 square kilometers
- 17 million inhabitants
- 480 inhabitants per square kilometer

Staatsbosbeheer – commissioned by the government – manages a considerable share of all nature reserves and National Parks in the Netherlands. Staatsbosbeheer is promoting outdoor-recreation at as many sites as possible.

- 250.000 ha nature reserves and National Parks
- 6% of the total surface of the Netherlands
- 92% is open to the public
- 100-150 million annual visits

Occasion; the budgetcut 2014

In 2014 there was a big cut of almost 40% in the budget for recreation due to government decisions. So it was necessary for Staatsbosbeheer to redefine its recreational ambitions. In this redefinition we wanted to hold the public interest central and operate more demand driven.

At the beginning of 2014 we did have for some of our nature reserves estimations of the visitor numbers and their appreciation. But we didn't have any systematic research regarding visitor numbers for our most visited nature reserves in the different parts of the Netherlands.

So we had to collect visitor data in order to redefine our ambitions and to prioritize.

The task

We had to collect – in a very short time – data regarding our visitors per site. As we are provincial organised the data had to be collected likewise. We wanted to do this for a great number of the most visited sites per province. The collection of the data had to be uniform and without any effort for our local rangers. So we decided to perform online visitor research. The data we wanted to collect should be usable in ranking our most visited sites and had to increase our knowledge of visitors as well.

The key performance indicators we decided to collect regarding each individual nature site were meant to form an objective set of data leading to insights that informs our decision-making.

Our basic set of questions

- Number of unique visitors
- Characteristics of the visitors
 - male/female ratio
 - age distribution,
- Origin of the visitors
- Categories of number of visits a year

Later on in the process we added some extra features of the visiting public to get a better understanding of our visitors.

Our extended set of questions:

- Activities during most recent visit
- Expenses during most recent visit
- Appreciation of the area
- Appreciation of different recreational facilities
- Points of improvement of recreational facilities

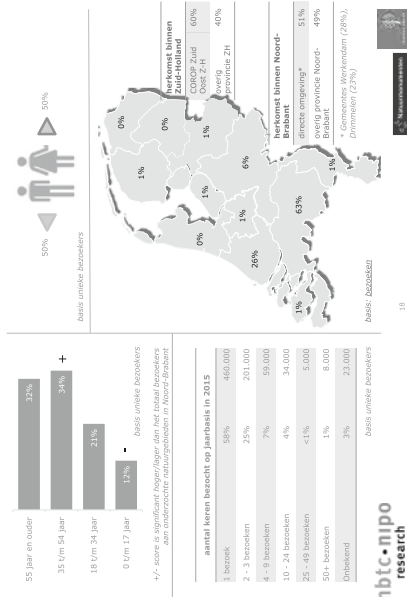
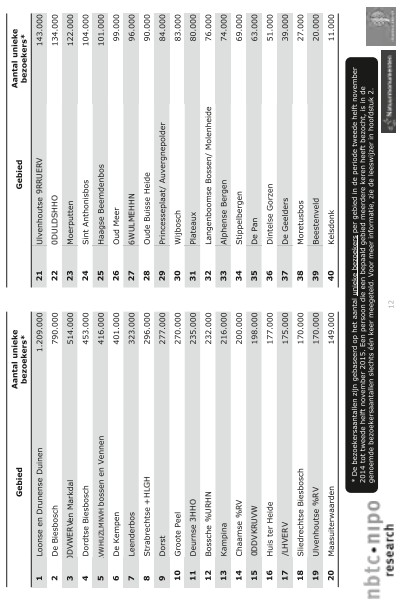
So during the process of collecting data province by province we made a shift from a more basic to a more sophisticated set of data. With this set of data we are able to make decisions on the provincial level. And what's more the data helps us to get a better understanding of the visitors to a specific nature reserve.

Study design

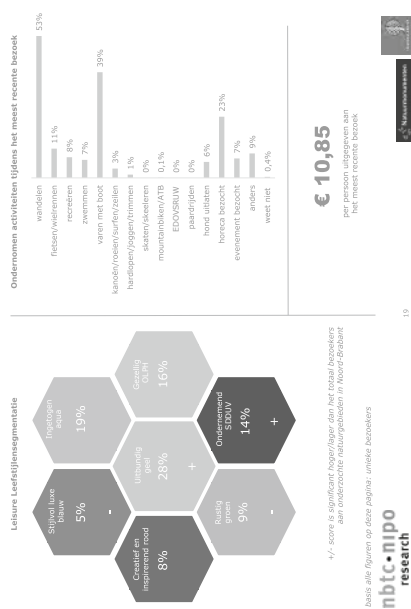
As Staatsbosbeheer was not experienced in online research we worked closely together with TNS.NIPO and NBTC. Two Dutch private organisations. NBTC is the Dutch organisation experienced in the field of tourism and marketing. TNS.NIPO is a leading global research agency specialised in online research. Based on our set of questions they made a preliminary basic design. The benefit of working together with NBTC and TNS.NIPO is that the outcome of the research comes up to high standards. After testing the study design in one province we added some additional questions. At the moment we have data for the most visited site of 6 out of 12 Dutch provinces.

In the online visitor research all visitors of 0 year and older are included. The weighted sample is drawn out of an existing national database. In this weighted sample the inhabitants close by are overrepresented, those living at a greater distance are underrepresented. This is according to the distance people are willing to travel in visiting a nature reserve or National Park. Regarding children under the age of 12; one of the parents of the child is approached for the research. The definition of a visit is a visit in spare time in the preceding 12 months. We don't apply any time restrictions, so a short visit less than 30 minutes is also included. On the other hand commuting is excluded as it has no recreational purpose, but a visit by car through or to the sites is included.

Bezoekersaantallen (o.b.v. unieke bezoekers) naar natuurgebieden in Noord-Brabant



2. De Biesbosch



2. De Biesbosch

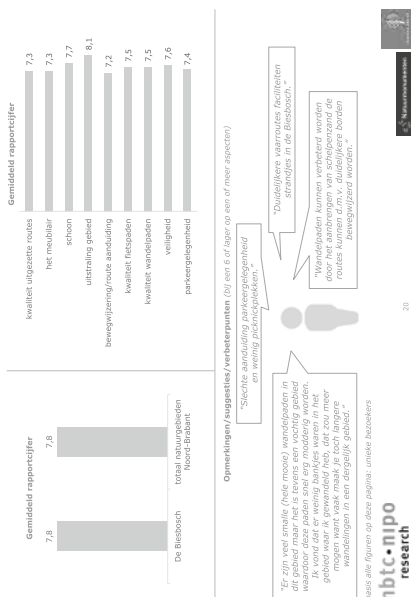


Figure 1.

Restrictions

Our online research is quantitative not qualitative. We made this choice to have a very short questionnaire for preventing the recipient to get bored and answering less accurate. The advantage of working with research agency TNS.NIPO is that they make a weighted sample out of an existing database of subjects of which they already had data like; age, gender, address, lifestyle etc..

We have no insight into the intensity of land use areas for all of our sites. On the other hand, for large areas as National Parks we can distinguish areas and get an insight in the most visited entrance.

Reflection

With the data of the the online research we were able to prioritize sites within a province. We now have a close look on the number of visitors to our most visited nature reserves and National Parks. We also got a better idea of the visitors, of its age, its gender, its recreational preferences an estimation of its number of yearly visits and so on.

And last but not least we could map the recreational expenditure at the last visit. Combined with the number of unique visitors this leads to the total recreational expenditure at the last visit. With this key performance indicator we are able to have a dialogue with the provincial government regarding the prior budget cut.

Long term visitor monitoring in protected and recreational areas – results from Finland and Estonia

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Introduction

Protected and recreational areas are often significant visitor attractions. Consequently, information on visitors is essential for successful management of these areas to ensure the protection of nature and cultural heritage, quality recreation experiences, sustainable tourism development, as well as the promotion of public health and well-being.

Parks & Wildlife Finland (P&WF) is a unit of Metsähallitus that manages Finland's national parks and other state-owned protected and recreational areas. Estonian State Management Centre (SFMC) is responsible for managing the Estonian state forests and providing opportunities for outdoor recreation in state forests and protected areas. Both agencies have monitored protected and recreational area visitors with similar methodology for more than ten years, P&WF Finland since year 2000 and SFMC since year 2002 (Metsähallitus 2016a, Metsähallitus 2016b, Karoles & Maran 2014). When visitor information is gathered with uniform and systematic visitor monitoring methods across areas and time, it provides invaluable possibilities for comparisons (Hornback & Eagles 1999, Kajala et al. 2007). This paper examines international visitor information, comparing national level visitor monitoring statistics from Estonia and Finland.

Material and methods

Visitor monitoring activities include visitor counting and visitor surveys. For visitor counting, both P&WF and SFMC use electronic counters. In Finland, the counters are mostly located at main entry points, and in Estonia they are located in main destinations inside each area. The point specific visitation counts obtained by electronic counters are extrapolated into area level visitation numbers by area coverage percentage (Finland) or with calculations that combine visitor counts and visitor survey information (Estonia) (Kajala et al. 2007).

Visitor surveys are implemented by both agencies as standardized on-site guided surveys (Kajala et al. 2007). The sampling aims to be as close to a random sample as possible, taking into account the limitations brought by resources and field circumstances. The questionnaire is four A4 pages (a folded A3) and visitors are asked to fill it towards the end of their visit, ideally when they are exiting the site. The interviewer is available for questions, but typically respondents fill out questionnaire independently. In Finland, each protected area with significant recreational use is sampled on average every five years, which means annually close to ten surveys to be administered. In Estonia, all areas are sampled at one year, generally with an interval of four to five years.

For data entry, storage, management and reporting, both agencies use nowadays a similar visitor information database system. The system – ASTA visitor information database system – was originally developed year 2006 for P&WF and taken into use by SFMC year 2009. The Estonian version of ASTA is called KÜSI and it is a translated and customized version of ASTA.

Results

In Estonia there are currently altogether 27 areas in visitor monitoring system and in Finland 59 areas. The results here focus on the two main categories of areas for both countries, i.e. national parks and recreational areas (SFMC) or national hiking areas (Finland). In Estonia there are five national parks and 13 recreational areas, while in Finland the situation is reversed; there are many more national parks (39), and only six national hiking areas (figure). Visitation numbers partly reflect these differences.

The average length of stay is fairly similar in Estonian area types, while visits to Finnish national park are shortest and visits to national hiking areas last longest, on average two days. Percentage of foreign visitors is remarkably high in Estonian national parks compared to their Finnish counterparts. The average age of visitors is higher in Finland than in Estonia; also at population level Finland's average age is higher than that of Estonia.

| | Year 2015 | | | | | | | | | |
|--|-----------------|------------------|---------------------------------|--------------------------------------|--|--------------------------------|-------------------|--------------------|--|------------------------------|
| | Number of areas | Number of visits | Average number of visits / area | Length of stay, 24 hour visitor days | Average length of stay, 24 hour visitor days | Percentage of foreign visitors | Percentage of men | Average age, years | Perceived health and well-being benefits (1) | Number of survey respondents |
| Estonia | | | | | | | | | | |
| National parks | 5 | 353,900 | 70,780 | 505,034 | 1.43 | 31.0 | 46 | 41.5 | 4.35 | 1,387 |
| Recreation areas | 13 | 1,413,700 | 108,746 | 1,717,939 | 1.22 | 7.9 | 44 | 38.9 | 4.43 | 3,986 |
| Finland | | | | | | | | | | |
| National parks | 39 | 2,634,600 | 67,554 | 2,984,973 | 1.13 | 8.1 | 48 | 45.7 | 4.34 ⁽²⁾ | 17,117 |
| National hiking areas | 6 | 275,400 | 45,900 | 550,033 | 2.00 | 4.2 | 50 | 49.2 | *- | 1,593 |
| *- Information not available | | | | | | | | | | |
| ⁽²⁾ Perceived physical, social and psychological benefits of the visit on a scale from 1 = totally disagree, ..., 5 = totally agree | | | | | | | | | | |
| ⁽²⁾ n = 2 340 because the question has been in use only since year 2013 | | | | | | | | | | |

Figure 1. National visitor monitoring statistics for Finnish and Estonian protected and recreational areas, year 2015.

Discussion

The visitor monitoring data of both P&WF and SFMC contain many more variables and allow for much more detailed comparisons. But even these few variables indicate interesting similarities and differences between Estonian and Finnish protected and recreational area visitors.

Establishing and maintaining a comprehensive visitor monitoring and information system requires significant investment in time and resources. Nevertheless, P&WF's and SFMC's experience is that this investment pays back many-fold. Standardized visitor monitoring methodology and a common database application ensures reliable and easily available visitor information which is a necessity at local, regional and national levels for effective management, planning, reporting and policy purposes. This study shows one additional way of using visitor information, i.e. for international comparisons.

Comprehensive national or even international visitor monitoring systems also include some challenges. Firstly, a prerequisite of this study is a long-term cooperation and coordination with which the agencies ensure comparability of the data. Secondly, monitoring inevitably means inflexibility because it requires commitment to certain fixed methodology and technical solutions. Consequently, we should bear in mind that in addition to visitor monitoring, also other, more spontaneous ways of gathering visitor data are needed.



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Introducing visitor produced pictures as a strategy for studying and monitoring visitor experiences in outdoor recreation management

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Visitor monitoring is an invaluable tool and source of information in recreation planning and management (Kajala et al. 2007). Traditionally, monitoring activities involve investigations on visitor numbers, profiles and spatial behavior, which is used for overview and information purposes. Unfortunately, monitoring activities that involve acquiring information about visitor experiences are rarely prioritized by managers (Elands & Marwijk 2008). This is problematic, especially because **recreation management** “includes managing both material and symbolic [...] landscapes” (Hall et al. 2013, p. 122). This is also emphasized by McCool (2006), who states that the state-of-art in visitor experience management needs improvement and that studying visitor experiences can be a way for managers to go beyond what he calls ‘superficial’ monitoring, which is monitoring efforts with a focus on visitor statistics only. Consequently, it is important that visitor monitoring efforts are not narrowed down to numbers and figures only, but also include detailed information about the details and specifics of various visitor experiences (McCool 2006). Indeed, it is an essential part of what has been referred to as experienced-based management, where securing and monitoring of high quality experience opportunities is put forward as a crucial part of area planning and management processes (Bushell & Griffin 2006).

From a management point of view, visitor experiences are particularly important to study and monitor because they reveal information about the physical, cognitive, and affective outcomes of recreational participation in a given setting (Jacobsen 2007). These outcomes can be both positive and negative, but they have in common that they influence visitor attitudes and opinions, and thereby also visitor satisfaction (Kajala et al. 2006). In order to secure high quality experiences and high levels of visitor satisfaction, visitor experiences therefore need to be examined by recreation managers as parameters and guidance for management decisions and planning measures. To gain information and knowledge about visitor experiences is, however, not an easy process, as it concerns moving beyond mere descriptions of different recreational activities in a natural setting (i.e. numbers and observations), to a focus on the experiential content and different symbolic meanings that visitors associate with recreational settings (McCool 2006). This calls for new thinking about how to both study and monitor visitor experiences and relate results to management practices.

Challenges

A particular challenge is that the study and monitoring of visitor experiences requires experiences to be examined on an individual level (Elands & Marwijk 2008). Furthermore, recreational experiences often contain very detailed content, which can be difficult to express or describe to other individuals not sharing the same

experience. Looking broadly in the literature on visitor monitoring, conventional based monitoring methods, such as questionnaire surveys and interviews, have most commonly been employed by recreation managers to study visitor opinions, attitudes and behavior (Kajala et al. 2007). However, when it comes to acquiring information about visitor experiences, these conventional monitoring methods often come short, as the depth and details of information they provide often is limited. This is especially the case when it comes to retrieving more qualified information about what experiential values and qualities visitors appreciate or seek in a given setting (Bushell & Griffin 2006). Consequently, recreation managers are in need of alternative study and monitoring measures that allow them to gain a more precise understanding of the visitor experience as a central part of recreational management.

On this background, the aim of this presentation is to explore how visitor produced pictures can be developed and applied as a potential study and monitoring tool in recreation management to provide important information about what visitors consider important experience values and qualities. To support this aim, a qualitative based case study from Sweden is introduced wherein visitor produced pictures have been applied as the main methodological approach. The case study itself took place during the summer of 2014 and involved 41 participants who via smart phones took pictures of important recreational experience values. Results show that recreational participants tend to focus on six different categories of experience values and qualities:

1. Natural elements
2. Social situations
3. Cultural environments
4. Recreational activities
5. Emotional reactions
6. Disturbing factors.

In the presentation, these categories will be described both broadly and in depth, and with special attention given to management implications in terms of studying and monitoring important experience values and qualities. The paper concludes that visitor produced pictures have considerable potential as an informative and efficient tool to capture important visitor experience values and qualities. It is therefore important that future research continues with the development of visual methods as a monitoring approach in recreation management.



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Monitoring Outdoor recreation in Serra da Estrela Natural Park, Portugal

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Introduction

Tourism and recreation in protected areas is rising in popularity globally, greatly challenging the management of conservation areas. The administration of these areas requires a growing number of monitoring and planning instruments aimed at enhancing management entities ability to conciliate user satisfaction with the protection of natural and cultural values.

Increasing of outdoor and sport activities has triggered the need to assess its environment impact. For instance, the repeated use of trails, highly accessible and informally disseminated, can represent a source of conflict and, therefore, make the environments where these activities are developed especially vulnerable.

The lack of information, the complexity of the visitor-related aspects, as well as the difficulties in monitoring its flows, interfere with the development of planning methods and instruments that can allow a better understanding of this extensive trend.

Using the information made available by new technologies and social networks specialized in this segment, the study proposes, based on Voluntary Geographic Information (VGI), the development of planning tools for an efficient characterization of this reality. The methodology intends to study, through an analysis of the available voluntary information, the users' preferences towards the trail system of Serra da Estrela Natural Park (PNSE). The study results will contribute to the definition of standard criteria used in the design of a trail network, optimized according to the users' profile and preferences.

Study Area

Serra da Estrela Natural Park (PNSE), is located in Portugal's central region, covering the mountainous area of *Cordilheira Central*, which is shared by the municipalities of *Celorico da Beira*, *Covilhã*, *Gouveia*, *Guarda*, *Manteigas* and *Seia*.

Created in 1976, the park is the second largest protected area in Portugal (with 89.132 ha) and has the highest altitude continental point (1.993m). It is characterized not only by its altitude but also by its morphological peculiarity, derived from quaternary period glaciations. Furthermore, the park boasts relevance for the presence of high cultural values, left by ancestral occupation and territorial humanization, as well as for its important fauna and flora, exclusive endemism integrated in the Rede Natura 2000 (PTCON0014) network and the RAMSAR reserve.

Its singular landscape, marked by the presence of snow, makes this park one of the most visited protected areas in Portugal. However, similarly to the remaining

classified areas in the country, the absence of an official entrance or delimitation translates into a complex evaluation the visitors' flow and distribution, resulting in a lack information to systematize the methodology to study this tendency.

Methodological Approach

Data treatment was subdivided in three distinct phases. Initially, inspired by Nogueira Mendes *et al* (2012, 2014), information was collected from the voluntary data made available by webshare services specialized in outdoor activities (GPSies, Wikiloc, Geobrowser, etc.), in order to analyse the number, distribution (space and time), profile and preferences of the PNSE's trail users.

After geo-statistic treatment and data validation, it was possible to dize the criteria and preferences of the PNSE's users, defining models of attractiveness and standard types of route (dimension, time, difficulty, etc.).

Finally, based on the statistical and space patterns obtained from the park's global analysis, physically and ecologically optimal paths were projected for each user and route type through geographic modelling. The modelling was applied on part of the protected area and based on an ancestral trail network already existent, which was previously digitalized through historical cartography and its trails hierarchized according to their potential to constitute official trails.

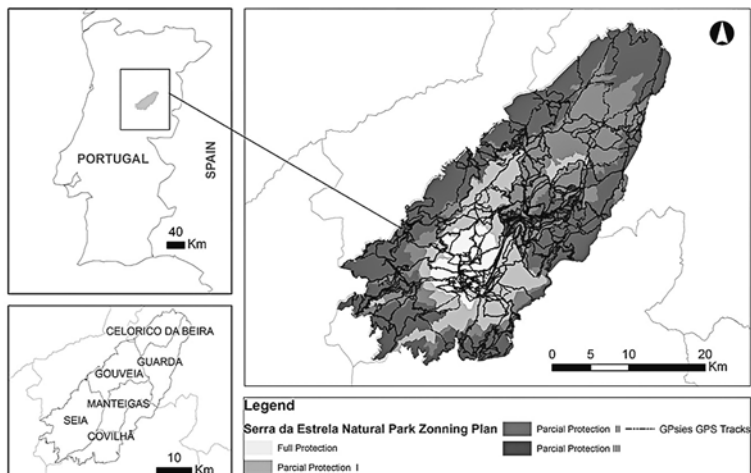


Figure 1. Serra da Estrela Natural Park Zonning Plan:
Conservation areas and the informal traks

Conclusions

Methodology approach can be easily introduced in further planning and management models and replicated in other protected areas, offering dynamic and updated information to management entities that enables the monitoring of the recreation management, particularly inside open areas.

The diagnosis of the activities' dimension and distribution, as well as of the users' preference profile, allows the forecast of conflicts and impacts, thus contributing to a risk minimization.

A better understanding of the audience and settled dynamics makes it possible to define balanced management strategies, project a range of activities suited to the users' aspirations and set a regulated use of classified areas.

In the method adopted, the transposition of a global system of preferences into the reactivation of part of ancestral trails for hiking activities not only permits a re-functionalization of routes disabled by the decline in the agro-pastoral activity, but also allows the forethought of ecologic and property conflicts inherent to a brand new route's installation.

In this study and future ones, voluntary information holds potential for exploration. Protected areas in particular should enhance its application both for available data analysis and to increase users' participation and collaboration management, improving the planning system.

Acknowledgements

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Gathering information about leisure and recreational activities in an open landscape setting

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Introduction

A non-profit organisation, which is responsible for the conservation of a protected area, has commissioned the University of Natural Resources and Life Sciences, Vienna with the collection of data about visitor activities in an area, which is particularly valuable in terms of nature conservation. The data collection should take place within the framework of several master's theses.

The study area located in the southwest of Vienna is a popular recreation area for the Viennese as well as for the population of the adjacent municipalities. The centre-piece of the study area constitutes a spacious semi-aridgrassland, which is an open landscape setting without any clear access points or restricted walkways, and the whole grassland can be used for recreational activities. The openness of the area allows an extraordinary view over the City of Vienna and the southeastern Vienna Basin. Besides this panoramic view, main pull factors for the visitors are the possibilities of hanging out, having a picnic in summer or watching a population of the European ground squirrel as well as good wind conditions for kite flying.

Information about visitor numbers as well as the different types and intensities of recreational activities the visitors practice on the semi-aridgrassland had been the main focus of the monitoring. Besides the allowed leisure and recreational activities, also the prohibited practices and behaviours, such as driving on the semi-aridgrassland by bike or walking dogs without a leash, should be captured.

Material and Methods

Visitor monitoring mainly takes place in entrance areas and at trail junctions (Henig, 2013). So far, there is little recording of people in open landscapes. In contrast to entrance areas open areas invite people to linger, look around and move slowly. Due to the fact that continuous counting, as often used for waypoints, does not lead to the desired results, the "point count" method has been used, which is commonly applied by ornithologists. With the "point count" method an observer records all information seen from a single point for a standardized time period and in a defined section (Suarez-Rubio & Thomlinson, 2009).

To survey the visitor numbers and activities a time-lapse video camera (type: Brinno TLC 2000) documented the recreational use in the study area from

dawn until dusk over a period of one year. A time interval of 15 minutes per hour was chosen (alternating weekly), in which every five minutes all people and activities in the camera's field of view were documented (this means three samples during the 15 minutes interval) and extrapolated to hourly values. To verify the results, the data were compared with visitor data collected in entrance areas with time-lapse video cameras.

Results

From April 2013 to March 2014 all in all around 115,000 visitors were detected based on the extrapolation of visitors counted during the 15 minutes intervals. Over the course of the year the highest visitor frequencies were captured in October 2013 and March 2014. The small visitor numbers during summer probably result from the climatic conditions in the study area at this time (very hot, little shadow, no water) as well as the holiday time. The evaluation of the visitors over the week showed somewhat uniformly distributed numbers on working days and a considerable increase at weekends, especially on Sundays. Leisure and recreational activities observed were walking with and without dogs (85%), hanging out (6%), having a picnic (3%), kite flying (3%), mountain biking (2%), Nordic walking (1%), jogging and sledding (> 1%). Most people stayed on the grassland (78%), except for the mountain bikers of which 91% used the available paths. A precise statement about the proportion of dogs kept on a leash cannot be made because in most cases (76%) it was not identifiable. But most dogs kept close to the owners (85%).

The comparison of the data with the data collected in the entrance areas showed a divergence of the extrapolated monthly visitor numbers between 1 and 12%, with the biggest divergences arising with increasing visitor numbers (higher visitor numbers using "point count" method).

Discussion and Conclusions

Video recordings are a beneficial data source for gathering information about visitors and their activities. There are, however, some challenging aspects for the evaluators, especially in open areas. Due to the far distance between the camera and the visitors, the correct identification of activities (e.g. carrying a sleigh or a dog, dogs on or off leash) as well as individual-related information such as sex and age was difficult. The data quality was also influenced by the current weather and light conditions (e.g. poor visibility caused by backlight, fog, intense rain or a snowy camera lens). Furthermore, the used "point count" method didn't allow determining the total number of visits in the study area. Persons captured in the count unit were possibly counted again in the following sample units if they moved very slowly or paused for a while. Therefore, the captured numbers of visits are rather approximate values than total numbers. The same applies to typically ongoing activities such as having a picnic or kite flying; thus the quantity of these activities can probably be overestimated. To evaluate the results you could e.g. cross-check the visitor numbers with data from other monitoring points in the area such as entrance areas as done in this project. In general, the "point count" is a method for providing an overview of the temporal (season and daytime) and spatial distribution of the visitors in

open landscape settings as well as their activities and behaviour. To compensate the disadvantages mentioned above, a monitoring design that includes a mix of methods is useful/should be aimed at.

The evaluation of the collected video material was labour-intensive and time-consuming, especially because a lot of different aspects were documented. Automated image interpretation systems, which are still in development, could help to reduce the labour costs and make video monitoring more feasible. In the future, the necessity of appropriate methods for gathering information about leisure and recreational activities in open areas will still rise. Therefore, an increased use of methods from other research domains such as cultural, social, behavioural and economic science is thinkable (Erdmann, 2000, cited in: Hennig & Laube, 2005).



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TRAILS AND ROUTES MODELLING

The rocky path – defining a trail and route network for a new national park: Case study Parc Adula, Switzerland

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Introduction

Switzerland has the oldest national park in Central Europe and in the Alps – the Swiss National Park in the Engadin Valley. Established in 1914 and with an area of 170 km², the park is well known, and has strict but well accepted rules for visitors (Backhaus and Rupf, 2014). The Swiss National Park is not classified as a National Park, but as a Strict Nature Reserve category Ia (IUCN). It only consists of a core area without a buffer zone.

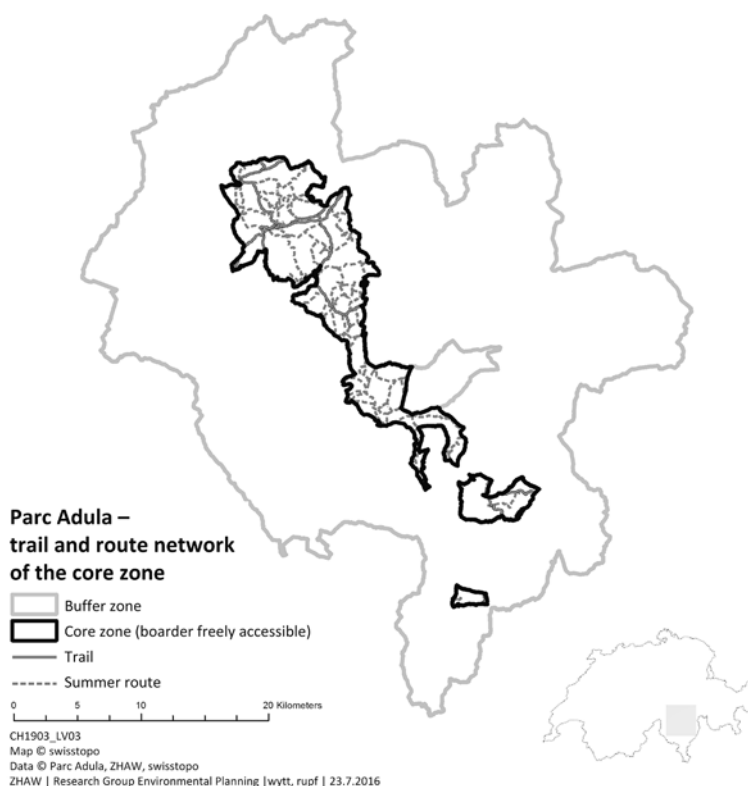


Figure 1. Perimeter of core zone Parc Adula with the trail and route network

In 2007 the legal basis for new protected areas in Switzerland including national parks (IUCN category II) was established. This was the beginning of several initiatives to launch new national park projects. One of them is Parc Adula (see Figure 1), situated in the south eastern part of Switzerland, with a total area of 1,250 km² and a core zone of 145 km² (12 %). Parc Adula is part of the territory of two different cantons and authorities (Grisson and Ticino). In addition, Parc Adula is home to three different languages and cultures (Italian, Romansh and German), with about 16,000 residents in 17 communities. The land drops from the highest peak, Piz Adula, from 3,402 m to 349 m, and different biogeographical regions are therefore represented.

Establishing new national parks in Switzerland – legal prerequisites

The introduction of the Federal Act on the Protection of Nature and Cultural Heritage in 2007 and the subsequent new Ordinance on Parks of National Importance (ParkO) were important milestones in nature protection in Switzerland. Supplementing guidelines for initiators and authorities were provided. Some core criteria for national parks are:

- High natural and landscape values (biodiversity, indigenous species and habitats, exceptional beauty and character of the landscape, low level of disturbance, uniqueness)
- Presence of a core zone and surrounding buffer zone (at least 100 km² core zone in the Alps and 10 % of the total park area)
- Bottom-up process with local initiatives
- Participatory process (majority of residents to vote in favor of the park and support it financially)
- Primary goal of the core zone is to enable free natural development: Thus for visitors it's prohibited to leave the trails and routes as well as to use vehicles and to take animals in the core zone, ...
- Rules for visitors in the buffer zone are the same as those in areas outside the park.
- By fulfilling all the criteria, the park can be labeled and financially supported as a national park for ten years. This process then has to be repeated every ten years.

Applied theoretical concepts to define a trail and route network

A trail and route network is a central component of the visitor management system of a national park. A trail is defined as a marked official mountain hiking trail or a fairly difficult marked alpine trail. In contrast, a route is not marked. An alpine mountain or climbing route is only described in climbing guides, e.g. the Swiss Alpine Club SAC.

Several basic concepts and management frameworks have been developed, especially in North America. As guidelines, the approach of 'Recreational Carrying Capacity' RCC (Manning, 2007), the frameworks 'Recreation Opportunities Spectrum' ROS (Clark and Stankey, 1979), and 'Limits of Acceptable Change' LAC (Stankey et al., 1985) have been used. Starting from an inventory of unique landscapes, habitats of vegetation and wildlife species as well as important sites for recreation, a system

of development objectives, principles and measures has been elaborated with the involvement of park management.

Definition process

Procedure

In respect of Parc Adula, it was crucial to select the most beautiful and important routes for the locals, hikers and mountaineers. This infrastructure needed to remain accessible to ensure that the project is accepted by these stakeholders. For this purpose a working group was formed with local mountain guides, SAC representatives, wardens of mountain huts, hiking guides, etc. The group characterized all routes in the park with regard to their importance for mountaineering and estimated frequency of use. Similarly, wildlife specialists evaluated the routes regarding their potential for disturbances to wildlife. These assessments from the perspective of recreational use and conservation were taken as the main bases to develop a balanced proposal for the core zone, implementing the requirements of the Park Ordinance. This proposal was discussed at workshops with all stakeholders. In some cases workshop participants were unable to find agreement and the board of Parc Adula made the final decisions.

Results

As a result of this process, all the official marked trails will remain accessible but the number of routes will be reduced. Nevertheless, SAC estimates that 90-95 % of to-days' mountain tours in the core zone will remain possible with the new network (Minder, 2015). Mountaineers will still be allowed to climb all major peaks, but not from every exposition. In order to enable free natural development, some valleys and small watersheds without human visitors and disturbance are required.

Due to the measures taken, the route network in the core area has been reduced from 384 km to 214 km, while the existing trail network is unaltered. This results in a trail and route density of 2.2 km/km² in the core area. Compared with other national parks in the Alps, the trail and route network density is still high.

In addition to the trail and route network, several spacious areas were defined where visitors can relax and enjoy nature. These visitor areas are places to observe wildlife or climb rocks, and there are also areas situated around mountain huts. Owners and wardens of the mountain huts were involved in the definition process.

Further steps

Existing data bases, e.g. frequency of use, are not of the quality required. Therefore, in the first phase of operation, visitor and nature monitoring is being carried out.

Regarding LAC, the further development of the trail and route network is a participatory process. For this, a trail and route commission will be established in which mountaineers, tourism experts, wildlife specialist, researchers and residents will be represented. This commission is expected to have a challenging task with the definition of indicators, thresholds and appropriate measures (McCool et al., 2007). Once these figures have been established, and based on other experience gained, the

trail and route network will be optimized, i.e. by addition, substitution or closure of trails or routes.

Lessons learned

Establishing a new national park with a trail and route network is a multi-dimensional, complex task. The case presented, Parc Adula, with its different languages, cultures and cantons is particularly challenging, and even more so as it will be the first national park of a new generation in Switzerland (IUCN cat. II). The park management needs to introduce this 'new national park' to voters who are currently only familiar with the existing Swiss National Park and its restrictions.

Furthermore, we are currently in times of transition, which are difficult times for inhabitants of the Swiss Alps. Voters have to choose between 'freedom in nature' and 'protected areas' with some restrictions, but new opportunities for their sustainable development. The participatory process used is a tightrope walk and it is impossible to fulfill the particular interests of each party involved.

Finally, it was found that the authorities responsible have no experience in this field. They may have a picture of an ideal national park in mind, but creating a national park, including defining a trail and route network, is a lengthy process. We sincerely hope it will be given a chance and not too many rocks will be placed in its path.

Acknowledgements

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Using Photo Elicitation to Understand Hiker Perceptions of Energy and Communication Related Development Along the Appalachian Trail

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As a result of a growing population, the demand for energy and communication related development has increased. Development needs inadvertently fall within boundaries or cut-through protected areas (i.e., national park units). Understanding impacts resulting from energy and communication related infrastructure development on an individual's recreational experience is important to resource management agencies such as the National Park Service (NPS). Specifically, with eight power-lines stretching over 2,000 miles through six states associated with the Appalachian Trail (AT), understanding the impact of energy and communication related development is of increased concern. The purpose of this presentation is to provide results of a photo-elicitation study conducted with AT users in conjunction with the NPS and Appalachian Trail Conservancy (ATC) to determine hiker perceptions towards various energy and communication related infrastructure.

Data for this project were obtained from a study of recreational users' opinions towards energy and communication related infrastructure development within the mid-Atlantic region (e.g. Virginia, West Virginia, Maryland, Pennsylvania, and New Jersey) of the Appalachian National Scenic Trail (AT). A total of 611 useable on-site interviews were conducted from May to October 2014 at designated sampling points selected in consultation with the NPS and ATC. During the interviews, participants were shown a series of six, randomly ordered photographs representing different types and degrees of energy and communication related infrastructure. A series of quantitative and qualitative questions were asked to obtain users' perceptions towards varying degrees of development. See Figure 1 for an example photograph and responses to the questions asked for each scene.

Quantitative results indicate individuals responded more negatively to power-line infrastructure than communication towers while responding more positively and with mixed reactions to wind energy development. Not surprisingly, respondents also preferred fewer and smaller structures that were further from the trail. Findings also showed statistically significant variations based on user group (i.e. day users, thru hikers), wilderness preferences, and overall opinions towards energy and communication related development. Results of a qualitative analysis of an open-ended response question are used to provide further insights into the aforementioned findings. For example, wind turbines were often referenced as providing a more natural form of energy development than power lines while also being a symbol of sustainability. Additionally, communication towers were often rated more



Figure 1. Respondent ratings corresponding to Photo Master ID number 17.^a

| | Mean |
|--|------|
| Please rate the <i>scenic value</i> of this photo. ^b | 2.46 |
| Please rate the <i>effect on your enjoyment</i> if this was the actual view. ^c | 2.63 |
| Please rate your <i>likelihood to return</i> if this was the actual view. ^d | 2.80 |
| Does the development depicted in this photo have less, the same, or more impact than other existing projects... ^e | 1.80 |

^a Coded as: Type = Powerline; Density = High; Proximity = Near; Authenticity = Real.

^b Measured on a scale where "1" = very low scenic value and "7" = very high scenic value

^c Measured on a scale where "1" = very negative effect and "7" = very positive effect.

^d Measured on a scale where "1" = much less likely to return and "7" = much more likely to return.

^e Measured on a scale where "1" = less impact, "2" = about the same and "3" = more impact.

negatively than wind turbines, but were cited as a necessity for safety purposes and much easier to ignore from view sheds than power lines. Future research needs and management applications will be further addressed.

Investigating the Incident Profile of Vulnerable Climber Segments: Older Climbers in the North Japan Alps

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Introduction

Recreational mountain climbing in Japan has some of the highest-participation rates in the world, but there has been a recent increase in climbing-related incidents and fatalities (OSC, 2016). From 2004 to 2013 the number of incidents across the country increased by 64%, and fatalities by 20% (Kobayashi & Jones, 2015). 47% of all incidents involved climbers aged over 60 years, with many due to falls confirming the heightened risk faced by older (non-climber) citizens (Curl et al, 2016). This paper aims to investigate these trends, and offer implications for improving risk management, by using prefectural police incident reports to examine climbers' profile in the North Japan Alps.

Methodology

Case study site

The Chubu Sangaku National Park, colloquially known as the North Japan Alps, is a range of mountains covering 1,743 km² that divides East and West Japan. The range includes several peaks over 3000m and some of the steepest V-shaped valleys in the country. It is known as the birthplace of modern mountain climbing in Japan, and trends here have national relevance (Murakoshi, 2010). For example, there was a three-fold increase in the number of climbing incidents in Nagano Prefecture from 1998-2013, when it accounted for over a third of all incidents in Japan.

Research method and sources

The national park spans the four prefectures of Gifu, Toyama, Nagano and Niigata, but the latter covers a small area so was excluded. Prefectural police incident records from 2004-2009 were utilized. Hard copies of the annual report were transcribed and a database created which pooled the following 7 variables: date; prefecture; area; gender; age; cause; extent of injury. Incidents involving other motives such as picking herbs or vegetables were excluded. Although subject to certain limitations, including slight variations in record-keeping procedures, the multi-year police data enabled identification of the overall trends in climber incidents. Findings were triangulated via follow-up interviews with the relevant police departments, NGOs and research organizations.

Findings

Overview

The total number of incidents increased 49% from 2004 (n=137) to the peak in 2008 (n=204), before a slight decline in 2009 (n=183). Although the climber population is also estimated to have grown, trends suggest it has been surpassed by the increase in incidents: for example, from 1995-2014, the increase in incidents (254%) outstripped that of climber numbers (177%) (OSC, 2016).

Nagano and Toyama Prefectures accounted for a combined 86% of all incidents, with Toyama's share increasing from 42% in 2004 to 49% in 2009. Incidents recorded in Gifu accounted for a median of 14%. 67% of all incidents involved climbers aged 50 or over. Also, the number of incidents involving climbers aged 70 or over increased from 7% (2004) to 13% (2009). These findings are in keeping with a long-term trend toward ageing: the proportion of incidents that involved climbers aged >50 was 30% in 1995 but by 2015 had increased to over half (OSC, 2016).

Incident causative factors

The most frequent causative factor was trips, accounting for 29% of all incidents. However, the interviews suggested some ambiguity over the definition of trips, slips and slides, so the categories were merged into “underfoot events” (Bentley & Page, 2008) whose combined share accounted for 57% of all incidents. Underfoot events accounted for 62% of all incidents in climbers aged >50. At the older and younger extremes, illness was more frequent (57% aged <30; 30% aged >70).

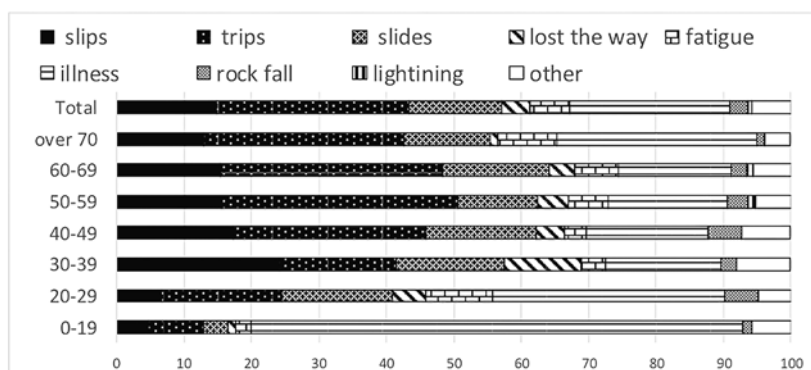


Figure 1. Comparison of incident cause factor by age group

Incident severity

13% of all incidents involved a fatality, with an additional 1% missing (presumed dead). Amongst the non-fatal accidents, 32% were classified as “severe” injuries wherein recovery was expected to take a month or more. 33% were classified as “non-severe” injuries with an expected recovery time of less than one month, but the share declined from 43% (2004) to 24% (2009). Conversely the proportion of climbers “rescued” in-

creased from 13% (2004) to 28% (2009). Climbers aged >50 displayed more fatalities (15%) while those aged 50-69 had more severe injuries (37%).

Discussion

This paper investigated a recent increase in climbing-related incidents in Japan via the case study of the North Japan Alps. Results provide insight into incidents involving older climbers, who were found to account for a larger but not statistically significant share of the total. Results have risk management implications for improved information and targeted search and rescue operations.

Toward improved risk management and targeted management responses

In 2015, Nagano Prefecture introduced a new by-law making it compulsory for all climbers to pre-register their route information with local authorities, which could facilitate search and rescue operations. The same prefecture has also pioneered a map showing visitors graded trails to facilitate matching their physical ability (1-10 scale) and technical difficulty (A-D scale) of trail; elevation difference; distance etc. By using this combination of 'sticks' and 'carrots', it may be possible to cope with vulnerable climber segments, building the capacity for more targeted management responses such as risk management strategies for particular visitor segments.



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Modelling use of forest recreation routes; an application for woodlark (*Lullula arborea*) conservation

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Introduction

Forests are popular recreation destinations (Marzano & Dandy 2012) often enhanced through provision of extensive footpath or trackway networks, picnic sites and car parks. However, it may be necessary to manage recreational use of a forest if species sensitive to disturbance are present (Marzano & Dandy 2012). Spatially explicit models of recreational use provide a tool for recreation management. Here we model recreational use of a forest trackway network to estimate disturbance rates on habitats managed for woodlark (*Lullula arborea*), a disturbance-sensitive species of European concern.

During the 20th century large parts of the UK were afforested to provide a strategic timber reserve (Peterken, 1993, pg. 85). Afforestation of open habitats reduced the extent of unimproved grasslands, heathlands and wetlands, with consequent declines in associated species. To mitigate these impacts the UK Forestry Standard (Forestry Commission 2011) recommends a minimum 10% open space. In Thetford Forest (18,730 ha) the Forestry Commission is widening verges along 278 km of trackway to increase open habitat (current extent 7.1%) and create an 'Open Habitat Network' (OHN) to enhance habitat and population connectivity for rare and protected species (Armour-Chelu et al. 2014).

The OHN has the potential to offset woodlark population declines within the managed plantations by providing additional breeding habitat. However, providing this as strips alongside trackways used for recreation may mean fewer woodlark settle. Breeding woodlarks are sensitive to disturbance; the probability of colonisation of suitable habitat in Dorset ($n = 16$) was less than 50% at 8.3 (5.8-10.9 95% CI) disturbance events hour⁻¹ (DEs h⁻¹; Mallord, Dolman, Brown, & Sutherland, 2006). For linear habitat bounding or spanning a trackway, lack of a 'refuge' may increase avoidance costs (requiring escape flight across the adjacent trees), so disturbance thresholds may be lower.

In the present study we model recreational flow throughout the Thetford Forest trackway network to estimate DEs h⁻¹ on all elements of the proposed OHN. From estimated thresholds for woodlark we quantify the number of trackway elements in the OHN unlikely to be colonised and therefore the potential loss of conservation benefit due to recreation. This tool is then used to assess mitigation through access point closure.

Methodological Approach

One of the challenges of landscape-scale recreational modelling is that number and type of visits depend upon many factors including proximity to an access

point, type of entry point, car park capacity, trackway type, time of day, day of week, and size of local source population. To capture this variability and calibrate our model, recreational visit data was collected over 5 non-consecutive years (2007-2014). Surveyors spent 1 hour periods recording recreationists (dog walkers and walkers) encountered at trackway elements adjoining intersections (sampling points) randomly located throughout forest ($n = 338$; Fig. 1a). Annually, each point was surveyed approximately 3 times during April-September with time of day ('time') and day of week ('day') varied and included as predictors in separate models of dog walker and walker recreational behaviour.

To generate potential explanatory variables for these recreational visits, several spatial layers were imported into ArcGIS 10.3 (Copyright © ESRI, USA). These included a line feature class delineating the trackway network with attributes for trackway element length and class ('forest road': a well-maintained hard surface road; fire route: all-weather hard surface maintained for fire truck access; trackway: less well maintained, usually grass or mud surface), a point feature class of car park access points with car capacity as an attribute (indexed by visual assessment on Google Earth), and a point feature class delineating sampling points (Fig. 1a). Car park capacity is important due to the size of the forest, distance from urban areas and barriers to pedestrian access created by major roads, meaning that most users arrive at Thetford Forest by car. We included trackway class as we hypothesised that wide, well maintained forest roads and fire routes would be preferred to narrower, potentially overgrown or muddy trackways. From these layers we calculated a weighted network distance ('net. dist.') from access to sampling points. The 'New Closest Facility' tool in ArcGIS Network Analyst was used to find the closest access point for each sampling point based on weightings for 1) car park capacity, 2) road crossings and 3) trackway class. This generated a line feature class of lowest cost routes connecting each sampling point with an access point, accounting for car park capacity, road crossings and trackway classes along the whole route. Routes were generated a number of times, varying the weightings for these three components. The observed number of recreationists (separately for dog walkers and walkers) was then modelled in relation to the accumulated weight attribute from the routes feature classes (net. dist.), time, day, and the number of households in 3 distance bands around access points. The weighting combination in net. dist. that resulted in the lowest AIC (best model fit) was retained for subsequent modelling.

Application

Resulting predictive models were used to estimate the mean (\pm 95% CI) DEs h^{-1} of dog walkers and walkers for every trackway element in the network. The combined 95th percentile predictions for dog walkers and walkers were mapped (Fig. 1b) and overlaid with the OHN. The number and location of OHN trackways unlikely to be colonised due to recreational disturbance was estimated, through sensitivity analysis of potential woodlark disturbance thresholds. We illustrate the utility of our model for mitigation through testing closure of access points under current and future housing scenarios and re-estimating amount of OHN unsuitable for woodlark.

Challenges

Modelling recreational use of routes presents many challenges, including the time and effort required to sample a large forest network (1,694 person-hours in this study) and to generate a classified trackway for use in the network analysis. Assessment of appropriate weightings for components of the network analysis is also time consuming. However, once the model is calibrated, predictions are simple and quick for extrapolations to larger areas and repeat runs for scenario testing.

Acknowledgments

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Figure 1. (a) Thetford Forest boundary, trackway network, access points with parking (circles) proportionate to car capacity and sampling points used in model calibration (triangles); (b) Predicted disturbance events h⁻¹ (95th percentile) from dog walkers and walkers combined (shown for part of the forest trackway network); (c) Location of Thetford Forest within England.



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Spatio-temporal Patterns of Mountain Bikers in the UNESCO Wienerwald Biosphere Reserve

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Introduction

Since many years, mountain biking has become a popular activity. In the late 1990s, more than 800 km of mountainbike trails were laid in the Wienerwald, Lower Austria and Vienna. Since then the demands of mountainbikers have changed, because besides hardtail mountainbikes, downhillbikes and full suspensionbikes have also gained importance. In the last few years various non-designated single trails in and around Vienna have become popular and many off-trail areas (areas with illegally built ramps and jumps by the users themselves) have developed. Interviews (e.g. Reimoser et al., 2008), observations (Arnberger and Eder, 2007) and analysis of available online GPS-user data (e.g. heat maps) show that non-designated trails are sought out by mountainbikers.

Since 2014, various stakeholders (representatives from forest owners (Austrian Federal Forests, the forestry authority of Vienna, Stift Klosterneuburg) and mountain bikers (from the association Wienerwald Trails, Wienerwald Tourism and Wienerwald Biosphere Reserve) have decided to work together to develop mountain biking in a sustainable way according to the goals of the Wienerwald Biosphere Reserve (Koeck and Brenner, 2015). For example, first outputs of this platform can be seen in the transformation of a former illegal downhill trail area in Weidlingbach (near Vienna) into a legal trail.

A visitor management project analyzed the temporal distribution and the intensity of use of mountain bikers at designated and non-designated routes of the Wienerwald Biosphere Reserve. Results of this monitoring build a basis for an effective management of mountainbikers and provide basic data for evaluating the acceptability of the new trail area.

Study Area

The Wienerwald Biosphere Reserve extends across the two federal provinces of Vienna and Lower Austria. Area size is about 1050 km² and it is bordered in Vienna by settlement areas. UNESCO Biosphere Reserves are divided into three zones, namely transition zone, buffer zone and core area. Areas within the Biosphere Reserve are designated as core zones, in which nature protection and not forest management is the primary goal. Nevertheless it is still possible to visit core areas along officially marked hiking, biking and horse riding trails. With the exception of one trail, all monitored trails lead through or pass along the border of a core zone.

The Biosphere Reserve represents a popular and highly frequented recreational area, especially in the surroundings of Vienna. Different user groups visit the W-

Wienerwald for their recreational activities. Between the various user groups as well as between nature conservation interests and user groups, conflicts exist (Arnberger und Eder, 2007, Hirnschallet al., 2012, Reimoseret al., 2008, Reimoseret al., 2012).

Methods

On behalf of the management of the Wienerwald Biosphere Reserve, four trails were observed for a period of one year and information such as frequency of use and temporal use pattern of mountain bikers was gathered. The permanent counting was done by electronic counting devices which were installed at designated and non-designated trails in and around Vienna. The counting devices, three induction loops and a tube sensor, counted only the cyclists. The anonymous counting was performed from June 2015 to June 2016. The data was downloaded twice a month, transferred into a database and checked for plausibility.

Results

The following results are based on the data collected during the period from June 2015 to the end of March 2016. Mountain bikers use the trails throughout the year; the highest frequency of use took place between June and November and on days around Christmas. Three trails (one legal and two illegal) show similar day use patterns. ($r=0.7-0.8$; $p<0.01$). The counters registered the maximum number of mountain bikers not only in the official mountain bike trail, but also in the two illegal trails. In September and November, the highest numbers of users were registered in one of the two illegal trails. Only the off-trail area, suitable only for experienced users, shows different use patterns: Comparatively relatively few mountain bikers used the off-trail area; but the number of users was rather stable over the whole monitoring period. In all the trails, maximum number of mountain bikers were registered on Sundays and public holidays. The daily-use patterns vary predominantly between the seasons. During the warm season, the peak occurs during the morning and evening hours; in winter and spring however, between 10 AM to 4 PM. In the off-trail area, the peak occurs in the afternoon which is different from the other trails.

Conclusion and Outlook

The seasonal distribution shows that mountain bikers use the Wienerwald throughout the year, whereby the extremely mild beginning of the winter and the mostly snow-free winter has favored this distribution. Main conclusions of the monitoring are:

- Daily activity patterns show that mountain bikers change their activity times during the year.
- As legal trails and illegal trails show similar use patterns, it can be assumed that bikers bike where trails are attractive.
- Very experienced bikers with good skills go biking regardless of the season.
- Daily use patterns show that mountain bikers use the trails in the mornings and in the evenings as well as in winter. Thus the Biker Fairplay rules (for mountain bikers in the Wienerwald) are still not accepted as mountain biking is forbidden during these times of the day (Reimoseret al. 2008).

This evaluation provides an important basis for further management and monitoring of mountain bike trails in the Wienerwald Biosphere Reserve and other recreational areas: Illegal trails should be identified and intensity of use should be monitored. Then they can be compared to legal trails in the surroundings and adequate management measures can be implemented.

Actually one of the illegal trails in the study area has been transformed into a legal trail. Continuous monitoring would help evaluate the effects of the legalization of the trail and answer the question: In what way does the intensity of use on designated and non-designated trails change?

Acknowledgements

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Arboretum Mlyňany (Slovakia) – what can we learn and experience more?

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Introduction

Recreational activities are connected with the leisure time of human. They have passive or active form, individual or social mode, organised/regular or occasional way and could be realised in urban, periurban or rural environment. Rural recreation and rural tourism are important for the economic growth of rural areas and contributes to the protection and improvement of environmental values. It is based on the attractiveness of the environment and landscape. It can develop and protect cultural, historical and natural heredity of the site (Flekalová, 2015). In Slovakia, the recreational activities in the protected areas is regulated by The Act. No. 543/2002 on Nature and Landscape Protection. According to the degree of the protection, different activities could be provided on the site. Arboretum Mlyňany belongs to the fourth level of Nature Protection (there is a five degree scale of Nature and Landscape Protection in Slovakia) (Štěpánková et al, 2012). Signs, trails and wayside exhibits are connectors between the site and visitors. They give meaning to the experience of the moment. Effective trails and interpretative sites are important components for telling the story of a site (Gross et al, 2006).

Material and Methodology

Mlyňany Arboretum manages the largest collection of non-native trees and shrubs in Slovakia, which also happens to be one of the richest collections in Central Europe. Arboretum is a member of Slovak Academy of Sciences. The article presents proposals for the supplementation of existing educational trails in Arboretum Mlyňany. Our proposal has the aim to bring young generation to the protected area and through the unusual information share wide range of knowledge.

The arboretum was founded in 1892 by Dr. Štefan Ambrózy-Migazzi. His plan to create an Evergreen Park on 40 ha of land in original oak-hornbeam forest, led to the establishment of one of the first large scale plantings of evergreen trees in Central Europe. During the period 1953-1985 the area of the park was extended to 67 ha and holds a collection of approximately 2000 different trees, mostly varieties of wild species. The trees in the display areas are mainly native to the northern hemisphere with the dendroflora of East Asia predominating.

In the Ambrozy's original 40 ha Evergreen Park the trees were grouped together regardless of their origin and have been carefully preserved. In more recent areas of planting, which includes an East Asian Section (14 ha), a North American Section (7.5 ha), Korean Section (5.5 ha) and Native Slovak section (4 ha) the trees have been grouped on phyto-geographical principals, according to their vegetative types and taking into account their natural distribution world-wide and especially their ecological relationships.

Several analyses of the territory have been elaborated, namely: Analyse of the functional zones of the Arboretum, Analyse of the current equipment of the Arboretum, Analyse of the educational boards and interactive elements, Visitors monitoring, Analyse of the attractiveness of the site. According to the results of the analyses thematic trails have been proposed. They will lead visitors through different dendroflora and explain the facts, which are connected with particular continent.

Results

In the Arboretum can be pursued dendrology and allied sciences which examine the many facets of the relationship between plants and environment. Collections of trees and shrubs are useful to botany, biology and forestry students and also for students of zoology and landscape architecture (Hořka, Barta, 2012). There are 16.9% of conifers, 14.1% evergreens (broad leaved) and 69% of deciduous trees and shrubs.

Arboretum Mlyňany is a protected area. There are several educational trails in the site: information boards, name tags (tree name in Latin and Slovak), audio recordings was removed due to bad conditions. There are also guided tours, indoor and outdoor interactive education, art activities organised for students at Primary and High schools, Leisure Centres, Universities and public. According to the visitors' monitoring, there are more than 30 000 visitors every year. The total number of visitors in the year 2007 was 37 655; in the year 2008: 46 613; in the year 2009: 43 250; in the year 2010: 31 943; in the year 2011: 38 896; in the year 2012: 39 356; in the year 2013: 32 172; in the year 2014: 37 379 and in the year 2015: 33 019. Categories of the visitors are as follow: 24,1% of students up to 14 years, 13% students up to 25 years, 8,3% families with children, 45,3% adults and 9,3 % Seniors.

According to the site analyses, we have proposed new, modern information boards with QR codes, which will share the facts interested for all aged categories of the public.

Ambrozy's sempervireo park describe the life of comte Ambrózy and history of the Arboretum. Educational boards in East Asian Section inform visitors about the history of this continent, the main representatives of flora and dendroflora and curiosities. The person, who is shown is actor Jackie Chan, his life, most famous movies, stunts, basic of kung fu.

North American Section is represented by President Abraham Lincoln, natural remarkableness of the nature and history of USA, presented dendroflora in arboretum, the most famous presidents of the country.

In the Korean Section visitors could explore woody plants of Korea, history, natural attractions and Korean culture. They will be involved to dance with rapper PSY (Jae Sang) in Gangnam style.

Native Slovak section describe the life of Milan Rastislav Štefánik – Slovak astronomer, photographer, military pilot, French general, diplomatist and politician. There is also presented history of Slovakia, natural attractiveness, native plants and well known researchers.

Conclusion

The „lesson“ for the visitors are not only pure facts, but the significant of the information. Meanings are more important to people than mere facts. Good interpreta-

tion helps visitors find personal connections between tangible places, objects and events and their own lives and values (Gross et al, 2006). The aim of our work was to bring as many interesting information as possible and give people the reason to visit Arboretum not only once, but several times again. Exploring the area, you can find many unique views, architectural buildings, exceptional species, explore fauna, flora and dendroflora. You can observe nature and natural processes, be part of seasonal changes. All unconscious perception can be completed by the knowledge shared through words, movies, experiences.



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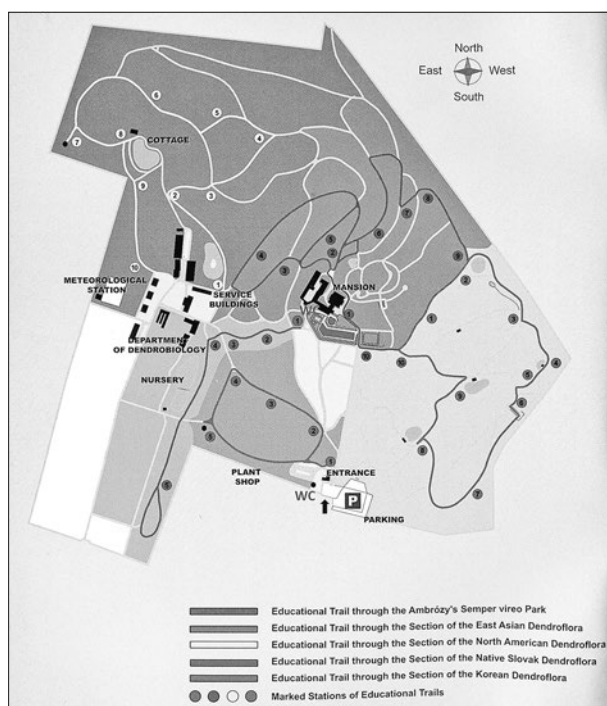


Figure 1. Current division of the paths and educational trails with stops in Arboretum Mlyňany

CONTEMPORARY TRENDS IN OUTDOOR ACTIVITIES

What's the latest research on mountain biking in protected areas?: Results from the special issue of the *Journal of Outdoor Recreation and Tourism*

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Public use of protected areas is changing, with declines in activities such as horse riding and hunting in some locations, while others such as mountain bike riding are increasing. Mountain biking riding is popular now in a wide range of protected areas from urban parks to wilderness areas and in many countries. Such popularity energizes the discourse about how mountain biking can contribute to protected area objectives, and at what cost. There is also an increasing focus on research on social and environmental aspects of mountain biking. This interest was reflected in numerous talks on the challenges of managing and monitoring mountain biking at MMV7 (Reimann et al. 2014). Inspired by this emphasis, a special issue of the *Journal of Outdoor Recreation and Tourism* was set aside to showcase the latest research on mountain biking (Pickering and Leung, 2016).

As the call for papers for the special issue stated: Research is needed to provide managers with information on: (1) The diversity and types of mountain biking, (2) Management of mountain biking in protected areas, (3) Social and health dimensions, (4) Positive and negative social interactions including the potential for conflict among different types of users, (5) Authorised and unauthorised development and use of trails and trail technical features for mountain biking, and (6) Environmental impacts of mountain biking including adventure racing events. The special edition aims to set the research agenda on mountain biking, while providing information for management and planning and include studies in social sciences and natural resources, and those with an interdisciplinary or transdisciplinary nature.

There were common themes to the research in the special issue, as there were for the presentations at MMV7. This includes studies assesses who mountain goes biking, why they go riding, riders, values, motivations and preferences. Some of these studies found that, although there have been some changes in the socio-demographics of mountain bikers, it's still predominantly men, often younger and well-educated, who go riding. Also, although riders often emphasized their desire for exercise, reflecting the health benefits of riding, motivations can vary including among destinations and even within biking cohorts.

Where people go mountain biking is diverse, but there appears to be a common trend for increasing use of destinations in and close to cities including a range of urban and peri-urban protected areas. Within destinations, riders' preference for tracks varies often with their level of experience including for different types of tracks. This includes variation in the duration of the ride, steepness of the track, single vs multi-use tracks, and for track surfaces. What mountain bikers want in tracks can also differ to those of other user groups such as hikers, with riders often preferring longer, steep-

er single tracks compared to some hikers and runners. Research on track preferences has utilized a range of data types including publically available GIS data, online and field surveys as well as field observations. Where data assessing the values of riders has been collected, it has provided interesting insights. Mountain bike riders in some protected areas have been found to exhibit environmental values consist with an ecocentric value set, even when exercise was a major motivator for their presence in the Parks.

Mountain bike riding off and beyond official trail networks appears to be an issue in several protected areas. Studies from different locations all found that mountain bikers often use trails where biking was not currently permitted. This reflects how demand for mountain biking can outstrip opportunities in some locations, but also the challenge for managers, when there are specific environmental and social reasons why mountain biking is not appropriate on some trails and locations, despite its popularity.

Mountain bikers are often using the same tracks, at the same time, as other users including hikers and runners resulting in interactions among different user groups in particularly popular locations. In some cases this can lead to social conflict. In other situations, however, there appears to be limited conflict, at least from the perspective of the mountain bike riders.

Many studies emphasized how the development of new types of mountain bikes has shaped demand for different styles of riding and locations. These issues are illustrated by the development of fat bikes and hence demand for access to snow covered trail. Such new styles of riding result in new challenges for managers including the potential for conflict with existing users, but also the opportunity to diversify use temporally as well as spatially. Similar, large scale riding events are increasingly popular in some locations, providing economic benefits, but also management challenges.

There is still very limited research on the environmental impacts of mountain biking, despite increased recognition from researchers and managers of the importance of such data. Controversial issues for which their remains limited information include the relative impacts of mountain bikers compared to other common activities such as hiking, mountain bike specific impacts such as those from unauthorized trail technical features, and the extent to which mountain bikes transport weeds and pathogens, including which types, how much and how far.

The results of these and other studies highlighted how many protected area agencies are still playing 'catch up' with demand, preferences and diversification of mountain biking, including in terms of policies, facilities, on ground practices and planning. We hope that both the MMV conferences and publications such as the Special Issue of the *Journal of Outdoor Recreation and Tourism* assist in the more effective management and monitoring of this increasingly important type of visitor to protected areas.



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Predicting Outdoor Recreation – Experts vs. the Public

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Future participation in outdoor recreation is of interest to authorities as well as tourism and outdoor recreation organizations, but at the same time difficult to give an accurate answer for. It is not possible to study the future as such, since there is no empirical data to be analyzed which measures the time ahead of us. But the future is nevertheless a very important field of research because predicting the future is inherent important to make the right management decisions, improve adaptation, inform policy makers and ultimately support a more sustainable development. Alm et al. (2012:7) argue that “...we can use our knowledge about history and about the current situation for a discussion that also involves our values. The basic idea is that we can better shape our future in the way we want if we do this on an educated basis”. Elements in building this educated basis with regard to social science is for example information about changes over time for activities and attitudes, as well as presumptions concerning the future expressed by different groups. Hence, among the techniques that can be used to get a better basis for speculations about the future are predictions by experts and surveys among potential participants.

It is reasonable to believe that some groups are better informed and “ahead” of other people with regard to for example future attitudes and behaviors among the public. This technique of asking experts is sometimes called the “Delphi method” according to the ancient habit of asking the Delphic oracle in Greece about what the future will be. With regard to outdoor recreation and nature based tourism it could be entrepreneurs (always keen on discover new markets), producers of equipment (looking for new fashions) and public officials and politicians (trying to avoid upcoming conflicts and keen on establishing laws and regulations to adapt with changing patterns). Important aspects of using this method is that these groups are often limited in size, interested of the issues and quite easy to reach. But there is of course a risk that such groups are mainly thinking “inside the box” and could be instinctively reluctant towards new perspectives that challenge their own competence, products and/or current management methods.

However, if interested in the future changes in outdoor activities among the public at large – why not simply ask the same public about their plans for the future? Important pros with such an investigation technique is the simplicity – you can ask specifically about the attitudes and behaviors you are interested in, and the method of doing so through structured questions to a random sample of the population is a very much established approach.

Predictive data

Panels of experts were in 2003 and 2013 asked about their predictions of increases in outdoor recreation activities in the Swedish high mountain area in a ten year perspective. The groups involved 54 persons in 2003 and 65 in 2013, and consisted of researchers, tourist industry, government agencies and organizations with an inter-

est in the mountain area. The surveys of the public were done in 2004 (n=1067) and 2013 (n=1000) to reflect the opinion among the general adult population of Sweden. The same set of questions used for the experts were included in the surveys among the public.

When comparing the predictions done by the public and the experts in 2003, the differences are quite striking (Figure 1). First of all, we note that the public in general are more prone to predict increases in activities than the experts are. The only activity experts believe will increase more compared with the public is snowmobiling. Other activities experts predict to increase in the next ten years are short hikes (1-3 hours), day-hiking, mountain biking and angling. Looking at the answers from the public, we instead find backpacking, day-hiking, downhill skiing, angling, and snowmobiling (in decreasing order) to be expected to increase in the future. Hence, differences in predictions between the two groups are quite significant, especially when it comes to backpacking and downhill skiing, the two major recreation activities in the mountains.

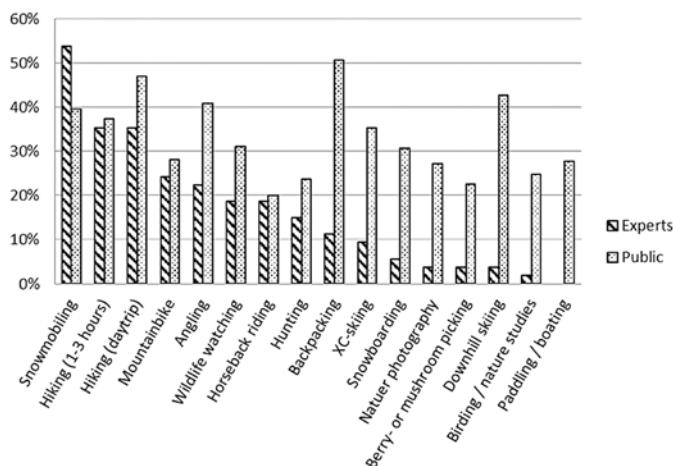


Figure 1. What activity will increase in the coming decade? Results from a survey among the public compared with an expert panel in 2003.

Actual changes

The next issue to look into is then which of the two sources of information – public surveys or expert panels provide the most accurate predictions of the future? The answer is to be found in statistics of actual changes in outdoor recreation participation during the study period, i.e. from 2003 to 2013. Since we are interested in recreation in a specific region, we can not only rely on data from a particular population (e.g. Swedes), but need to look at “on-site” data that include also other nationalities visiting the region, as well as those age groups that population surveys typically do not include (e.g. young and old persons). A preliminary analysis of selected data reveal a significant increase in overnight stays at backcountry mountain lodges (+33%)

and cabins (+10%), reflecting an increase in backpacking during the study period. For downhill skiing we observe a 39% increase in ski-pass sales, while the annual number of “skier days” have increased only slightly (+0,6%). Hence, our results indicate that predictions of future outdoor recreation by the general public are at least as accurate, perhaps even more so, than those done by experts.



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Foresight Outdoor Recreation – A discussion based on monitoring experiences in the Nordic context

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Foresight outdoor recreation in the future is inherently important to inform policy makers and make the appropriate management decisions. It is also an essential tool to cope with changes. Participation in outdoor recreation in the Nordic countries has a long tradition and has been closely related to wellbeing, social welfare and cultural values. More recently, however, social, economic and environmental changes challenge the traditional view on outdoor recreation. This includes, for example, urbanization, increased mobility, improved economy, cultural diversity, aging populations, new technology, climate change, competing leisure activities and time constraints.

Most measures of outdoor recreation participation are cross sectional studies at one point in time, but more recently there are an increasing number of longitudinal measures (e.g. replications of earlier studies) reported in the Nordic region. Such historical trend data can be extrapolated and is one obvious way of forecasting the future, but there are many limitations. New approaches needed should be forward looking rather than backward based, to deal with increased complexity and change. Hence, the aim of this paper is to discuss approaches to foresight outdoor recreation based on experiences from outdoor recreation monitoring in the Nordic context with two purposes: (i) to provide an overview of different monitoring approaches used and (ii) to propose alternative approaches to foresight outdoor recreation given contemporary changes in society.

Trend analyses based on monitoring

Monitoring outdoor recreation is typically done either on-site covering a specific area or off-site targeting the population in e.g. a municipality, region or country. Most longitudinal data have used national survey data (mail, phone or web-questionnaires), focusing on trends in activity participation, frequency, etc. A wide range of methods and techniques exists for on-site visitor monitoring. Basic on-site survey approaches include i) automatic counting stations, ii) on-site questionnaires (in different variations), and iii) self-registration. With the increase in smartphones and Internet coverage, data collection based on QR codes or web links direct to the visi-

tor are expected to increase in the future. The Nordic countries have a long term and broad experience of outdoor recreation monitoring.

Denmark

In Denmark, three national population surveys (in 1976/77, 1993/94 and 2007/2008) have been conducted, using the same methodology. Comparable information collected was e.g. number of forest visits, duration of visits, activities and transportation. The intensity of the recreational use of specific forests has also been monitored in 1976/77 and 1996/1997. The yearly number of visitor hours and visits was estimated, and questionnaires used to measure e.g. length of stay, group size and activities of the car borne visitation. Four permanent car-counting stations have been in use since 1976 which are able to describe the time-dependent variation and the trends in the extent of the recreational use. Finally, the Danish National Forest Inventory includes indicators like trails, hunting facilities and litter since 2006.

Finland

National Outdoor Recreation Inventory (LVVI) -study is a population wide survey to produce basic information of outdoor recreation behavior and recreational use of natural resources, it is conducted in 2000 and 2010. The principal outcome is Outdoor Recreation Statistics. The comparable information cover participation in 86 outdoor activities, information of the last visit to nature, of the last nature trip (nature tourism), and a large set of background information including access to recreational home, possession of equipment, number of holidays etc. Visitation in national parks and state owned hiking areas managed by Natural Heritage Service (Metsähallitus) has been monitored since 2000.

Sweden

Statistics on outdoor recreation participation is collected by Statistics Sweden as part of the national census and surveys have been conducted approximately every five years since 1976 using both personal and telephone interviews. In 2007, the interdisciplinary national research program "Outdoor Recreation in Change" conducted a nation-wide postal survey to provide information on participation in more than 40 outdoor recreational activities as well as associated motivations, constraints, economic and social factors. Some of these topics were followed up in another national survey in 2014 as the national outdoor recreation objectives were evaluated. In 2009 the Swedish Environmental Protection Agency proposed a special program for monitoring outdoor recreation at the national and local levels. While the program was never implemented as suggested, on-site surveys of visitors to all 29 Swedish National Parks were done for the first time in the summer of 2014.

Approaches to foresight outdoor recreation

Foresight information aims to help to see the future beyond the immediate years to come and different methods provide information for different needs and time perspectives. Policy and planning often have long term perspectives while management decisions are short termed. We argue that continuous monitoring is a funda-

mental basis for all foresight, but validity and reliability can be improved through mixed method approaches. In additions to trend data, different approaches to foresight outdoor recreation discussed here include:

- Scenarios and future tables
- STEEP, PEST, EPISTEL-M (see e.g.: <http://pestleanalysis.com/>)
- Cohort studies
- Intentions by the public
- Predictions by experts
- Back-casting
- Ethnographic online approaches

Future prospects of nature-based recreation and tourism in Finland

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Introduction

Recent changes in tourism and recreation have been driven by socio-demographic shifts, increases in disposable time and incomes, technological changes, transport developments, and emerging systems of policy and governance (Williams & Shaw 2009). In addition, population growth, urbanization and decreasing environmental quality have been identified as megatrends in tourism, recreation and leisure (Gartner & Lime 2000).

In developed, western countries populations are aging, younger generations are welleducated, and middle-classes are dominating population groups. Increase in recreation demand is associated with higher education level and middle-age (Manning 2011). In regard to the demand of outdoor recreation, changes in socioeconomic structure of society can be detrimental: population concentrates in urban areas, and countryside communities suffer from aging dwellers and lack of job opportunities. However, e.g. in Finland, visits to countryside cottages and recreational areas has been increasing (Hiltunen & Rehunen 2014).

There is a general tendency for decreasing amount of areas with natural vegetation in urban proximity, and also areas which provide access for recreation. Use of natural resources and land use is intensifying in many ways. Warming climate, deteriorated water quality, visual landscape poverty, loss of natural and cultural heritage and biodiversity are central issues of environmental quality. All these aspects of environmental quality and amount of resources for recreation are seen to be threatened in the future.

Changes in our everyday lives, in social and physical environment and resources available, put pressure for agencies which provide recreational services, and finance and administrate the sector, to better understand the on-going changes and also to anticipate better what the future will be and what kind of demands are expected. The future is unknown, but broad general directions can be predicted and reasonably dealt with.

Aim of the study

The aim of this study was to identify societal driving forces and trends of outdoor recreation, and to capture the insights and understanding of alternative futures among the actors working in research and practice in the field of nature-based recreation and tourism in Finland.

Data and methods

Experts in recreation resources management, sport, land use and forestry planning were invited to discuss about the future of nature-based recreation and tourism (n=39). Three workshops were organized in 2015. The workshop material consisted of pre-materials and structured discussions including the use of future table technics. The pre-materials included two web-surveys. The first survey focused on state of art concerning how knowledge is implemented and the needs for new information. Second survey was a 'mindmap' -type of survey, which invited the participant to suggest driving forces and important items related to future of outdoor recreation.

Results and conclusions

The three workshops produced nine different alternative and possible descriptions of futures for nature-based recreation and tourism (Table 1). The time perspective was 2030.

Table 1. Alternative futures of outdoor recreation.

| Name of alternative future | A short description of content |
|----------------------------|---|
| Polarised society | Population groups are more separated in terms of time and money available for recreation, which is reflected in selection of activities and participation frequencies. |
| Finns close to nature | Neighbourhood nature strengthens the nature relationship of young people and immigrants |
| Immigrants close to nature | Nature and outdoor recreation activities can act as a tool for integration of immigrants in the Finnish society, which is supported by voluntary work. |
| Nature for everyone | Neighbourhood nature helps senior citizens to get health benefits from nature and exercise. Equality, good environmental awareness, responsibility, sense of community and principles of sharing economy are realised in recreational use of nature. |
| Nature for the elite | This dystopia needs to be prevented. |
| Supermarket of recreation | Urbanized population desire to get back to nature. Multiple subcultures of outdoor recreation appear, more activities are subject to charge, and productisation of nature increases. |
| Neighbourhood nature | Neighbourhood nature maintains our well-being enabling at least with short neighbourhood visits, edible parks, i.e. the increase in urban farming. Recreational services maintained by the municipalities and the state are important, but the question is whether or not maintaining them is possible. |
| Nature-based economy | Willingness to pay for recreational use of nature is increasing, offering new livelihood opportunities for landowners in the countryside. |
| Diversifying Finland | Multiculturalism and internationality have an ever stronger role. There are more demands placed on the service network. |
| Polarised future | There is great variation in recreational use of nature between the crowded southern Finland and the large sparsely populated area. People must be prepared to pay for the use of nature. |

Most of the alternative futures were described to have positive development for outdoor recreation and representing changes, which were suggested to be supported by society. Only one of the futures was clearly interpreted as dystopia, which should be prevented. The most important means to support equality of access to nature and, as a consequence a fair distribution of health and wellbeing benefits from nature to all, were land use planning, which secure the neighbourhood nature, and the provision of recreational service close to home offered by municipalities and society in general.

In Finland, the prospects for future relying on the policy and practice of today, which suggests that society, the state and municipalities, pay a major role for provision on recreational services, even that the needs for recreation are going to be more diversified and population is polarized in terms of time and money available for recreation.



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Monitoring Human Use around Wildlife Movement Corridors in the Rocky Mountains, Alberta, Canada

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Introduction

The Canadian Rocky Mountains are home to a diversity of large, terrestrial mammals including carnivores (wolf (*Canis lupus*), cougar (*Felis concolor*), grizzly bear (*Ursus arctos*), black bear (*Ursus americanus*), lynx (*Lynx canadensis*), coyote (*Canis latrans*), red fox (*Vulpes vulpes*) and wolverine (*Gulo gulo*)), and herbivores (elk (*Cervus elaphus*), deer (*Odocoileus* sp.), moose (*Alces alces*), bighorn sheep (*Ovis Canadensis*) and mountain goats (*Oreamnos americanus*)). As human use of the Rocky Mountain landscape increases in both space and intensity, the effects of natural topographic fragmentation are exacerbated by human infrastructure, compromising wildlife movement and habitat use. While formal protection of these landscapes may exclude industrial disturbance, impacts from recreation and related infrastructure (trails, campgrounds, picnic sites, day-use facilities) may still represent a significant challenge to wildlife, particularly more wary species.

Within the Canadian Rocky Mountains, Alberta's Bow Valley exemplifies the challenges associated with co-managing for protection and recreational use of the landscape. The Bow Valley study area, located approximately 80km west of Calgary, Alberta, is a multi-use, multi-jurisdictional land base. The rapidly growing town of Canmore is almost entirely surrounded by Provincial Wildland Park, and lies immediately east of Banff National Park and west of an industrial landscape of unprotected crown lands within the Municipal District of Bighorn. The valley is a busy year-round tourist destination as the mountainous environment provides a world class setting for mountain biking, Nordic skiing, hiking, rock climbing, mountaineering, and trail running. Despite formal protection of wildlife movement corridors, their effectiveness for wildlife has been questioned as visitor and resident use of the valley continues to grow.

In May 2015, the Town of Canmore and Alberta Environment and Parks, Parks Division, embarked on a two-year collaborative study to better understand both wildlife and human use of the valley, particularly within wildlife corridors. The study stemmed from a series of recommendations developed through a comprehensive stakeholder process known as the Canmore Human Use Management Review (HUMR). The overall goal of our study is to determine how wildlife and humans use the greater Canmore/Bow Valley landscape so both provincial and municipal land managers can develop effective strategies to increase the sustainability of the area for wildlife. As the study is ongoing until May 2017, we present preliminary results in this paper.

Methods

A total of 77 remote wildlife cameras (Reconyx PC800 Hyperfire, Reconyx Rapidfire, and Reconyx Silent Image) were deployed throughout the Bow Valley surrounding the town of Canmore in May 2015. Cameras were distributed systematically at one camera per square kilometre and at higher densities in identified wildlife movement corridors (Figure 1). Approximately half of the cameras were set on wildlife trails and half were set on human-use trails in order to determine differences in use for the two trail types. Where cameras were deployed on human trails, they were set at knee height to avoid taking photos of people's faces. Cameras were serviced monthly by Alberta Parks staff and volunteers, which included battery and memory card replacement. Camera data was analyzed using Timelapse software (Version 2.0). Upon completion of data collection, occupancy models will be developed for each species using presence-absence data.

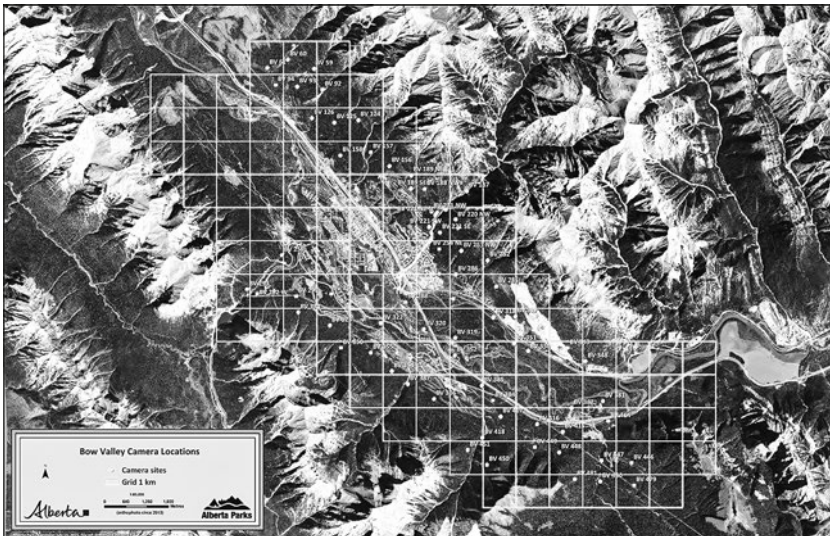


Figure 1. Location of the 77 remote wildlife cameras deployed on trails in and around Canmore, Alberta to monitor human and wildlife use of trails in the area

Preliminary Results

In the first year of the study, human use constituted 94% of overall trail use, with >150,000 human-use events recorded. The main user types on trails were hikers (64%), followed by bikers (22%) and runners (12%). There were approximately 30,000 domestic dog events recorded, of which 61% were off-leash, despite a strict on-leash law. Dogs were most likely to be off-leash when accompanied by a biker (91% off-leash). There were >9,500 wildlife-use events recorded, with deer and elk being the most commonly photographed species. There were also several large carnivore events recorded, including 13 grizzly bear, 46 wolf, 167 cougar, and 273 black bear events.

All carnivore species used human trails more frequently than wildlife trails, while deer and elk used wildlife trails more frequently than human trails. Grizzly bear and wolf use of trails decreased drastically when there were >10,000 human users per year on a trail (translating to ~ 2 human users/daylight hour). Grizzly bears, wolves and cougars were found most frequently at higher elevation sites further from the town of Canmore. Coyotes, wolves and foxes used trails with high human use more frequently at night than during the day. Deer and elk do not appear to avoid trails with high human traffic, but results suggest deer may avoid trails with high numbers of off-leash dogs.

Discussion

Preliminary results suggest that some species of wildlife may be adjusting their behavior to avoid people recreating in corridors and habitat patches around the Town of Canmore. Despite formal designation and protection of wildlife corridors, people continue to utilize these spaces which have been set aside for wildlife. Even in the presence of educational signage and messaging, recreationists continue to run their dogs off leash in areas where it is illegal. As recreation in the Bow Valley continues to grow in popularity with both residents and visitors, a variety of human-use management strategies will need to be implemented in order to ensure the sustainability of this landscape for wildlife. This will require bold and decisive management by both Alberta Parks and the Town of Canmore.

Borders of outdoor recreation

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This paper focuses on the establishment of a bilateral and transboundary management of the Halti mountain area. The area is located on the border between Finland and Norway. The region holds a special place in many different aspects. For Finns in general and many tourists Halti holds a national symbolic value as it is the highest mountain in the country. The pristine nature is also attracting many tourists annually, but mainly on the Finnish side of the border. On the Norwegian, just like on the Finnish side, outdoor recreation, hunting, angling and reindeer husbandry are the prominent activities. Reindeer husbandry and cultural heritage are also important attributes that characterize the region. The area is also recognized for its biodiversity as an alpine landscape that connects the coast and boreal taiga forest. As an important wilderness area in Scandinavia that covers this diverse landscape, biology and history on both sides of the border there is a common interest and expressed need to secure a sustainable development for the region. By establishing a lasting cooperative organization – *Halti landscape area cooperative board* – one will work to secure a holistic management of the area that enhances the region's unique value in terms of cultural heritage, biology and landscape qualities which makes it attractive for recreational use. Through forming a common body of management one overcomes some of the challenges that borders represent as the region share many interests, tasks and obligations to the preservation and development of the area.

Outdoor recreation in the border areas between Norway and Finland is growing. However, the contrasts between the countries are substantial on the conditions for development of outdoor recreation and nature based tourism. The border seems to be a border in a traditional sense, stopping people from the two countries going into the neighbor countries and as such represents obstacles for a joint development of outdoor recreation and the tourism industry. There are efforts made through this project to break down the barriers in between. However, the way borders tend to be treated currently, as something dynamic and processual may make these efforts easier. Border is a relational matter, not only between two nations, but also between management system, and people in general. And border can be a resource for tourism development, when dialogues and interaction between management and business people take place. This paper will look into the opportunity for a cross border recreational tourism destination, but also focus on obstacles in the unevenness concerning management systems, visitability and image of the two areas. As such the Halti case serves as an important example of how this can be done and how we can understand these processes today.

What have we learned in the past 12 years about Monitoring and Management of Visitors in Recreational and Protected Areas?

Current knowledge and future research directions.

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Introduction

Visitation to recreational and protected areas continues to increase and diversify. This creates both challenges and opportunities for those who engage in these activities and for those who manage the destinations. With increased visitation there can be increasing environmental impacts and potential for social conflict unless appropriately managed. Recognizing the importance of these issues a group of scholars came together in 2002 to provide opportunities for academics and practitioners to exchange information by running multidisciplinary conferences every two years on Monitoring and Management of Visitors in recreational and protected areas (MMV conferences). The first conference was in Vienna, Austria in 2002, Vienna, with subsequent conferences in Rovaniemi, Finland in 2004, Rapperswil, Switzerland in 2006, Montecatini Terme, Italy in 2008, Wageningen, The Netherlands in 2010, Stockholm, Sweden in 2012, Tallinn, Estonia in 2014, and here in Novi Sad, Serbia in 2016 (Figure 1).

The proceedings of these conferences provide snapshots of key issues and research outcomes in this important discipline. By reviewing presentations from the conferences we can assess: (1) who is conducting research on MMV, (2) where is the research conducted, (3) what types of research are presented, (4) what methods are used, (5) are their trends over time in the research presented, and (6) research gaps and future directions for research on managing and monitoring visitors.

Methods

We conducted a Systematic Quantitative Literature Review of the proceedings of the first seven MMV conferences using the methods of Pickering and Byrne (2014). This involved entering data on the abstracts of the core oral presentations at the conference excluding the abstracts for poster sessions, open presentations and keynote speakers. For each of these abstracts information was entered into a person-

al database on: (1) who did the research including names of authors and their country of affiliation, (2) where the research was conducted including the country where the study was located, and if it was conducted in a protected area, (3) the type of research including if the presentation was of original research, a report on one or more case studies, a method paper, concept paper or a review, (4) the discipline area of the presentation including if it was primarily focused on Environmental, Social, Technology and/or Visitor usage (i.e. information about numbers and/or visitor flows obtained by traffic counters or other types of devices). For each study we recorded all individual locations and countries where the research was conducted.

Results and Discussion

Across the seven proceedings there were 758 conference abstracts for standard oral presentations of which 10% were from Vienna, Austria in 2002, 8% from Rovaniemi in Finland 2004, 17% from Rapperswil, Switzerland in 2006, 13% from Montecatini Terme, Italy in 2008, 16% from Wageningen, The Netherlands in 2010, 20% from Stockholm, Sweden in 2012, and 15% from Tallinn, Estonia in 2014 conferences. There were a total 1227 authors, with most from USA, Austria, Germany, Switzerland, Netherlands, Finland, Australia and Canada. Authors who have multiple papers at the conferences were mostly from Austria including Andreas Muhar (21) Arne Arnbberger (18) as well as Dominik Siegrist (12) from Switzerland and Peter Fredman from Sweden (11). Other authors outside Europe with several presentations included Wolfgang Haider from Canada (17), Catherine Pickering from Australia (9) and Donald English from USA (8).

As one would expect for conferences held in Europe, most presentations reported the outcomes of research in Europe (68% presentations), with a strong focus on research from Germany, Austria, Switzerland and Finland (Figure 1). The conferences also included presentations from other parts of the world, including North America (15% papers), Asia (11%), Australia and New Zealand (6%), South America (1.6%) and Africa (1.3%). There were temporal spikes in the number of presentations based on the location of the conference, with region where the conference was held often well represented that year (Figure 1).

Most of the research has been conducted in national parks or other types of protected areas (58% presentations). National Parks that featured in many presentations included Danube Flood Plains in Austria, Daizetsuzan in Japan and Oulanka in Finland. Outside of protected areas there were studies in ski resorts (2%), urban green spaces and other areas (6%) among other destinations. Many of the studies looked at recreation and tourism generally (64%), while others assessed specific activities such as hiking (20%), mountain biking (9%), and skiing (4%).

Most of the oral presentations were of original research (64%) or case studies/reports (15%), with some presentations in the form of reviews (11%), concept papers (4%) or focused on developments in methodology (6%). There was a strong emphasis across conferences on the social sciences with 622 presentations on this discipline area. Of these 67% assessed visitors, 14% assessed local communities and 6% assessing government organizations with some assessing combinations of these three. In contrast there were only 231 presentations on the environment, many of which as-

sessed the environmental impacts of trails. Reflecting advances in technology there were 197 presentations focused on technology including 50 reporting on computer simulation models, 37 on types of traffic counters and 30 reporting on GPS trackers and/or hand held digital devices.

Although the relative dominance of presentations for different fields of research (i.e. social, environmental, technology) has remained relatively constant over time, there are some important trends in the topics presented. Between 2002 - 2014, social science presentations transitioned from data on visitor socio-demographics to presentations also looking at factors affecting visitation such as perceptions, attitudes, motivations and social values. The types of visitor data collected has also expanded from data on visitor numbers to also include data on visitor behavior and movements captured through technologies including GPS trackers, smart phones and social media. Within environmental presentations, there has been a trend from studies focusing on recreation impacts on terrestrial vegetation and wildlife to include marine ecosystems.

Conclusions and future research directions

The MMV conferences are important outlets for research on a wide range of topics relating to managing and monitoring visitors, particularly social science research including visitor data. It is also likely that there will be increasing focus on presentations involving the analysis of 'big data' from hand held technology and social media including geolocated images at future conferences. More presentations from under represented regions including South America and Africa would be desirable in future conferences.

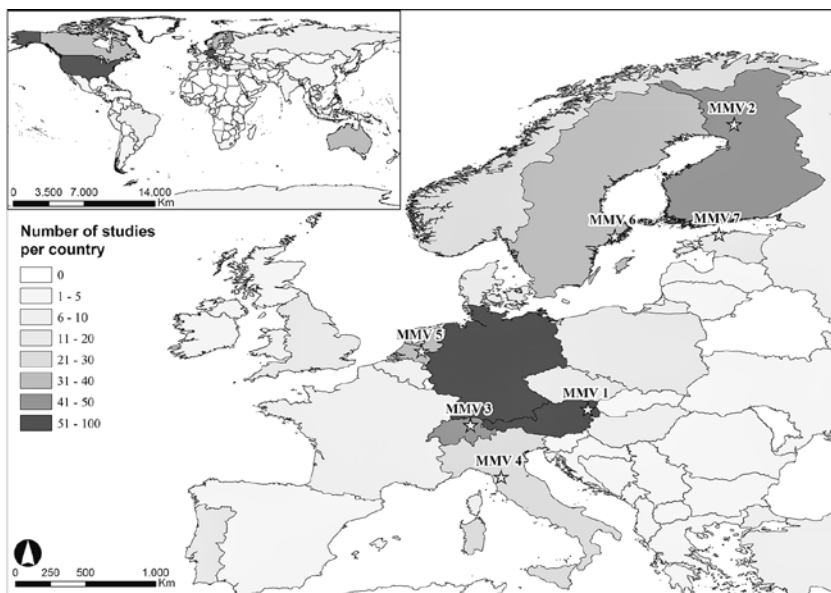


Figure 1. Geographical distribution of the location of studies from 758 oral presentations given in the first seven Managing and Monitoring Visitors in recreational and protected areas conferences



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Breeding racing pigeons: The serious leisure perspective

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Introduction

Pigeon racing is based on the remarkable homing instinct of pigeons, which enables their return to their loft, usually many hundred miles away. It offers not only the thrills and excitement of racing, but also the more sedate and intellectual rewards of breeding and rearing the birds (Jones, 2015). The history of breeding and racing pigeon is somewhat ancient. Pigeon homing was immensely popular during the nineteenth and early twentieth centuries. Nowadays, pigeon breeding continues in many countries, especially through pigeon clubs or associations. These communities primarily aim to train and race homing pigeons. Apart from this, secondary objectives relevant to sustainability are also stated, including careful breeding, and taking measures to counter the poaching of birds (Baker, 2013).

In many ways, pigeon breeding is recreational, with its refreshing, amusing and pleasure effects. However pigeon breeding is also expensive, time consuming, require space and specialised knowledge (Jones, 2015). Pigeons are bred for many years in large cages. Breeders provide quality and healthy living conditions for the birds. This recreation requires considerable effort and time. However, breeders generally take pleasure in spending time with their pigeons, coaching and racing them. Pigeon racing usually covers hundreds of kilometres between and across international borders. Not only pigeons and their breeders, but also people interested in watching the race are moved across borders. Hence pigeon breeding includes racing as an important recreational activity. Moreover it can be considered as a serious leisure activity not casual.

Robert Stebbins defined serious leisure as “the systematic pursuit of an amateur, hobbyist, or volunteer activity sufficiently substantial and interesting in nature for the participant to find a career there in the acquisition and expression of a combination of its special skills and knowledge” (Stebbins, 2007:5).

There is little research examining the serious leisure perspective in Turkey. In addition, no research has been found to survey breeding racing pigeons as a recreation in the country. Thus the aim of this study is to examine breeding racing pigeons with serious leisure approach in Turkey.

Method

A survey research method was applied for the purpose of the study. There are 16 active pigeon racing associations in Turkey. The research population consists of members of these associations. Akyıldız's (2013) Serious and Casual Leisure Measure Scale, developed in accordance with the Serious Leisure Perspective (Stebbins, 2007), was used in preparing the questionnaire. A total of 104 survey questionnaires were collected via internet survey. The data were interpreted by applying descriptive statistical analysis.

Results

Some basic demographic characteristics of the participants were obtained using survey. All participants are male, level of education is not high, and the mean age is about 35 years (Figure 1).

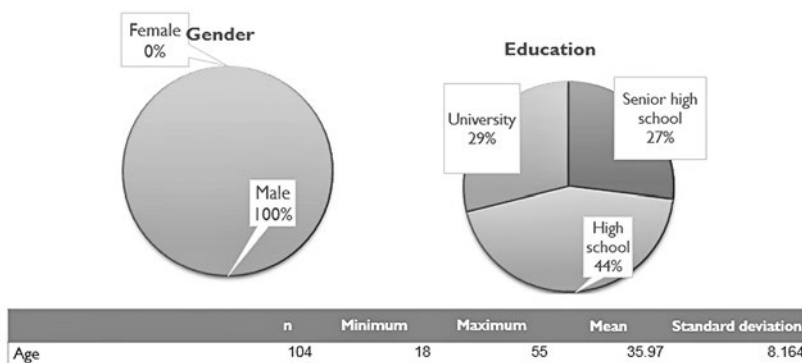


Figure 1. Demographic characteristics

Result analysis of Serious and Casual Leisure Measure Scale have been summarised in Table 2. The factors are respectively ranked as *competence, persevere, psychosocial benefits, therapeutic benefits, effort, career, identity, social world and dependence*. The Cronbach Alpha value, which shows the internal consistency of the scale, is 0.95, which is quite high. Correlation matrix is utilised to determine the structure validity of the scales. It was observed that there is a relationship between factors. The results of this analysis indicate that the participants agreed to all factors of the scale.

Table 1. Breeding racing characteristics

| Factors | Mean | Std. Deviation |
|--|--------|----------------|
| Career | 4.2724 | .69521 |
| Competence | 4.5327 | .65869 |
| Psychosocial benefits | 4.3750 | .77437 |
| Therapeutic benefits | 4.4365 | .79404 |
| Social world | 3.8894 | 1.11631 |
| Dependence | 3.7091 | 1.15178 |
| Identity | 4.0745 | .92227 |
| Persevere | 4.4495 | .71681 |
| Effort | 4.2452 | .80199 |
| n=104 Measured on a 5-point scale Measured on a 5 point scale where 1= Strongly disagree and 5=Strongly agree | | |

Conclusions

This study reflects that, breeding racing pigeons has all the characteristics of 'serious leisure'. The practice requires competence and perseverance. Pigeon breeding also requires significant personal effort. Additionally, participants reap psychosocial and therapeutic benefits. Their social world is deeply enriched, and their pursuit tend to identify themselves. Finally, participants sometimes depend on breeding pigeon for psychosocial reasons.

The current study was mainly conducted in descriptive terms. The study would be repeated with large sample size. Given that the recreational aspects of pigeon breeding has been somewhat ignored, despite its historical value, further research may thoroughly investigate the practice and its effects from the standpoint of sustainability.



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ENVIRONMENTAL AND LANDSCAPE AESTHETICS AND DESIGN

Visitors' trade-offs between physical and social factors of bark beetle impacted recreational forests

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Introduction

Extensive outbreaks of both introduced and native forest insects are increasing across Europe and North America due to climate change and other factors. Extensive bark beetle outbreaks, in particular, can result in both tourism revenue and timber value losses. Further, if constraints to recreation—such as unattractive forest landscapes—prevent participation, its recreational and restorative benefits are not realized.

Landscape preference studies on insect-affected coniferous forests reveal beetle activities are not or hardly accepted by the public (Buhyoff & Leuschner, 1978; Flint, McFarlane, & Müller, 2009; Sheppard & Picard, 2006). As such, it seems forest insect-changed landscapes impact opportunities for outdoor recreation and nature-based tourism.

Despite the prevalence of forest insect outbreaks, little is known about the social impacts of these outbreaks and little research exists on visitor response to visual changes in forest recreation settings. Few, if any, studies have examined how forest visitors weigh trade-offs between social such as visitor numbers and physical factors of bark beetle-impacted forests and how these vary nationally or internationally. This study fills that research gaps and examines these trade-offs in two countries: Germany and the United States.

Method

This study used a stated preference approach to explore visitor perceptions of bark beetle outbreaks at two state parks in the USA and a national park in Germany. A visual discrete choice experiment (DCE) employed digitally calibrated images (Arnberger & Eder, 2011) to simulate forest stands with varying levels of bark beetle out-

breaks, different management practices, and varying visitor uses. Translated and back-translated on-site surveys were conducted in summer 2014 with convenience samples of visitors at State Forest State Park (n=200) in Colorado, USA, Bemidji State Park (n=228) in Minnesota, USA, and Harz National Park in Germany (n=208). Each site has a history of bark beetle infestation with varying management approaches.

Participants evaluated alternative scenarios of forest environments displayed as digitally-calibrated images of the DCE. Each photorealistic forest scenario depicted the same six physical and social attributes, but varied in level, characterization and configuration (Figure 1). The images showed different stages of a bark beetle outbreaks, ranging from a mature, unaffected commercial or natural forest to ones where the forest was largely brown and dead. Social factors were the number of visitors, varying visitor compositions and dog walkers' behavior. Respondents chose their most and least-preferred forest environment alternative out of a choice set consisting of four images. In total, they evaluated four choice sets, resulting in an evaluation of 16 different forest scenarios.



Figure 1. Example of a choice set consisting of six visual social and resource variables with varying attribute levels

Results and conclusions

Results revealed the condition of the immediate forest surrounding was the most important attribute for visitors' landscape choices. Visitors preferred vital, mature and mixed forest stands, and disliked forest scenarios with substantial dead wood. The number of visitors was the most important social factor for visitors' landscape choices. When the number of visitors exceeded four persons, preference for the for-

est recreation site decreased. Differences between study sites were observed for social and physical factors.

This study shows that forest insects have a negative impact on cultural ecosystem services, in this case, on landscape preferences (Daniel et al., 2012). This impact will probably concern more forest recreation managers on a global level because of the increasing outbreaks of forest insects due to climate change and global trade. If forested recreation sites are heavily-impacted by forest insects, then their attractiveness will diminish and visitors may avoid visiting such forest environments, leading to reductions or redistribution in tourism revenues.

Acknowledgements

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R-Types - Development of a typology of recreationists as a base for planning and design of nature-based recreation areas

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Abstract

Recreation planning is an important aspect of landscape planning. The population of densely populated urban and peri-urban areas relies on the presence of attractive nature-based landscapes close to nature and open spaces. A central aspect in the planning and design of recreation areas is the inclusion of the needs of the population. Against this background, the aim of the project “R-Types” is to assist landscape architects in planning and designing attractive recreational landscapes. First, a visitor survey will be carried out in five selected test areas in Switzerland. In parallel, an online survey will take place. Secondly, a classification of recreational areas in Switzerland is created on a qualitative basis. This enables to assign specific recreation types to each class of recreational areas. Based on this, type-specific measures to protect sensitive natural areas are developed.

Initial position

Recreation planning is an important aspect of landscape planning. The population of densely populated urban and peri-urban areas relies on the presence of attractive nature-based landscapes close to nature and open spaces (Buchecker et al. 2012). A central aspect in the planning and design of recreation areas is the inclusion of the needs of the population. Motives and expectations of recreationists regarding health, exercise, nature experience and relaxation play an important role (Sijtsma 2012). Another important aspect is the prevention of conflicts of recreation seekers among themselves and with flora and fauna in ecologically sensitive areas (Mönnecke et al. 2006). Against this background, the aim of the project “R-Types” is to assist landscape architects in planning and designing attractive recreational landscapes.

Methodology

First, a visitor survey will be carried out in five test areas in the Swiss cantons of Glarus, St Gallen, Zug and Zurich and in the town of Zurich. The key questions relate to visitor frequency, reasons for visiting, preferences, needs and activities of recreationists. By means of a cluster analysis, a typology of recreationists will be developed on this base of data. This survey will take place between May and August 2016.

In parallel, an online survey will take place. For this survey, the platform <green-mapper> is used in collaboration with the University of Groningen. This is a Google Maps-based map application, which is accessible for everyone via internet. The ad-

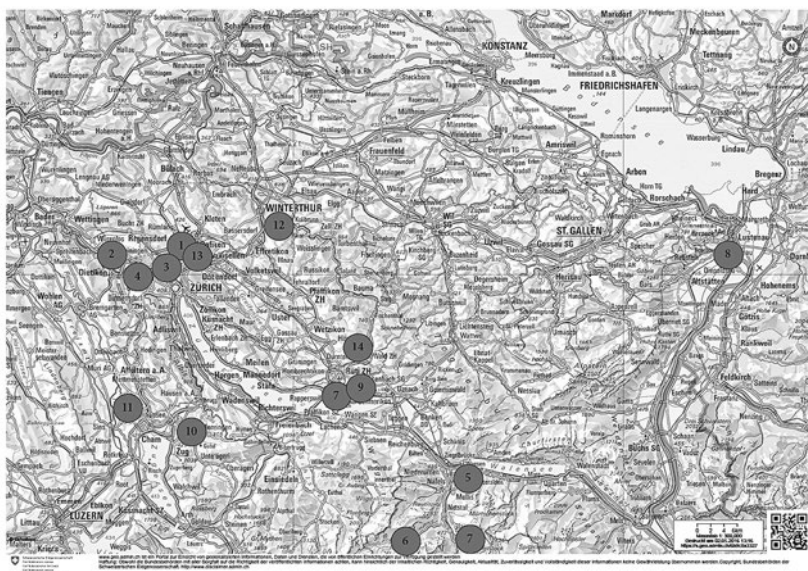


Figure 1. Test areas in Switzerland

Legend: 1 Affoltern-Seebach, 2 Limmatauen, 3 Hönggerberg-Käferberg, 4 Albisrieden-Schlieren, 5 Gäsi, 6 Klöntal, 7 Aeugsten, 8 Rheintal, 9 Jona, 10 Rapperswil, 11 Lorzenebene, 12 Zugerberg, 13 Hardwald, 14 Bachtel

vantage of this tool is that respondents draw their preferred nature-based recreation areas directly on a map and evaluate it by means of a questionnaire. With the combination of geo-referenced data and answers of respondents, a number of spatial analyses can be performed and the results can be presented cartographically (Sijtsma 2012).

Secondly, a classification of recreational areas in Switzerland is created on a qualitative basis (see fig 1). The criteria are landscape character, types of protected areas, accessibility, recreation infrastructures and preferred activities by visitors. This enables to assign specific recreation types to each class of recreational areas. Based on this, type-specific measures to protect sensitive natural areas are developed and compiled in a manual for planners.

Expected results

Basic orientations in recreation

From the point of recreation seekers, the need for silence, but also for opportunities for sports and exercise is important. Slow, contemplative activities on one side and quick activities on the other side often face each other.

Some of the recreationists, show interest for information and knowledge (e.g. nature, culture, history), others have the desire to relax and for leisure.

Together with the interest for individualistic (sports) activities, the need for social and communicative meeting places comes along. Recreation areas are important meeting places in public space.

Quality of recreational areas

Nature-based recreation areas should provide for recreation seekers on the one hand the opportunity for contemplation with quietness and wideness, on the other hand space for activities (encounter, sports, children's play, etc.). Of importance is also the security and manageability of the recreation area. It is expected, that key factors for attractive green spaces are usability, accessibility and infrastructural facilities.

In nature-based recreation areas, the local population expects unspoilt nature and a landscape with cultivated areas, but also with natural "wild" elements. Depending on the predominant use in the recreation area the need for (adapted and landscape-sound) infrastructures (such as walking paths / trails, running tracks, cycle paths / bike trails, benches, fireplaces etc.) is gaining importance.

Information possibilities about nature, culture and landscape with themed trails, leaflets, brochures, audio guides, etc. may not be equally important for all recreation seekers. But there is a segment among recreationists, which especially wishes for such information services.

Nature conservation

Potential conflicts between recreational use and fauna / flora should be minimized with good visitor management. In view of the acceptance amongst the local population, soft measures (such as information, products) are preferred to harsh bans. A large proportion of recreation seekers is already quite well aware of the concerns of nature conservation and observes the rules of conduct, where known and realistic.

Many recreational areas include nature conservation objects and are wholly or partly under a statutory protection. This restriction provides so far an opportunity for the planning of recreational areas, in the sense that authorities have an option to handle regulations (e.g. no dogs allowed, defined beach etc.).

Access to the recreation area

From the perspective of those seeking recreation, nature-based recreational areas should be easily accessible, preferably walking and in a relatively short distance from the living place. The quality of the road to the recreation area plays an important role (landscape quality, road crossings etc.).

Well-developed axes for non-motorized traffic are important for recreation seekers, beside footpaths, this applies especially to secure and attractive bicycles routes and other rolling means of transportation (separation from the road, secure road crossings, no stairs etc.).



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The Dutch and German Waddencoast: Similar but different. An entrepreneurial context

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Background

The Dutch and German Waddencoast belong to the international Waddensea area, which was assigned the status of World Heritage Site by UNESCO in 2009. Cross-border comparison shows both areas have similar natural resources, however show different developments where tourism is concerned. While along the German coast artificial beaches, marinas and campsites are represented, these tourism assets are less matured along the Dutch Waddencoast. Empirical evidence shows that the natural and cultural resources of a destination constitute only a comparative advantage of a tourist area: they are a necessity but not a sufficient condition for being competitive (Cracolici & Nijkamp, 2009). Hence, if these resources do not provide an answer in explaining the difference in tourism development between Germany and the Netherlands, explanations should be sought elsewhere. Moscardo (2014) emphasized on the complex pattern of governments, entrepreneurs and other actors within the process of community development and called for a need to understand the interplay between tourism and other community activities. This research paper focuses on the interplay between tourism entrepreneurs and their environment. The purpose is to understand the difference in tourism development along the Dutch and German Waddencoast by exploring the meanings, feelings and beliefs German and Dutch tourism entrepreneurs attach to their environment.

The concept of social representation is used to explain the shared meanings entrepreneurs attach to their environment and to explain the actions they undertake. Social representation is a concept designed by Moscovici and is understood as the collective elaboration “of a social object by the community for the purpose of behaving and communicating” (Moscovici, 1963, p. 251). It represents a group of people with a common sense and equal thoughts concerning social, cultural or symbolic objects. Social representations are formed by politics, culture or economics and therefore are strongly bound to a certain social structure, social organization or/and social institution. In this light, the difference in tourism development along the Dutch and German Waddencoast is explored by researching the relation between social representations and the action local tourism entrepreneurs undertake, based on these shared perceptions.

Results

Narrative interviews were conducted with tourism entrepreneurs, both in The Netherlands and in Germany. The results shows that stakeholders in The Netherlands and Germany hold different perceptions on nature and the role of UNESCO, result-

ing in different actions of local interest groups. Dutch tourism entrepreneurs are rather critical towards the Waddencoast being a World Heritage site. They have the opinion tourism development and nature protection are not to be seen as enemies, but they feel the Dutch governance has no clear policies towards the status of the area being a World Heritage Site. As a result, Dutch tourism entrepreneurs feel the need to develop own initiatives within the context of tourism development. On the other hand, their German colleagues experience the actions of the government more as a top-down approach and although they also reported being critical towards governance actions, this results in less initiatives compared to the Dutch entrepreneurs. Another difference was the fact that Dutch entrepreneurs were of the opinion local inhabitants do not show any pride towards their region, while the German entrepreneurs did not report this at all.

Conclusion

When natural resources will not explain the difference in tourism development, intangible aspects can do. This research focused on meanings and feelings local tourism entrepreneurs attach to community processes. We argue that these different perceptions on nature, the role of networks and interest groups, the attitude towards regional developments, the perception entrepreneurs hold towards the role of the government (bottom up or top-down) are not to be ignored in explaining the difference in tourism development.



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TOURIST INFRASTRUCTURE IN NATURAL AREAS

Natural areas for everyone – What infrastructure do people with disabilities require?

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Recreational activities in the outdoors have increased remarkably. Being in nature is ever more popular in society as a whole. This also includes disabled people for whom the positive impact of outdoor recreation on well-being and quality of life is even more important than for not handicapped people. But, what kind of infrastructure is needed by disabled people to allow them accessing natural areas? How should elements be designed to be in line with disabled people's demands? These questions are investigated in the senTour project.

Introduction and Research Question

Outdoor recreation activities, and in particular recreation in natural areas, have greatly increased over the last decades. This is well received since recreation in the outdoors has many positive effects on people's physical health and mental well-being (Immoos and Hunziker 2015). This is even more true for the disabled for whom being in nature has an even stronger impact on quality of life than for the non-disabled (CA 2005). Although the number of disabled people is still under-represented in the outdoors, the topic of accessibility of natural areas is steadily gaining interest.

People with disabilities include all persons that, due to physical, sensory, or cognitive impairment are challenged by barriers and obstacles that prevent them from fully participating in the world. At that, disabilities may be present from birth, occur during persons' lifetime because of accidents or sicknesses, or it might be due to age-related deficits and alterations (Atkinson and Castro 2008). Besides disabled equality acts, which guarantee the right to non-discrimination in employment, education, access to goods and services, buying and renting property, the fact that our society is ageing (and older people have a higher risk of disability) triggers the need to investigate how to improve accessibility of natural areas for disabled people. Here, accessibility is defined as the ability to access the functionality and possible benefits of products, devices, services, or environments for people with disabilities. It describes the degree to which a building, outdoor area or other facility is accessible, i.e. can be entered and used by everyone – independently, without the need for special arrangements (EC 2004).

Like for not handicapped people infrastructure such as parkings, trails, signposts, information centers, resting areas, viewing points, natural attractions, and staff are central prerequisites in order to perform recreational activities in the outdoors. But, what kind of infrastructure is required by disabled people to allow them accessing natural areas? How should relevant elements be designed? These questions are investigated in the senTour project (funded by the Austrian BMVIT under the FFG Program Benefit; duration 2014-2016), which aimed at developing a web-based informa-

tion portal for the Austrian Gesäuse National Park. Since the objective of this portal is to deliver information on recreational infrastructure relevant for disabled people in order to allow them visiting this protected area, the first step was to gain profound understanding which infrastructure is needed by older and in particular disabled people.

Methods

To yield insight into infrastructure needed by disabled people, in senTOUR project several methods were applied: An extensive literature review was undertaken. Reports and documents prepared by natural i.e. protected areas managers, experts, stakeholder groups and umbrella organizations as well as scientific publications on recreation and tourism, accessibility and barrier free products were searched. The results of the literature review served as basis for the preparation of two questionnaires. One survey was conducted among large protected areas in Germany, Austria and Switzerland (autumn 2014). The questionnaire, which was prepared using the online questionnaire design tool Survey Monkey, contained of 17 mostly open questions. The questionnaire was distributed using email. From 197 large protected areas the questionnaire was sent to, 68 responded. A second questionnaire with 23 mostly closed questions (using also SurveyMonkey) was prepared and sent by email to target group members by help of Gesäuse National Park and ÖAR (spring 2015). Here, 129 valid questionnaires were returned. The data collected through the two questionnaires was pre-processed and analysis using MS Excel and IBM SPSS.

Results

Disabled people require a variety of infrastructure. However, elements needed do not in all cases vary from the ones demanded by not handicapped people, but disabled people request infrastructure to have specific characteristics. Insight in demand on infrastructure and their characteristics is given in the table below.

Table 1. Selection of recreational infrastructure and their characteristics required by disabled people (based on Hennig 2015)

| Infrastructure | Characteristics |
|---|--|
| arrival: parkings, public transportation means | close to entrance or attraction; sufficient number of disabled parking places; suitable size and orientation; marked as such; signage; possibility to call for help; shelter; flat terrain; no cobblestones or lawn stones etc. |
| trails | trail head close to parkings, public transportations; wayside and crossings clearly recognizable; path width at least 120 cm; no steps, barriers, or path narrowing etc.; not too steep (best flat terrain) if e.g. slope between 4 – 6% ever 100 m a resting place should be provided; path surface no stones, mud, or roots etc.; availability of shadow and shelters; on-site information regarding the remaining distance; possibility to shorten the tour; no bicycles or cars on the trail; provision of benches and resting places; access to toilets, possibility to get help (emergency calls); possibility to use assistive technology |
| guiding systems | gapless; clearly and good to recognize; easy to capture, to read and to understand; use of two-sense principle (hear and see, see and feel, feel and hear); using symbols, colors and text, large letters, high contrast, being tactile (e.g. Braille); pointing to all accessible infrastructures (toilets, natural attractions, viewing points, exhibitions etc.) |

| Infrastructure | Characteristics |
|--|--|
| on-site information: information boards, overview maps etc. | use of two-sense principle (hear and see, see and feel, feel and hear); use of colors, images, large letters, high contrast, easy language, being tactile (e.g. Braille), providing information also by other means (paper map, accessible homepage, mobile app etc.); no steps; usable/ reachable by wheelchair drivers (position, height); marked as such (guiding system); availability of benches |
| resting: seating and benches, picnic areas, resting places | easy to reach (without any steps etc.); marked as such (guiding system); benches with backrest, grips, in different height (46 – 50cm, 45 – 50 cm, 32 – 44 cm, 70-80 cm), tables can be used by wheelchair drivers (different heights etc.); access to toilets; close to parkings, public transportation means |
| on-site nature experience: viewing points, wildlife observation points, information pavilions etc. | close to parkings, public transportation means; marked as such (guiding system); no steps; not slippery; hedges and railings; enough place for staying and moving (wheelchair turn area); flat terrain; shelter and shadow; accessible information provision (see on-site information); exhibition pieces and windows for observation in different height or adjustable height (usable by wheelchair drivers); see also recommendations on accessible exhibitions and museums: http://nullbarriere.de/ausstellung-barrierefrei.htm , http://www.lmb.museum/de/fach-und-arbeitsgruppen/ag-barrierefreiheit-ausstellungen/barrierefreiheit/ |
| on-site environmental education: educational trails | headset close to parking, public transportation means; length: 2-4 km/ 2 - 3 hours; marked as such (guiding system); accessible trails and stations; not located next to the trail but in particularly designed "bays"; accessible information provision (number of stations „less is more"); use of easy language and images; tactile information; easy to read (large letters, high contrast); suitable position of installations (to read, to use) also for wheelchair drivers; possibility for assistance (staff, assistive technology etc.; accessible toilets, accessible resting places being close etc. |
| indoor environmental education; information centers etc. | close to parkings, public transportation means; marked as such (guiding system); overview map and guiding system inside the building; use of two-sense principle (hear and see, see and feel, feel and hear); accessible toilets; possibility to take a rest (benches etc.); accessible outdoor terrain; following criteria for accessible exhibitions and museums (e.g. http://nullbarriere.de/ausstellung-barrierefrei.htm , http://www.lmb.museum/de/fach-und-arbeitsgruppen/ag-barrierefreiheit-ausstellungen/barrierefreiheit/) |
| staff | particularly trained/ skilled staff |
| excursions | use of two-sense principle; use of easy language; accessible trails, particularly trained/ skilled staff; possibility to get detailed information on it and to book it in advance |
| service & facilities: toilets | following criteria for accessible toilets (e.g. http://www.oear.or.at/barrierefrei-gestalten/barrierefrei-planen-und-bauen/informationsblatter/informationsblatter-des-netzwerkes/Infoblatt_1%20-%202005-5.pdf) |
| service & facilities: chances to stop for a bite to eat | following criteria for accessible restaurants and hotels (e.g. http://www.dehoga-bundesverband.de/branchenthemen/barrierefreiheit/handbuch-barrierefreiheit-in-hotellerie-und-gastronomie/) |
| (service) information | pollen warning service; weather forecast; emergency numbers; mobile network availability; indicating if assistant dogs are welcome; possibilities regarding assistance (e.g. sign language interpreters); offers to rent (e.g. swiss track); possibility to charge electric wheelchairs etc. |

In addition, results of the literature review and the two surveys show that for the target group it is of pivotal interest that infrastructure is available building a complete tourism service chain (providing infrastructure in terms of planning, arrival, orientation, moving around, on-site experience, departure, and memory-sharing). All elements along the service chain must be barrier free. Here, if only one element is missing or not accessible, this does not just mean discomfort or inconvenience for the visitor, but - in the worst case – that “the chain breaks” and that people will not be able to visit a destination at all.

For disabled people the decision to visit a site strongly relies on having accurate information available. Lack of information is one of the most outstanding problems limiting the use of the outdoors by disabled people. Information provided must mirror all aspects of the tourism service chain. Infrastructure and relevant characteristics have to be described in detail.

Conclusion and Outlook

Accessibility is a topic of increasing interest for natural areas. On the whole disabled people do not require different infrastructure elements compared to not handicapped people, but they require infrastructure to be designed and implemented in a way suitable to them.

Concerning the description and classification of accessible infrastructure it is problematic, that literature outlines a lack of standards on accessibility of the outdoors. Further, there are no commonly accepted levels of accessibility like provided by WCAG 2.0 regarding the accessibility of web content (with three conformance levels). So, there is urgent need for elaborating accessibility standards and accessibility categories regarding recreational infrastructure in natural areas – considering different types and degrees of impairments.



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Meaningful knowledge for coastal city RV park creation: Understanding RV camping in practice

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RV camping remains a popular type of self-drive tourism in Europe. Freedom and comfort are reasons why tourists chose to travel by RV from place to place. By facilitating RV campgrounds, or so-called RV parks, a coastal destination such as Vlissingen could improve its image and develop its brand.

International theories on RV Camping

The welcoming of RV recreationists allows for season extension while historical, cultural and landscape aspects receive positive attention. For this reason, RV campers are an interesting market and allows for integration in destination branding activities. The Recreational Vehicle lifestyle is being characterised by a strong desire for outdoor living, being part of a social group and enjoying the availability of comfort whilst being on the road. People involved with RV camping want to be fully aware of their natural environment that hosts recreation activities. Destinations known for being RV friendly appreciating economic benefits of hosting RV campers. These campers select an RV campground which is already visited before or recommended by relatives. Still, campers eventually pick a spot on the available features and state of the camping ground above the actual destination the campground is located. Studies on RV campers' motivation and demands are fragmented, just like insights on RV campground design. Research that combines supply and demand are not existent. A practice theoretical approach to RV camping does show potential of unravelling RV camping in practices before, during and after visiting a destination.

RV Camping in a coastal city

The objective of this study is to give a detailed understanding of contemporary and desired practices related to RV camping. These insights could then be of use to foster strategic policy decision making concerning the creation and operation of an RV park in the coastal city of Vlissingen. Since value is tied to practice, a particular interest is given to what specific value is attached to which elements as competences, meanings and materials in a variation of practices that together make RV camping. By following the customer journey and policy making stages, this study aims to share useful findings per practice that actually highlights value and offers detailed guidelines for both scientific and managerial recommendations.

Methods

In order to understand and describe practice, a range of data collection methods have been applied. Interviews were conducted with five RV camping experts; these experts are RV campers themselves and volunteering for the Dutch RV camping

club, renting out campers, owning an RV park, operating a yacht harbour that facilitates RV camping spots and one interviewee also designs RV campgrounds. Representatives of four municipalities other than Vlissingen are being interviewed about their perspectives on RV camping in practice, just as representatives from the recreation association, and two of another Dutch RV club. A number of fairs have been visited; the holiday saloon in Antwerp, day of the city marketing, and tourist industry meeting convention. Combined with a survey of 350 campers and adding desk research on policies and own observations whilst working in the municipality of Vlissingen on this topic resulted in an meaningful overview of RV camping in practice.

Results

Following practice theory, five different practices have been identified:

1. Being responsible, creating and managing a campervan pitch
2. Choosing a campervan pitch/destination
3. Making use of the facilities at a campervan pitch
4. Enjoying the campervan pitch location
5. Sharing memories

In the first practice, it became evident that the government should better work together with the tourism industry as this is necessary to get to a clear vision on RV camping in the municipality of Vlissingen. In the second practice, it shows that Vlissingen is still too much of an unknown among the fast growing target group of campervan owners. The municipality of Vlissingen is responsible for this itself, as it could have devoted more attention to this at the start of the realisation phase through marketing or other appropriate activities. Concerning the facilities available at a campervan pitch, it became clear that while Campervan owners are self-sufficient and do not require many facilities in order to stay at a campervan pitch, they are not completely independent. The municipality of Vlissingen does appear to think this is the case and is therefore only offering bare campervan pitches to stand and stay for the night. In enjoying the location, it appeared that the location of the campervan pitch is very influential for campervan owners. It must be a good combination between the urban and natural environment. They will also need to feel safe and want to be able to enjoy plenty of peace and quiet during their stay. Concerning practice five, sharing memories, it could be argued that it is of real importance for campervan owners to share their experiences. This is only possible if campervan owners are informed of this fact and become curious about sharing their experiences and memories. The municipality of Vlissingen will therefore need to find an appealing way to make them enthusiastic about sharing their trip memories with others.

Discussion

By not only looking at how value is tied to practices but also by contrasting contemporary and desired practices, the gap is discussed and offers valuable information. This study shows that value as tied to consumption in practice differs per prac-

tice, causing a careful planning, design, operating and promoting of RV camp parks in the future. The study also highlights that whenever a municipality thinks about them as the ones to initialize the creation of an RV park, they should probably think twice as close cooperation with tourism entrepreneurs is crucial. As far as Vlissingen concerns, recommendations for their RV campground policies entail improving the location, the facilities offered and partnering with an RV camping website to better its promotion.

May the concept of ecolodge and ecohotel enhance the development of ecotourism in national parks of Serbia?

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Introduction

Regarding nature conservation as one of the significant aims of ecotourism (Buckley, 2009; Stojanović, 2011) and the fact that this type of tourism is frequently tied to protected areas, the essential question of the ecotourism importance issues in national parks of Serbia needs to be raised.

Tourism development in national parks should follow the sustainable development criteria and enhance positive effects of this sector impact (Jovičić, 1997), but also to create prerequisites for ecotourism development in concordance with its principles. For instance: (1) **activity** that is based upon natural values and their protection, (2) **philosophy** of nature, people and local culture respect, (3) **strategy** that offers solutions for nature protection, (4) **marketing** that promotes nature protection, (5) **principles** that insist on joint efforts of tourism and environment (Walderback, 1995). Each of the principles may find its place in hospitality which is also important in sustainable tourism development, with regard to the increasing number of protected areas (Damnjanović, Đoković, Petrović-Petronić, 2016). Ecolodges are basic accommodation type in ecotourism in national parks. Tourism development through building ecolodges where philosophy meets ecotourism principles may essentially enhance nature protection in national parks and act as ecotourism generator.

The need for research of interrelations of (eco)tourism, accommodation capacities and nature protection in national parks of Serbia may and should contribute to sustainable tourism development, since insufficient attention has been devoted to tourism sector in the Strategy of Sustainable Development in Serbia.

Study Area and Methods

The research comprises four national parks in Serbia: Fruška gora, Đerdap, Tara and Kopaonik (Table 1), which represent ecological, natural and cultural variety of Serbia both as a country and a tourism destination. The variety is observed within a broad spectrum of geological, pedological, climatic, hydrological and biological factors of the environment (Amidžić, 2005). The territory of the national parks and their surroundings comprise numerous accommodation capacities that reflect current condition, scope of tourism development and indicate restrictions of the model of management in the area (Damnjanović, Đoković, 2013). The aim of the research is not only the analysis of the level to which ecolodges and ecohotels meet the criteria, but also the observation of the broader context of the fulfilled conditions for ecodestination development.

Preliminary analysis and discussion

Despite tendencies, plans and achieved progress in the past 15 years, Serbia has not been recognized as a destination country at the international tourism market. Furthermore, conventional content and destinations (mountains, events, cities, rivers) dominate the plans and programmes of development, whereas national parks as ecodestinations (with all the theoretical and practical content for this destination type) have not reached their true position. According to this, accommodation capacities that foster ecohotel and ecolodge business or best practice in sustainable tourism sector have not been observed yet. The conclusions that comply with the topic of the paper have been reached:

- Ecolodges and ecohotels, according to the largest number of criteria both theoretical and practical, have been under-represented within national parks of Serbia.
- Mass tourism in certain national parks prevails upon alternative and eco-tourism; hotel accommodation is dominant and in concordance with those market segments (this particularly refers to NP Kopaonik as the most important destination of winter or ski tourism, where carrying capacity has been continually disrupted for the past three decades)
- Standards and best environmental practices in hotel industry have been sporadic, without environmentally friendly certificates and even the tendency to obtain one.
- Prizes which may act as a stimulus for hospitality businesses that comply with eco standards have not been established yet. Moreover, the prizes may become a type of marketing incentive for others to introduce eco standards. The plans that anticipate building and activation of ecolodges as an important type of accommodation in ecodestinations are almost nonexistent (except for National Park Fruška gora).
- Finally, commercial forestry is allowed in national parks of Serbia (which is not the case in former Yugoslav republics Slovenia and Croatia) which shadows the potential economic impact of tourism in less tourism oriented national parks, i.e. primary role in development is assigned to a “stronger” economic activity.

Concluding remarks of this paper are concerned with the issues of an accommodation type that would stand in concordance with both an ecodestination type and a national park, which have not been quintessential in Serbia yet. First of all, in national parks of Serbia there should be activities to create better atmosphere that will in return lead to popularization of ecotours and nature protection through tourism development (ecotourism), which would finally lead to growing interest in accommodation capacities that contribute to development of this type of tourism (ecolodges and ecohotels).



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Barrier-free nature experience in national parks – Evaluation of visitor guidance through experience engineering

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More than 7 million people in Germany are known to be severely handicapped and about 17 million are limited in daily life. Barrier-free accessibility in sport and tourism is therefore very important in the light of equal opportunities and social participation. Installing the trail “Wilder Weg” has been a first step of the Eifel National Park Administration in 2014 to grant everyone access to experiences with and within nature. The trail to experience nature is a barrier-free circular route with ten partly interactive stations providing information about various forest-related subjects as well as the biological diversity within the Eifel National Park. The fully accessible Wild Kermeter area for experiencing nature is situated on the slopes of the Kermeter hills about 500 m above sea level between two water reservoirs. The forest covering the Kermeter is one of the biggest deciduous forest areas in the Rhineland and is characterized by red beeches that are up to 200 years old. It is said to be the “ecological core element” of the national park.



Figure 1. Ecotainment stations with full accessibility distinguish themselves not only by ways free of obstacle and free of gradient, but also stimulate several senses. Thus the station “bark beetles” includes audio records (also into language easy to understand), photographs, and tactile galleries of the bark beetles. Beside its function guiding to the next station, the tunnel makes it able to experience the habitat of the bark beetles between bark and wood.
(Photo: BRSNW, Disabled Sports Association of North Rhine-Westphalia)

The purpose of the study has been to discover the actual accessibility and usability for all people, either handicapped or not, to prove the attractiveness of each station to the visitors and to find out whether the measures of experience engineering can take over the tasks of visitor guidance effectively. 137 people, aged from 6 to 82 (49% female, 51% male), have taken part in the evaluation of the Wild Kermeter in the period of 07.2015 to 10.2015. Half of the sample was physically and/or mentally handicapped. The evaluation of the barrier-free utilization possibilities in the investigation area is based on a combination of qualitative and quantitative researching methods. Paper-pencil surveys, participatory observations and an adjusted Visitor Employed Photography have been applied.

The results show the needs “experience nature” and “movement” to be the main reasons for visiting the trail “Wilder Weg”. The offerings at the trail and in the Wilder Kermeter area for experiencing nature are attractive and therefore visited selectively. They are perceived as being “instructive” and “eventful”. It seems to be important that a successful visit is dependent from an innovative character of experience engineering and the possibility of getting to know something new or to experience something already known in a new way. Regarding the full accessibility, it is important to take different perceiving senses into account (figure 1).

The barrier-free trail is therefore gladly being visited, also from people without handicap, for its simple and even paths, that offers a high sense of security. The study confirms the statement of the German Society Tourism For All, NatKo, that barrier-free accessibility is compelling necessary only for 10% of the visitors, helpful for 30%, and indeed, for 100% comfortably. In addition, 98 % of the interviewed persons were completely satisfied by this offering and enjoyed using the trail.

Adjusted to the individual needs of a selected target group, in this particular case for handicapped people, and offering convenient possibilities to experience something special, measures of experience engineering like the trail “Wilder Weg” at the Eifel National Park are a very helpful instrument to manage visitor flows. Even target groups which were not primarily focused are addressable by qualitative measures.



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Nature Houses in the Czech Republic

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Nature Conservation Agency of the Czech Republic (NCA) is a state organisation that administrates 25 protected landscape areas covering more than 10.000 km² in total and several hundreds of nature reserves and monuments of national importance. NCA is responsible for state administration as well as for practical measures, monitoring, reporting, expert support, etc. Environmental education and spreading information are ones of priority activities.

10 years of state nature conservancy partnership programme realisation

Conservation of nature and landscape is not possible without support of wide public. Most of large protected areas in the Czech Republic are traditional tourism destinations and are hugely visited. Oversize and just a little regulated tourism causes some negative impacts. Reduction of such impacts is managed through construction of high-quality and targeted visitor infrastructure and services leading to regulation of visitation and building positive relationships between nature conservation and visitors. Construction, running and care of visitor infrastructure and work with visitors directly in the field are ones of the most important ways of public relations (Pešout, Šulová & Licek, 2014). The Nature House programme becomes the most demanding and key part of the visitor infrastructure system. Visitor centres (Nature Houses) and information centres in protected landscape areas are being constructed within the programme. The programme started in 2006 and since then it was designed on principles of PPP projects (Public Private Partnership). It is a partnership programme realised always in co-operation with municipalities, businessmen, NGOs, land owners and other regional stakeholders.

Nature House provides following activities in a protected landscape area:

- welcomes and in different forms informs public about phenomena in a protected area; attractive permanent interactive exhibition on nature and landscape both in interior and exterior is the carrying part,
- increases awareness on basic principles and reasons for nature and landscape conservation, encourages interest and creates positive relation of visitors to the site as well as to nature conservancy in general,
- helps in environmental education of visitors and regulation of their dispersal in a protected area,
- provides teaching and educative programmes for schools and visitors,
- provides basic information on tourism in cooperation with local destination management,
- supports meeting of local people in pleasant space,

- provides selling of printed material, regional products, quality souvenirs, promotional goods, maps, educational material,
- allows watching educational films related to particular protected area.

Unified frame and project realisation procedure performed by many partners was set up at the beginning with clear and firm rules (Pešout, Šoltysová & Licek, 2009) with help of NCA Visitor Centres Suggestions Manual (David & Velková, 2009). The manual defined a system of negotiation, unifying elements and requirements for joining the Nature House network. Nature Houses and expositions are designed to appeal on emotions and to develop sensual discovery of authentic nature. Authors start from basic presumption, that impression of enjoyable landscape, long-term formed by generations, is intuitive based and that a deep affiliation to nature is connected to sensual recognition, cheerful experience, feel of happiness, adventure and discovery.

Construction of visitor and information centres in the Nature House network was co-financed by European Regional Development Fund through the Czech Operation Plan Environment, by the Czech State Environmental Fund and from partners' budgets. Operation of centres is managed by local partners using multisource financing (national programmes, municipality and regional authority subsidies and local businessmen support, income from own activities).

There are 8 finished visitor centres – Nature Houses – open for public in 2016 and seven information centres, all in 12 protected landscape areas. Discussions are being held about further Nature Houses with partners in other PLAs, too. By the end of 2023, at least 20 buildings should be in service - 12 Nature Houses and 8 information centres. The 10 years of the project duration are considered successful, even though faster development of the Nature house network was assumed. To convince own employees and responsible people at the ministry of the Environment of advantages of such solution was one of the most difficult tasks.



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Eco-labels in tourism and hospitality industry

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Ecolabelling is a voluntary method of environmental performance certification and labelling that is practised around the world.

At the end of the last century only environmentally oriented tourists could hear or learn something about ecological labels like Green globe or Heritage Environmental Rating Programme. After decades of specific behavior patterns of tourists the current trend is returning from the mass to the individual both environmentally friendly tourism, where new eco-labels come into play.

Good environmental performance is encouraged by integrating the participants in sustainable development, which eventually leads to the establishment of various voluntary initiatives and environmental protection programs. Of all the environmental programs (eco-labels, environmental protection programs, rewards and recognition system of environmental management, standards - codes of conduct, obligations and companies publications) the most effective are eco-labels and environmental awards. In contrast to "green" symbols, or claim statements developed by manufacturers and service providers, the most credible labels are awarded by an impartial third party for specific products or services that have been independently determined to meet transparent environmental leadership criteria, based on life-cycle considerations (ISO 14001). The environmental protection programs are meaningful only when present in an appropriate manner to all market participants, especially customers. Label which ensures the quality or promised commitment to environmental protection shows that the product is environmentally, culturally and socially oriented. Labels have become extremely powerful symbols with a significant contribution to the establishment of tourist services and spending on both sides of the spectrum of the market - supply and demand (Mensah, 2014). This process is still in development, given that more than half of the existing eco-labels are under the age of ten. Financial and human resources and adequate administrative and organizational structures are necessary for successful operation of eco-labels.

It is important that the growing environmental awareness of the population demands a radical change in business mentality. International standards for the enforcement of environmental protection provide companies with resources for effective environmental management system, which can be associated with other management requirements.

Eco-labels provide objective information about the impact of products or services on the environment. In tourism, eco-labels are labels that confirm the impact on

the environment (similar to that of industrial products) for tourism product, organization or destination. They are also indicators of environmental quality, examining the ecological level of the tourism product or destination (Sibila Leba, 2006).

Eco-labels in the tourism sector are the result of verification of compliance with certain environmental regulations and confirm that the tourist company, facility, product, process, service or management system meets certain environmental standards and criteria. Eco-label is not the same as a reward for environmental protection, which “recognizes the leading cases to help the tourism industry to protect natural and cultural heritage of our planet” (UNWTO). Awards for environmental protection are usually periodic (such as the annual award ceremony), while the eco-labels are valid at all times when certain criteria are met.

Providers of tourist services (hotels, restaurants, transport companies) decide to introduce measures to protect the environment in their operations for several reasons. First, of course, to avoid interventions due to pollution caused by mass tourism. It is also important to become recognizable on the market and this would result in a economic effects. By obtaining a eco-label following specific positive effects can be achieved, whether it is for a destination or accommodation (hotel, restaurant, or even a vehicle): enhancing the reputation and joint offer of individual operators and tourist destinations, strengthening of market position, better risk management, better asset management, better human resources development, positive effects on other sectors related to tourism and lower operating costs (Strick & Fenich, 2013).

The sum of all positive factors arising from environmentally-oriented activities is reflected in the economic efficiency of companies, but usually in the medium or long term. Owners, managers, government and tourists need reliable information about products and services in the tourism sector. Eco-labels, awards and declarations are the way to ensure compliance with quality for a variety of tourism products and services.

In general, there are three levels of eco-labels in tourism and hospitality: for mass tourism, for sustainable tourism and for ecotourism. The first type of eco-labels is



Figure 1. Examples of logos of some eco-labels that can be found in the tourism and hospitality industry

the most general and the least strict. In most cases, it only draws attention to the environmental impact and energy consumption and waste. Eco-labels for sustainable tourism symbolizes natural environment, socio-cultural and economic criteria (eg. Blue Flag on the beaches). Appropriate labels for eco-tourism involve meeting the highest level of criteria and taking into account only the products and services that have been declared as ecological.

Organizations related to the environment are usually non-profit, but they have to compensate for their costs. Applicants pay the costs of the application depending on the size, type of tourist accommodation (hotels, hostels, country houses, B&B, mountain lodge), number of rooms or similar criteria.

Some of good examples of eco-labels applicable in tourism and hospitality industry are: *Green Globe*, *Viabono*, *EU Ecolabel*, *Energy Star*, *Green Key*, *Eco Camping*, *Nordic Ecolabel*, *Green Seal*, etc.



ISO 14001 series of standards

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LOCAL COMMUNITY AND NATURE MANAGEMENT

Understanding and fostering local community support for protected areas engulfed by urban sprawl

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Introduction

It is generally well accepted that engaging local communities in protected area management improves conservation outcomes (Reed 2008). Engaging and supporting communities living around areas of high biodiversity to value these places as their own and support their protection helps to ensure protected area objectives are met. This has been well demonstrated particularly in developing countries, where attitudes and perceptions of communities towards neighboring protected areas are increasingly being considered in both the establishment and management of national parks (Anthony 2007; Andrade and Rhodes 2012).

Peri-urban landscapes are the transitional zones between urban metropolitan areas and the rural hinterland. In many parts of the globe, these areas are undergoing rapid land use change as a result of urban expansion (Simon 2008). Continuing urban growth results in significant land use changes and as a consequence, protected areas that may have previously been considered remote, are becoming surrounded by housing development. Management of these protected areas needs to adapt to the rapidly expanding urban boundaries and increasing population sizes that in turn change the usage and pressure on the parks.

This study examined the awareness and perceptions of the conservation values of a local community living in newly developed suburbs on the southwestern urban fringe of Melbourne, Australia. The suburbs border a series of Ramsar listed wetlands, a coastal park and foreshore reserves managed by the Victorian protected area management authority. The wetlands and coastal park in the study area have high biodiversity values, provide important habitat for a variety of fauna species, including migrating birds and support a number of different vegetation communities. Previous studies have shown that increasing urbanization has resulted in a more visitors and a subsequent rise in unauthorized activities and potentially harmful use (Antos et al., 2007). The primary aims of this study were to 1) to explore the local communities awareness, perception, attitudes and usage of the local parks and 2) identify potential compelling messages and triggers that can influence local resident attitudes and behavior.

Methods

Both qualitative and quantitative methods were used to explore the relationship between local residents and the parks, and to identify suitable management strategies for improving community engagement with the protected areas. The qualitative component of the research involved six focus groups, with a mix of residential property owners, park users and local rural landholders. The quantitative component included a telephone survey of 400 local residents, aged over 18 years. Both users and non-users of the parks were targeted for the survey.

Results

Results showed that overall the local community did not regard the parks as an area of conservation significance. Wetlands were not linked with wildlife or biodiversity and often viewed negatively. For community members living in close proximity to the protected area, awareness of Ramsar was very low, even among users of the parks. The majority of users were not familiar with the term Ramsar or its international significance. When provided with a definition of a Ramsar site, over half of the respondents had positive (62%) response the local parks being Ramsar sites. When informed of the high conservation significance of the parks, 97% of users indicated a willingness to change behavior that was having a negative impact. There was an overall positive attitude to being responsible and respecting park values. Increasing the profile of the area through targeted communications and informative signage are potential tool for raising community awareness.

Conclusions

A key challenge for the future of the parks will be the ability of managers to foster a sense of stewardship for protected areas amongst the communities that live around its borders. This is particularly critical in this peri-urban area where urban growth is proceeding directly adjacent to the parks at a rapid rate. The difficulty for park management is that many of the new residents of these developments have little knowledge the natural values being protected within the Ramsar site and surrounding parks, or understanding of how they can be involved in maintaining these values. Giving the local community a contributory role in the narrative of the park can help to engender pride and potentially encourage greater social responsibility for these important protected areas.



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Nature Conservation for Local Community: Sustainable Tourism Planning

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Introduction

Two Sustainable Tourism Management Plans (STMPs) were developed within the framework of the “SEA-Med project: Development of Sustainable Economic Activities in Marine Protected Areas”. STMPs are strategic documents for nature conservation and tourism sectors. They were initiated and developed by the nature conservation sector, although tourism sector was included in its development. One STMP was developed for Lastovo Archipelago Nature Park (Marine Protected Area (MPA)), which administratively covers the same territory as Lastovo Municipality. Lastovo is one of the most remote inhabited islands and located in southern Adriatic. The other STMP was developed for whole Dugi Otok, which Telascica Nature Park (MPA) is part of. Dugi Otok is located at the border between northern and central Adriatic.

Stakeholder engagement and planning process

STMPs have been developed from spring 2014 until end of 2015, by engaging all relevant stakeholders during its development (nature conservation sector, tourism boards, tourism agencies, accommodation service providers, divers, local farmers, NGOs, etc.). 219 stakeholders from 21 institutions, 8 NGOs and 27 private businesses were engaged during the management planning process. Croatian Agency for the Environment and Nature reviewed the STMPs and provided its input from the point of view of nature conservation. The Croatian Institute for Tourism has been engaged in the process as well, in order to ensure best practice from the tourism sector. The process for the development of the STMPs included capacity building of project team, stakeholder workshops, internal workshops, capacity building of MPA staff, study visits, establishment of Advisory Boards in each MPA, and public presentation of the STMPs with presentation of local products.

Capacity of the project team was built through 3 regional training workshops that dealt with: STMP development process and specific objectives; resource analysis with the goal of addressing negative impacts and defining activities; and consolidation of the plan, best practice examples, introduction into the marketing and communication of the MPAs. There were 3 stakeholder workshops in each MPA (6 in total) and they covered the following areas: SWOT analysis of sustainable tourism, elements of the vision and analysis of touristic activities; detailed development of the STMP activities; zoning of tourism, identification of thematic routes and de-

velopment of the Sustainable Tourism Guidebook for Dugi Otok and development of one educational trail on Lastovo. There were 5 internal workshops on Telascica and 4 internal workshops on Lastovo Archipelago. They were done before and after stakeholder workshops and included preparation for and evaluation of stakeholder workshops, as well as detailed development of specific parts of the plan.

Capacity of MPA staff was built through training workshop for the development of communication strategy (and subsequent internal workshops in each MPA), communications training and marketing training. Two study visits were organized during the process of STMP development – one national in order to showcase a protected area (PA) that has been having an advisory board for 10 years; and the other international in order to show best practice in cooperation between the public and the private sectors (or PAs and local producers and service providers) in the PA management. Advisory Boards of each MPA were established and these boards adopted the STMPs. Although not obligatory, public hearing was organized and after incorporating all comments from stakeholders, STMPs were publicly presented. These public presentations included presentation of the local products from family agriculture productions from Lastovo and Dugi Otok and guest performances of local a cappella groups.

The process was accompanied by the knowledge transfer to the SEA-Med Field Project in Albania (where STMP for Karaburun-Sazani Marine National Park has been developed) and experience-sharing with nature conservation sector in Croatia (presentation at the Annual Conservation Service Meeting) and Mediterranean MPA managers (MedPAN Regional Experience-Sharing Workshop). STMPs were used as best practice examples in the training seminar “Community Outreach and Participatory Protected area Management”.

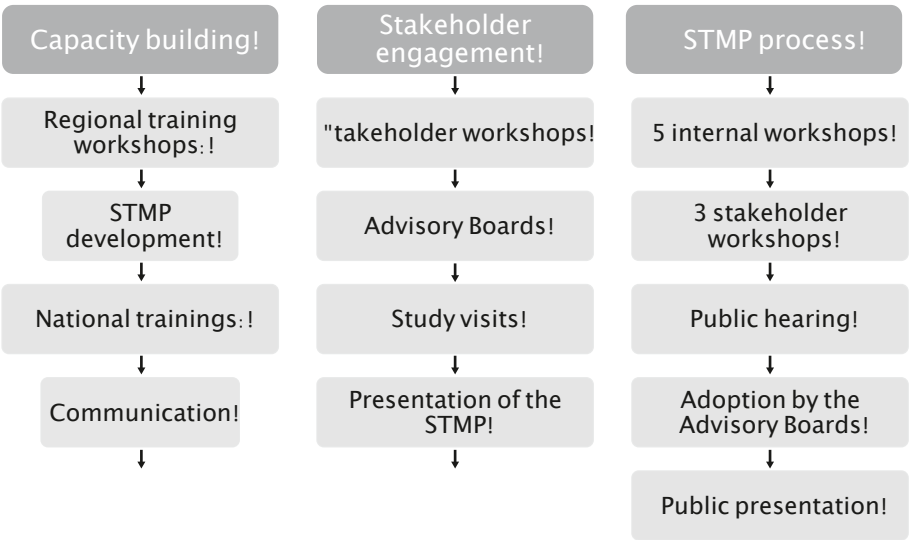


Figure 1. Elements of the process for the development of sustainable tourism management plans in Croatia

Structure and content of the plans

Structure of the plan follows the typical structure of the strategic documents: introduction and context, vision, objectives, activities, financing, monitoring and evaluation. Introduction encompasses general information on the STMP, implementation partners, regulatory and strategic framework, market analysis and tourism trends, tourism resource base and offer, and island as sustainable tourism destination. Planning part of the STMP includes objectives and indicators for achieving objectives, activities and implementation indicators, priorities, sustainability elements, time-frame, and partnerships (lead and partners).

During the three stakeholder workshops current state was analyzed, vision, objectives and activities of the STMPs were defined, as well as priorities and implementation partners. Special attention was given to sustainability of each activity, such as impact on natural and cultural values, income staying within the local community and impact on visitor satisfaction. Also, specific activities from the plans that will be implemented within the SEA-Med Project were jointly selected and planned in detail.

The islands are looked upon as unique destinations and the plans encompass tourism programs and offer, visitation system, quality of the destination, education and awareness raising, visitor infrastructure, contribution to setting up of the waste and wastewater management systems, and improved cooperation among all stakeholders. The focus of the STMPs stayed on MPAs, but with the view of MPAs being development drivers of the whole island.

Conclusions

Participatory approach is challenging and complex but it is the only approach that ensures ownership among actors and implementation of the plan. The planning process enabled improved cooperation between nature conservation and tourism sectors. The STMPs can be used as local tourism development plans. Although the plans were developed for the local level, the same approach could be applied for regional and national strategic planning processes. The process for the development of the STMPs could be used as best practice example for stakeholder engagement at the local level. In addition, adoption of STMPs laid the ground and enabled the development of project proposals related to sustainable tourism (including projects at the Mediterranean level).



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Which local policies increase revisit intention to Amami Oshima Island, Japan?

Using Best–Worst scaling methodology

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Introduction

Tourism is one of the largest and fastest growing industries worldwide. It provides local communities with important economic and social benefits. Especially on islands, it is a major source of communities' income. Since previous studies note that achievements of sustainable tourism rely heavily on repeat visitors (e.g., Darnell and Johnson 2001), it is necessary for such local governments depending on tourism industries to implement policies to encourage tourists to make repeat visits.

Recently, many studies have increasingly used and discussed the concept of revisit intentions. For example, Baker and Crompton (2000) have examined the relationship between revisit intentions and their satisfaction with travel. Chen and Gursoy (2001) have revealed the influence of past vacation experience on their revisit intentions. However, our previous studies conducted in Japanese recreational sites have shown that most tourists have expressed high revisit intentions. It seems difficult to identify which local policies increase revisit intentions of tourists using general questions (e.g., 5-point Likert scale questions).

Based on the above backgrounds, the present study used Best–Worst Scaling (BWS) methodology to examine which local policies encourage tourists to revisit the destination. The advantage of BWS over general rating questions is to easily elicit relative importance of items such as policies for respondents because they choose one most and one least preferred item in each choice set. This advantage can give decision makers facing budget constraints useful information about local policy priorities for sustainable tourism.

Materials and Methods

Research Site

Amami Oshima Island, our study area, is located southwest of the Japanese archipelago. The island, with an area of 712km², is the second largest island in the Nansei Islands of Japan. Because the island has rich and endemic ecosystems, it is expected that a part of the island become a national park and the World Natural Heritage Site. On the Amami Oshima Island, tourism with nature and culture is one of the most important industries. The annual number of tourists visiting the island was about 400,000 in 2014. Also, until recently, the number has continued to gradually

increase because media exposure of Amami Islands has increased and low-cost carriers have been in service in July 2014. Based on these backgrounds, there is a growing necessity to design new policies to balance nature conservation and sustainable tourism development in the island.

Best-worst scaling approach

In this study, we implemented BWS to evaluate tourists' preference for the policies. BWS was developed by Finn and Louviere (1992) and became popular in a number of academic fields. Although application to tourism management has been still limited, Crouch and Louviere (2007) have revealed the relative importance of convention site selection factors using BWS. To our knowledge, this is the first study regarding the concept of revisit intentions. BWS is classified into three types: the object case, the profile case, and the multi-profile case (see Flynn 2010, for detail). Since this study used the object case, we will mainly focus on the object case here.

Questionnaire design

Based on the discussion with decision makers in the Amami Oshima Island, this study have selected five related policies included in the BWS design: policies for 'improvement of infrastructure in the island', 'building new facilities for wildlife viewing', 'conservation of endangered species', 'landscape conservation', and 'preservation of traditional cultures'. To construct choice sets using the five policies, we employed a balanced incomplete block design (BIBD); we created five series of choice sets that contain different combinations of four policies. The respondents were asked to choose from each choice set the policy they most highly evaluate if they made repeat visit the island and the policy they least highly evaluate.

Counting analysis

This study used counting analysis, which was one of the simplest and most practical analyses. We subtracted the number of times each one was chosen as least important from the number of times it was chosen as most important in each choice set. BW scores are divided into two categories: individual level (disaggregate) BW scores and aggregate level BW scores. In this study, we show the findings from a hierarchical cluster analysis using individual level BW scores to consider respondents' heterogeneity along with aggregate level BW scores.

Sampling procedure

Data was collected by conducting a questionnaire survey to the tourists on the Amami Oshima Island in holidays in May (i.e., Golden Week), 2015. Questionnaires were distributed to 1,200 tourists at the Amami Airport. A total of 245 questionnaires were returned. For this analysis, we have used the data of 180 respondents who answered all relevant BWS questions.

Results and discussion

Aggregate level BW scores indicate the preference of an average respondent. Among the five policies, ‘landscape conservation’ had the highest BW score, followed by ‘conservation of endangered species’, ‘building new facilities for wildlife viewing’, ‘preservation of traditional cultures’ and ‘improvement of infrastructure in the island’. That is, based on average preference, landscape conservation was the most effective policy to encouraged current tourists to revisit the island.

In addition, a hierarchical cluster analysis using individual level BW scores identified three groups of respondents with significantly different preference for relevant policies. As shown in Figure 1, there was indeed some preference heterogeneity among groups. The infrastructure improvement was the worst policy for two thirds of the current tourists although it was the second best for the others. It could pose conflicts between them.

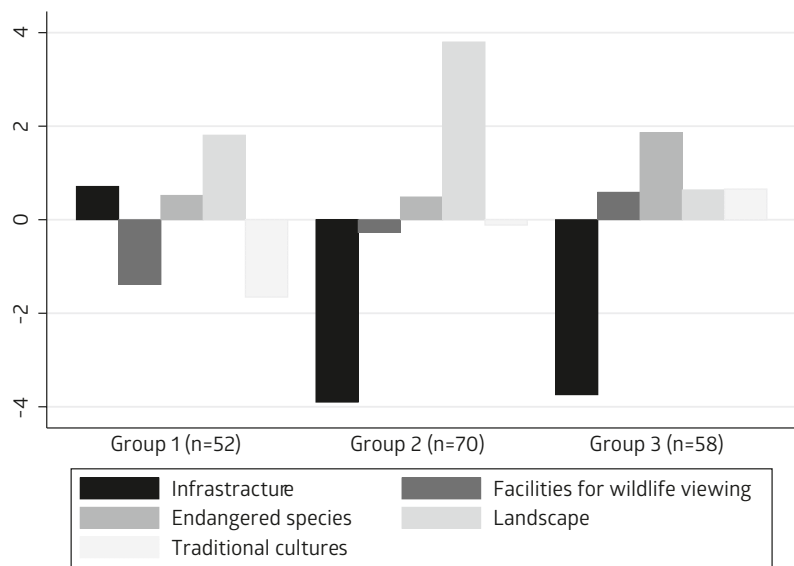


Figure 1. Comparison for BW scores among three groups

Conclusion

To achieve sustainable tourism, it is necessary to consider how to make current visitors revisit. Polices concerning landscape conservation is one of the important policies to increase current visitors’ revisit intentions. In addition, a rise in tourists leads to an increase in demand for improvement for infrastructure within the areas. However, we need to understand the risk that improvement of infrastructure can deprive the current tourists of their revisit motivation.



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Sustainable Tourism Development in Belize:

A Comparison of two communities at different stages of development

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Background

The concept of sustainable tourism attempts to represent an ideal compromise between positive impacts on local people, benefits to both tourists and the industry, while simultaneously respecting the environment. According to the WTO sustainable tourism can be fundamental tool in economic development and the reduction of poverty (López-Guzmán, Sánchez-Cañizares&Pavón, 2011).

Recently Belize has implemented a National Sustainable Tourism Plan that aims to highlight Belize's rich tourism resources while ensuring a sustainable future for tourism. Given that sustainable tourism must benefit local peoples and conserve nature it is important to understand exactly how tourism is impacting local communities. In this study we undertook an analysis of the current state of tourism in the communities of Laguna and Hopkins Village in Belize to identify: how residents perceive tourism and its impacts; the perceived economic, social and cultural effects of tourism on communities' livelihoods and; how this relates to location, governance, and gender.

Methods

An exploratory case study framework was chosen to address the outlined themes of the research. Use of multiple data sources and of methodological triangulation (qualitative and quantitative methods) increased validity and confidence in research data and results. The multiple case study framework involved literature review, semi-structured interviews and participant observations in both study communities.

Results

The results of the study demonstrated that the communities of Laguna and Hopkins are at different stages of integration into the tourism industry when considered in light of Butler's destination life cycle model of tourism development (Butler, 1980). Hopkins is exposed to unplanned mass tourism development and foreign investments, whereas Laguna is trying to pursue their own community-based strategy, while setting limits to growth.

Key themes that emerged among Hopkins residents were employment tensions, conflict of interests, resentment towards big resorts, marginalization, and resilience. In Laguna the key emerging themes were the relationship with the Toledo Ecotourism Association (TEA), numbers of tourists, the desire to remain farmers, and the recognition of limits to growth.

Discussion

Various approaches exist to evaluate and predict performance level of tourism initiatives (Molina-Azorin et al. 2010). In this case these models were simplified and factors affecting performance were divided into two groups: external circumstances and the internal characteristics of the enterprise (See Table 1).

Table 1. Factors affecting performance in tourism industry

| External factors | Internal factors |
|---|------------------------------------|
| Geographical location and environmental characteristics | Skilled labour |
| Cultural assets | Marketing resources and management |
| Demand and competitors | Motivations and goals |
| Supporting industries and stakeholders | Financial opportunities |
| Economic and political environment | |
| Tourism infrastructure | |
| Historically formed cultural aspects and demographics (ethnicity, mentality, religion, gender roles etc.) | |
| Constraints to sustainable community tourism | |

Although developed with tourism enterprise performance in mind, we adapted it to Laguna and Hopkins with a few basic assumptions. The two villages can be seen as two different firms, functioning and developing their tourism initiatives in a set of external and internal conditions and factors within one destination (Belize). Using the models outlined earlier, we defined the factors crucial to the case study that were analyzed in relation to the performance in each community (Table 1). When considered in light of this model the two communities exhibit differences reflective of their state of tourism development.

Both Hopkins and Laguna base their tourism enterprise upon the local culture (Garifuna in Hopkins and Maya in Laguna) and the geographic and environmental characteristics of the communities. The challenges facing the communities however are quite different.

Hopkins Village's greatest challenge is the external origin of tourism in the community and reflects mass tourism development and a difficult relationship with the foreign businesses that drive development. The nature of involvement in tourism for most people in Hopkins is opportunistic and very self-oriented. This negatively affects the ability to shift to sustainable tourism in the future. Overall, Hopkins suffers from a "curse" of most local communities that face foreign development. The situation gets aggravated by the limited knowledge about tourism and reduced livelihood diversification and, therefore, reduced resilience.

In contrast, Laguna's challenges are largely internal issues of growth and direction of development. In Laguna, the tourism industry is based solely on the malfunctioning TEA guesthouses system. It was clear from the interviews that community members are not opposed to the idea of tourism development in the village. However, villagers do not perceive tourism as a potential substitute to all or some of their

other sources of their livelihoods. Most of the interviewees see tourism only as a side activity supplementing their earnings with an amount of cash that is generally spent on school supplies for children. This disposition towards tourism sets substantial limits to its extensive or, more importantly intensive growth in Laguna. Although a dramatic increase in visitation is not desired by the community members, they are still interested tourism as a source of “school money”. Maintaining such a consistent flow of tourists requires regular attention to the tourism enterprise(e.g. village website development, promotion, tourism product development, trail maintenance etc.).This is the classic “chicken and egg” dilemma, where community members either do not have skills, time or money to invest in tourism development, consequently tourism doesn’t suffers, therefore people are forced to concentrate more on other activities, and as a result - even less time or money for tourism. This dilemma is undoubtedly related to the challenge of perception mentioned above, as well to the loyalty to the traditional ways and activities.

Conclusions

The research revealed that the economic, social and cultural effects of tourism and its importance for local livelihoods varied significantly between Hopkins and Laguna and was dependent on a number of factors – geographical, cultural, social etc. The issues of preserving cultural heritage, problems of marginalization, lack of skills, exclusion and other were all contributed to the sustainability of tourism at these destinations. This underscores the necessity of understanding local circumstances in the success of sustainable tourism development and the need to adapt community development models to tourism development. While culture was viewed as the most significant element in the communities offerings, there relative stages in the tourism product lifecycle significantly impacts their ability to capitalize on these cultural assets and develop a sustainable tourism product.



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Trail use and willingness to participate in trail management by local community of the Neeruti protected area, Estonia

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Introduction

Beside the visitor studies in protected areas local community studies are becoming more and more relevant in the perspective of locals' participation in trail use as well as in involvement in the management (Hughey et al 2015, Buta et al 2014, Reimann et al 2014). Neeruti Landscape Conservation area is established in 1957 with some restructuring in 1999 its area is 1313 hectares. The protected area is established to conserve unique postglacial landforms as well as forests, lakes and mires in the area. Neeruti is also included in the list of Natura 2000 areas. The area is also known as an action place of Estonian national epic, there Estonian national hero Kalevipoeg used to plow with a horse and formed the current landforms. Neeruti used to be a popular recreational area already 100 years ago when it had weekend recreation from Tallinn because of the good railway connection. In 1960s the first official nature trail in Soviet Estonia was established here. Today more marketed national parks and other protected areas have stronger popularity in Estonia and Neeruti has mainly regional importance for Lääne-Viru county inhabitants. The purpose of the current study was to find out the usage and importance of the hiking trails for the local community and their willingness to contribute to the trail and visitor management processes.

Material and methods

As in most of the rural regions many people who call themselves as locals are actually just summer residents, many of them used to live in the area permanently some 20-30 years ago, but as the job opportunities in rural Estonia are getting more and more limited many people find a job in cities and are able to visit their former homes only for summer and weekends. The aim of the study was to interview the real locals, it means who live permanently within the borders of the protected area. Authors communicated with the village elder to find out the permanent residents of the area. 15 households were selected for research. Structured interviews were conducted with 11 persons. As the demographic situation in Neeruti is typical for the outlying area in Estonia local community is ageing and 9 respondents out of the 11 were 45+.

Results and discussion

Local residents are active in their everyday life and the majority (7) of them visited hiking trails at least once a week, two once a month and two of them did not visit hiking trails because they thought that trails are not enough attractive and they have much nicer nature closer to their homes than on the trailside, one respondent (92 years) mentioned also health problems. Locals who visited trails frequently said that trails are pleasant places for enjoying nature and for exercising, often they also enjoy trails together with their families. They like walking and skiing in the winter-time, also berry and mushroom picking were mentioned. Locals have very strong emotional and place attachment with the protected area and they are very proud of the beautiful nature of their neighborhood and they said that visitors who love nature are always welcome. Most of the respondents are delivering the information to visitors with pleasure and allow the visitors even camp on their private land (for free).

The majority of respondents (9) have not been disturbed by the visitors, two respondents mentioned that visitors are disturbing them sometimes. Those locals live close to the recreational facilities and to the main access road to the trails. They said that they do not have anything against nature lovers, but the problematic ones are the visitors who do not care about the nature and just come to have noisy parties. Another problem besides the noise was littering, but this problem is relevant to small amount of visitors.

The majority of respondents (9) were ready to participate in trail maintenance work on voluntary bases. They said that they have done it years ago and they would like the trails to be more attractive, because beautiful sceneries which existed are closed by the bushes and scrubs and if they cut and remove even fallen tree from the trailside they are perform illegal activities, because the nature conservation laws and bureaucrats are very strict. Locals are aware that maintenance work of hiking trails and increased attractiveness can cause the growth of visitation, but they are ready for that, because attractive trails should attract more nature lovers. Only two respondents got some economic benefits from the recreation performing sometimes as guides to the groups. The rest of the locals would do it just for their own emotional benefits and they are happy to share their beautiful neighbourhood with all the visitors.

Conclusions

Working with visitors the park managers often forget local residents as a key stakeholder group because of their constant interaction with the setting through their daily and recreational activities, their place attachment and memories of the surroundings which can date back even centuries. The current study proved that locals can be very active in usage of recreational facilities and are ready for discussion and sharing their knowledge. Landscape conservation areas like Neeruti are established to maintain landscape diversity and scenery according to the Estonian Nature Conservation Law. Some management and forest cutting is allowed and more interaction and discussion is needed between nature conservation officials and local community, because their main goals are the same to conserve attractive landscapes and together it is possible to implement the beneficial knowledge of the both sides.



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Development of Performance Factors of CBT Learning Organization at Doi Inthanon National Park, Thailand

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Introduction

Tourism industry contributes significantly on the growth of national economy of Thailand. Community-based tourism (CBT) became an alternative tourism, which focused on establishing participation in community development and conserving natural resource and culture while generating income to local community (Saunsri, 2003). Several local communities near the national parks manage community-based tourism and use tourism resources in the parks. Even though national parks have certain laws and regulation that visitors must follow, local communities must assist park authority in visitor management and impact control.

The issue of achieving tourism sustainability was always recognized in community-based tourism that used tourism resources in the national park. Schianetz et al (2007) noted that even the goal is to achieve sustainable tourism but to create tourism organizations which are adaptive to change and capable of learning how to improve sustainability continuously is very important in order to accomplish the sustainable goal. As Senge (1990) defines the learning organization as organizations where people are continuously expanding their capacity to create results they truly desire, new and expansive patterns of thinking are nurtured, collective aspiration is set free, and people are continuously learning to achieve organization's goals, the tourism organization should adapt to the concept of learning organization.

In Doi Inthanon National Park, local community members created community tourism groups to deliver tourism program and services in the park. They must work with park staff in pursuing tourism in the park. Cooperation between community members and park authority was the main issue. Working with park authority could be a barrier to reach the tourism goal of sustainability. The way of thinking and practices, organizational culture as well as the knowledge management was relatively different between them. Hence, the concept of learning organization was employed here as a framework to design an efficient local tourism organizations to work with park authority. This study aimed to develop learning organization performance factors and to evaluate the success of learning organization in community-based tourism (CBT-LO) of the three communities at Doi Inthanon national park: Mae Klang Luang, Nong Lom, and Pa Mon.

Methods

The snowball sampling technique was employed for developing performance factors of CBT-LO and 25 experts were selected. Delphi technique was employed by mail survey until the experts' opinions were best conformed. The experts gave opinions

on the appropriateness of the performance CBT-LO factors and the significance of each factor ranking from 1 to 5, the lowest to the highest level. The mean, standard deviation, mode and median of the significant scores of performance factors of CBT-LO were calculated. The focus group was employed to pretest the CBT-LO factors at Ban Huay Hee in Mae Hongson province. The face validity and reliability was checked by the process of reflection.

The focus group was performed at each local village to evaluate the success of CBT-LO using the factors developed above. The evaluation results were calculated by weighting score method. The results reflected the performance of each local community tourism group as a learning organization in community-based tourism management especially on the issue of visitor management and resource conservation.

Results and Discussion

The results of this study revealed 18 performance factors of CBT-LO in 4 elements: (1) leaders and community members in organization, (2) organizational culture, (3) organizational communication, and (4) knowledge management process (seeking, sharing, using, storing, and transferring knowledge).

Table 1 showed the results of CBT-LO evaluated by the three villages. The average score of Pa Mon tourism group was the highest at 2.5 from the total score of 3, Mae Klang Loun 2.39 and the lower were Nong Lom 2.13, respectively. The strengths of community tourism group at Mae Klang Luang were sharing knowledge and organizational communication. However, the weaknesses were storing, transferring, and using knowledge which reflects lacking system of knowledge management and inadequate use of technology for information management.

The community tourism group at Nong Lom village had strength in leadership, community members and communication. In contrast, its weaknesses were on knowledge management. This might be because it had less experience (the youngest group) in tourism management. Hence, tourism management at Nong Lom village required the improvement of knowledge management process, for example, gaining knowledge from the outsiders and the park authority in visitor management strategies and creating partnership with travel agencies to promote tourism.

The strongest factors of the community tourism group at Pa Mon were sharing knowledge, organizational culture, communication, and leadership. However, it should improve on the aspect of seeking and transferring knowledge. Data from interview indicated that the tourism management was based on the outdated knowledge (about fifteen years ago) and they lacked of younger generation in their tourism organization to continue tourism in the future.

Table 1. Learning organization performance of local community-based tourism groups at Doi Inthanon National Park

| Performance factors of learning organization in community-based tourism | W _i | Performance scores | | |
|---|----------------|--------------------|----------|--------|
| | | Mae Klang Luang | Nong Lom | Pa Mon |
| 1. Leaders and members in tourism organization | 5 | 2.33 | 2.33 | 2.50 |
| 1.1 leaders encourage work of tourism group and provide opportunity to share idea (not only commanding) | | 3 | 2 | 2 |
| 1.2 leaders create new thinking and be flexible for learning and adaptation | | 2 | 2 | 2 |
| 1.3 leaders allow members in tourism group to make decision on tourism activities | | 2 | 3 | 2 |
| 1.4 leaders motivate members in the group to share experiences and learn to solve problems | | 3 | 3 | 3 |
| 1.5 members of tourism group are able to complete assignment and important mission | | 2 | 2 | 3 |
| 1.6 members of a group are able to work as a team | | 2 | 2 | 3 |
| 2. Organizational culture | 4.8 | 2.5 | 2.38 | 2.75 |
| 2.1 establishing learning culture in the tourism group | | 2 | 2 | 2 |
| 2.2 providing opportunity and establishing learning space for members in the tourism group | | 2 | 2 | 3 |
| 2.3 creative thinking in the tourism group | | 3 | 2.5 | 3 |
| 2.4 establishing tourism activities according to community's ways of live | | 3 | 3 | 3 |
| 3. Communication within organization | 5 | 2.66 | 2.33 | 2.66 |
| 3.1 tourism group has creative communication in their group | | 3 | 2 | 3 |
| 3.2 tourism group has continuous communication within the group | | 3 | 3 | 3 |
| 3.3 tourism group has continuous communication outside the group | | 2 | 2 | 2 |
| 4. Knowledge management | 4.94 | 2.06 | 1.48 | 2.10 |
| 4.1 seeking new knowledge | | 2.25 | 1.50 | 1.25 |
| 4.2 sharing knowledge | | 2.75 | 2.00 | 3.00 |
| 4.3 using knowledge | | 2.00 | 1.25 | 2.25 |
| 4.4 storing knowledge | | 1.66 | 1.33 | 2.33 |
| 4.5 transferring knowledge | | 1.66 | 1.33 | 1.66 |
| Total performance scores of community tourism group | | 2.39 | 2.13 | 2.50 |

Remark:

| | |
|--------------------------------------|----------------------------------|
| Score 0.00-0.75 = Low performance | 1.51-2.25 = Moderate performance |
| 0.76-1.50 = Relative low performance | 2.26-3.00 = Good performance |

Conclusion

The local community tourism groups in Doi Inthanon National Park when applied the concept of learning organization revealed that two out of three groups were in good performance. The only Nong Lom village was found moderate performance. The most improvement needed for all local community tourism groups was on knowledge management. To improve the working relationship with the park staff, the continuous communication and appropriate communication channel to park staff were suggested.



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USE OF ICT IN NATURE AREA MANAGEMENT

Smart monitoring visitors National Parks

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The Dutch government is reintroducing policy for the 20 National Parks. The aim is to develop the National Parks into a strong brand. The reason behind it is the claim that a National Park contributes to the regional economy. There is a clear need from the managers of National Parks to understand how that contribution works. Insights from the external factors, combined with information about its current users and stakeholders and market research data will help the manager, but also local enterprises to choose relevant target markets. There is therefore a need for the development of a tool that brings the benefits of a National Park in a simple, affordable and reliable manner. The tool consists of Key Performance Indicators (KPI). Key Performance Indicators will determine how well the National park is meeting its objectives (Wearing & Schweinsberg, 2016).

Key Performance Indicators

The tool should give answers to questions like the amount of visitors and where they come from, their characteristics, the spatial distributions of visitors in the National Park, their activities, their spending, their satisfaction and their preferences. Information about it is important for the manager to monitor the development of visitor rates and to adjust their policy, maintenance and management. The information can also be used to respond to changing demand and to promote more directly. The information is also important for stakeholders like regional enterprises and policy makers to give them insight in the economic impact. Finally, the information can be used to create a specific zoning between nature and recreation.

Together with the managers of two National Parks we set up five KPI's: A (Amount of visitors), S (Spatial distribution), E (Expenditure), S (Satisfaction) and P (Preferences). The characteristics and activities of the visitors are not defined as KPI's, because they differ strongly between National Parks. They are defined as Indicators and are strongly related to the land use and supply of the separate National Parks.

Limitation

The reality is that National Parks suffer from lack of funds to collect these data. There is no budget to buy counters or to do surveys. Also the managers suffer from lack of time to analyse and interpret the collected data. As extending traditional monitoring is too expensive, we have to find new ways to collect information about the visitors (Goossen & Kiers, 2015). In particular, the fast development of new emerging sensor technology and crowdsourcing contains a lot of potential. The idea is that a National Park is willing to invest a maximum budget of € 10.000 each year to collect data. We made a research proposal to collect data in a smart way to make these KPI's operational, analyse and interpret and to publish it with infographics.

Pilot

In a pilot study we investigate the possibilities of the sensor technology and crowdsourcing with the limitation in mind. The central question is how far can we go to connect available knowledge to information need and gather data in a simple, affordable and reliable manner? For the KPI Amount of visitors we will analyse TomTom data of car-users and smartphone data from Vodafone. The costs of these data are within budget but we have to test if the data are reliable. We will compare these data with data of actual car-users in some recreational areas where there is a barrier gate. For the KPI Spatial Distribution we will use Vodafone data and (probably) the Eddystone beacons from Google which you can use in an open source format. The beacons work without an app. Also we will test the usability of LoRa (Long Range Low Power Wide Area Network). LoRa is a type of wireless telecommunication energy-efficient network. It is designed to allow long range communications (almost 15 km) at a low bit rate among things, such as infrared sensors operated on a battery. These sensors can capture movements of visitors. If the tests are positive in the context of the limitations, we will develop a protocol to convert the purchased data into a usable format for analysis of participating National Parks.

The KPI Expenditure of the visitors consists of collecting existing national data and secondary analysis. Hopefully we can develop key figures with the existing data.

We will use crowdsourcing to collect data about the satisfaction with the National Park. Specific the reviews on websites as TripAdvisor and Zoover are of interests.

Finally, collecting data about the preferences as KPI are not yet developed, but maybe through short questionnaire or interviews.

Results

There are no results yet. There is one small result in the comparison of TomTom data and the actual use of a recreational area the Horst Beach by car-owners. In 2015 about 57.500 cars were counted. TomTom data shows 582 cars using the road to the beach in 2015. That is about 1% of the total. More comparisons have to be made to define this outcome as a key figure.

The authentic village Giethoorn (2620 inhabitants) located on the border of National Park Weerribben-Wieden received 590.000 tourists in 2015 according to Vodafone data (MarketingOost Kennis, Innovatie & Productontwikkeling, 2016).



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Comparing Climber Monitoring Methods on Mount Fuji

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Introduction

Monitoring visitation is fundamental to effective management of protected areas, directing limited budgets towards mitigation of high priority impacts, such as those related to trails, trash and congestion. Accurate data is fundamental to negotiate problematic ‘hotspots’ and minimize conflicts between visitor segments (Eagles, 2014). However, although considerable research efforts have been devoted to monitoring visitation, many protected areas still function with inaccurate or out-of-date visitation statistics, exacerbated by a lack of systematic data collection due to various problems (Cope et al., 2000; Cessford & Muhar, 2003; Buckley 2009; Aikoh & Gokita, 2015):-

- lack of multi-year time series due to changing count methods and institutional arrangements;
- under-reporting due to multiple entrances, multiple access roads or non-tourist traffic;
- representativeness of sample days undermined by weather conditions, public holidays, etc;
- ‘guesstimates’ based on perceptions of staff or local volunteers, indirect or anecdotal evidence.

In the ongoing quest for reliable, cost-effective collection methods, the pros and cons of on-site staff versus automated counters is a perennial question which this paper aims to contextualize using the case study example of two parallel systems currently being utilized on Mount Fuji’s north face.

Methodology

Case study site

Mount Fuji, Japan’s highest peak at 3776m, is located 120 km southwest of Tokyo. The four main routes to the summit each has a trailhead ranging in altitude from approximately 1400 m to 2400 m ASL. The MOE-J conducts multi-trail monitoring with passive optical infra-red sensors positioned on each trail. Due to its elevation (2300 m) and proximity to the Kanto plain, the Yoshida route on Mt. Fuji’s north face has the highest footfall, accounting for 60% of all summit ascents in 2015.

Method

This paper employs empirical evidence to investigate two alternative monitoring methods being used on Fuji’s north face. First, semi-structured interviews were con-

ducted with managers from local and national government. Next, data from the 2015 season was collected and compared, and a SWOT (strengths, weaknesses, opportunities, threats) matrix used to summarize the respective internal and external pros and cons of the two systems from a park managers' perspective (Table 1).

Findings

Both monitoring systems are used to track trends in the number of summer ascents. After 12 climbers were killed and 29 injured by a rock slide on 14 August 1980 the manual counting system was introduced at the 6th station in 1981 along with a 'Safety Guidance Centre'. Its database is lengthier, but only monitors climber movement by day, whereas the 8th station sensor is accurate to a second. This enables identification of two temporal peaks in climber flow: 15-17:00 (mountain hut stay); 23-25:00 (no stay). The MOE-J's multi-trail, multi-year data enables year-on-year comparison: for example, the total 234,217 ascents in 2015 represents an 18% decline on the 2014 season. 8th station results are collated, with an executive summary published online at the end of the season. Results reveal peak congestion periods and days (e.g. 7,867 ascents on 19 July, a public holiday). Fuji's linear trails negate the problem of climber passing distance, and broad correlation between the two data sets appears to validate their accuracy, although data from the 6th also includes casual tourists (defined as those with no intention of making a summit attempt).

Table 1. Overview of monitoring systems on Mt. Fuji's north face

| Location | 6 th station (2,390 m ASL) Safety Guidance Centre | 8 th station (3,100 m ASL) Taishikan mountain hut |
|------------------------|--|---|
| Method | field observers using hand counters | passive optical infra-red sensor |
| Organization | Fuji-Yoshida City | Ministry of Environment – Japan |
| Data collection period | 1981-1999 (1 July-26 Aug); 2000-2013 (until 31 Aug); since 2014 (until 14 Sep) | 2005-2013(1 July-31 Aug); since 2014 (until 30 Sep) |
| Variables | the date of ascending climbers | date and time; direction; temperature |
| Strengths | multi-year data since 1981; ability to distribute verbal warnings and information about trail conditions etc. | 24 hour but cost-effective; data since 2005; works even at night; location ensures passing distance of >2m |
| Weaknesses | proximity to trailhead ensures a significant number of non-climbing tourists; unreliable due to human error or during change-over of shifts etc. | susceptibility to fog; difficulties monitoring groups of climbers during busy period; regular data back-up and battery check required |
| Opportunities | potential to monitor other variables (climber gear, nationality etc); also for more information dissemination | could form a useful long-term tool for monitoring visitor flow as part of a national system for policy-making |
| Threats | cost of human resources; seasonal nature of employment undermines the level of field workers' engagement | accuracy affected by weather, air temperature, passing distance, type of clothing and visitor volume |

Discussion

This paper contextualizes pros and cons of two parallel monitoring systems on Mt Fuji's north face.

Discussion from a park managers' perspective has technical and governance implications. For the former, monitoring efforts must consider potential sources of internal and external error in the planning and installation, and calculate correction coefficients for each site (Andersen et al, 2012). Efforts to monitor visitor trends also reflect broader trends in protected area governance.

Mt. Fuji's case typifies the challenges prevalent among parks that lack an entrance fee system, with data instead collected from various indicators and collated to create trend indices. Fuji's multi-agency dataset does require collaboration between central and local government agencies, but further analysis is required to investigate if monitoring results can provide a platform for consensus-building and direct policy decisions by encouraging holistic management. Lastly, as counter technology is universal, standardization of the methods used to adjust findings across Japan's national parks could form the basis for a centrally coordinated system of visitor monitoring.



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Testing the use of wild game cameras for US Forest Service recreational visitor monitoring in Oregon/ Washington, USA

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In 2015 a university research group began developing new methods for data collection using wildlife cameras (game cameras) for short-term (7-day) and long-term (year-round) data collection at pre-selected recreation sites. The pilot study is in support of the US Forest Service (Region 6) National Visitor Use Monitoring Program (NVUM) program. NVUM has been the sole method of understanding visitor use within the US Forest Service since 2000. The USFS NVUM program manager selected 13 sites across Region 6 for the pilot study. Game camera methodology includes 16 short-term data collection sites scheduled for data collection at various times throughout the FY 2016 (four sites per Forest). These are a selection of low use sites and the goal is to continue to collect better quality data, reduce potential safety concerns, and at a reduced financial cost. Long-term data collection involves deploying cameras for year-round data collection. These are a selection of Permanent Traffic Counter sites where other monitoring methods pneumatic and infrared counters) are not appropriate for long-term monitoring due to factors such as geography (e.g. destruction by snow-plows) and limitations of the units (e.g. failure of some infrared counters to register high use counts). For both short-term and long-term sites, cameras can be used to collect valuable data pertaining to trail use (group size, overnight or day use, length of stay, etc.) and vehicle use (vehicles counts entering/exiting the Forest, vehicle type, etc.). Accordingly, we sought to a) Determine appropriate interval settings for cameras based on site type (i.e. necessary frequency of the recording of images to capture use of trails, roads) and b) Gather more information to contribute to the protocol in development for short-term (7-day) and long-term sites.

Methods

Multnomah Falls, CRGNSA

Three cameras were deployed simultaneously and collected data for a period of two hours on 3/16/2016. Cameras captured images at the following intervals:

- 3 seconds
- 5 seconds
- 10 seconds

Cameras were deployed on the trail at the halfway point between the Multnomah Falls parking area and Benson Bridge. This location was ideal for testing because it is high use (yielding a large sample in a short timeframe), is known for various user types (casual day users, hikers, and runners), and is representative of a “typical” trail switchback comparable to areas where many cameras will likely be placed according to planned sites.

Salmon River Road, Mt. Hood NF

Three cameras were deployed simultaneously in one location to calibrate best interval times for game cameras. The game cameras captured images at the following intervals:

- 1 second
- 3 seconds
- 5 seconds

Cameras were deployed facing NW in the Mt. Hood National Forest, approximately 500 feet from the Forest boundary on Salmon River Road. This location was ideal for testing because it was considered to be comparable to many forest recreation sites where cameras may be deployed to assess vehicle use (45 mph) and included “typical” roadside vegetation (tall trees more than 5 meters from the road) where many cameras will likely be placed according to planned sites. Placement of the 5 second interval camera at Salmon River Road resulted in a frame which captured less of the road than the other cameras. It was expected that all three cameras would have captured the same number of vehicles had they been placed in the exact same location.

Results/Discussion

Each time-lapse video was reviewed and a hand tally counter was used to record the numbers of visitors or vehicles entering or leaving the area. Results from each video are below:

Multnomah Falls, CRGNSA (3/16/2016 09:22-10:00)

| | 3 second interval | 5 second interval | 10 second interval |
|----------------------------------|-------------------|-------------------|--------------------|
| # of visitors visible (entering) | 52 | 52 | 52 |
| # of visitors visible (exiting) | 26 | 26 | 26 |

Salmon River Road, Mt. Hood NF (3/17/2016 09:24-10:22)

| | 1 second interval | 3 second interval | 5 second interval |
|----------------------------------|-------------------|-------------------|-------------------|
| # of vehicles visible (entering) | 9 | 9 | 6 |
| # of vehicles visible (exiting) | 7 | 7 | 5 |

There is no “one size fits all” camera deployment method for any site type. Each site will require careful planning. The time and effort necessary for camera deployment is not at all comparable to pneumatic/infrared deployment. Selecting proper locations for deployment at the two sites and placing the cameras for these tests took well over one hour. This process will be more time-consuming when locations are selected for actual 7-day and permanent traffic counters sites, because cameras should be placed in more discreet locations than were necessary for these tests, and they should be well-camouflaged.

Based on results, it is likely that trail use (foot traffic) can be captured with a 10 second interval setting with careful placement. The next longer interval setting available on the unit is 20 seconds. This is likely too infrequent to capture all use. For some areas, it may be decided that longer interval settings are appropriate. For example, trails which include points of interest (where visitors linger) or where multiple switchbacks can be captured within the camera frame would allow for longer interval settings.

The results showed that the use of roads (vehicle use) can usually be captured with a 5 second interval setting with careful placement. Results of the Salmon River Road test showed that some cars were missed with this setting. It is likely that more careful thought about placement would have captured all use.

Salmon River Road is a 45 mph road that is comparable to other settings. A vehicle moving 45 mph moves 66 feet per second. Therefore, a camera set to record an image every 10 seconds would need approximately 660 feet (two football fields) of straight road to do so without missing data. This does not allow for speeding vehicles. More reliable data should result with a shorter interval setting plus placement that uses curves, points of interest, or other places where vehicles are likely to slow down.

Conclusive findings and management implication will be discussed and related to local settings. Some discussion concerning the generalizability will also take place.

Online participatory GIS mapping of marine recreation in Denmark: contrasting crowdsourced and representative survey approaches

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Introduction

With more than 7,300 km of coastline, Denmark has a lot to offer in terms of marine recreational activities. A large part of the Danish coast and waters are indeed used all year round for organised and unorganised activities including swimming, kayaking, fishing, hunting, surfing and sailing. Some of these activities require formal facilities, such as marinas, piers, or ramps, while others, such as swimming, are informal and therefore take place anywhere at the coast. Although the entry points into the water are often known, but not currently systematically collected, the spatial extent of these activities once in the water is not known.

The lack of spatial information is a challenge to create a balanced and coherent planning and management of the sea, as framed in marine conservation planning and Marine Spatial Planning, MSP (Douvere & Ehler, 2009; Mazar et al 2014). The limited availability and quality of data on recreational marine uses is as an obstacle for implementing EU policy (EEA 2015). Innovative ways for documenting and mapping the missing 'social landscape' of the marine environment in terms of spatial attributes of recreational use are needed (Martin & Hall-Arber 2008).

To find out the extent of use of the Danish waters for marine recreation activities, our research aimed to collect the spatial extent, diversity, and intensity of these activities. Here, we discuss the quality of the data collected through two sampling strategies: an online crowdsourced survey and a commercial representative panel survey.

Methodology

We focused on two population groups to collect data representing marine recreational activities in Denmark: organised activity groups and the general population. The organised groups already actively take part in water-based activities and are part of a network sharing their specific recreation activity. The general population however, generally takes part in marine recreation activities in a less frequent and less organised way. The combination of results from these two user groups gives a comprehensive spatial representation of marine activities in Denmark; both studies complementing each others.

Geo-located information was collected using a custom-built webGIS, in which participants shared the location of the water activities they had taken part in. The interface allowed for the collection of points and lines (using drawing tools), and the uploading of GPX tracks (created by satnavs).

Crowdsourced strategy

Online sampling has been found effective in hard-to-reach populations (Baltar and Brunet, 2011). Since only a limited part of the Danish population takes part in marine recreation activities, sampling through organised channels such as social networking sites and federations aided in attaining a relevant small but important groups. Facebook represented 49% of the site visits during the first sampling year.

In that period (November 2014 - November 2015), we collected 7344 points, 624 lines, and 54 GPX tracks that were shared by 2453 unique respondents.

Panel survey strategy

Our crowdsourced sample effectively reached active marine recreationists. However, some marine activities are less organised; e.g. swimming or snorkelling. Therefore, our first sampling strategy did not fairly take into account such 'laid-back' activities, and so we used an opt-in commercial panel survey sampling strategy which targeted the general population at large.

We recruited participants through Userneeds, a Danish company specialised in organising panel surveys. Userneeds contacted more than 10,000 pre-recruited participants, representative of the Danish population in terms of home address, age, and gender.

We received data from 10,291 participants, of which 4054 (39%) added 7055 points, 1634 polylines, and 2 uploaded GPX track files.

Data collection evaluation

Our data quality evaluation is based on four main criteria: *representativeness* (geographically and demographically speaking), *completeness* (proportion of location added compared to other datasets), *accuracy* (scale at which the locations were added and their positional accuracy), and *quality* (relative amount of information added to each point).

Results

Representativeness

Our crowdsourced sample had an average age of 46.5, while the average Danish adult in a jetski, kayak, rowing, or sailing clubs was 50.4 (population size: 83,379). Therefore, our sample is consistent with age of the Danish adult population in a club. The sample had an over-representation of male (75% of respondents), gender unbalance that can also be found in clubs with 70% of males based on the same population as above.

Regarding the geographic representativeness, we found that a couple of municipalities were overly represented (normalised with the population size; 4 to 8 times

more responses than the least represented) and that the region bordering Copenhagen was not well represented.

Completeness and accuracy

Kite-surfers in Denmark have a spatial database of used locations for kitesurfing (kitemekka.dk); it contains 214 locations (Figure 1(a)). During the crowdsourcing survey, one of the 32 activities was kite-surfing, for which we collected 612 kitesurfing points or lines; some locations being duplicated, since they were mapped by different respondents (Figure 1(b)). 60% of the locations from kitemekka were included in our dataset, while some locations from our dataset were not in the kitemekka datasets. The panel survey only resulted in 10 mapped kitesurfing locations; all were also included in the crowdsourced dataset.

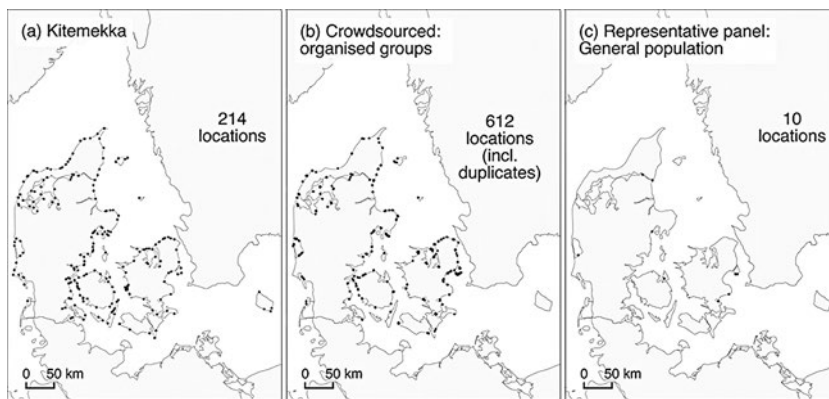


Figure 1. Dataset comparison for kitesurfing locations.

The maximum distance observed between two points referring to the same kite-surfing spot in the crowdsourced dataset was 3.2 km, with an average of 0.6 km. No restriction on the zoom was made when drawing points and lines; in both samples an average scale of 1:72,223 was used. This can be considered an accurate mapping scale in a national survey.

Quality

There were three types of fields to fill out in the survey: selection, simple data entry (1 word or number), and longer text fields. The selection fields were filled out for 86 to 95% of entries, data entries were filled out for 63 to 72% of entries, and longer text fields were filled out for 21 to 28% of the entries. The panel dataset gave similar numbers, and therefore the quality in terms of entries was comparable.

Conclusion

Our custom webGIS successfully gathered geo-located data from organised groups and the general population. Both strategies collected data from a representative sample of their respective population. The dataset produced, although of similar quality, was drastically different in terms of completeness for the kitesurfing activi-

ty; a niche activity that is therefore harder to reach through a representative sample of the population. More analysis needs to be carried out in order to explore further both datasets in terms of quality, accuracy and completeness for the 32 activities included.



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Geocaching in protected areas – a survey of potential negative effects on the natural environment and implications for future management in the Donau-Auen National Park, Austria

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Introduction

Geocaching originated in the year 2000 in the USA as a leisure activity, which requires the recreationists to find containers (so-called geocaches) based on their coordinates posted online. Since geocaches are often hidden off-trail in natural environments, protected areas are likely to be affected by this activity (Brost & Quinn 2011). Previous analysis has shown that the Donau-Auen National Park, which is partly located within the boundaries of Austria's capital city of Vienna and which is under a large amount of public use pressure (Arnberger & Hinterberger 2003; Tazcanowska et al. 2006), is most heavily affected by geocaching amongst all six Austrian national parks – both in terms of the number of caches hidden and in terms of the number of visits logged online (Hödl 2013).

Method & results

Based on the findings mentioned above, staff members of the world's largest online platform dedicated to geocaching, geocaching.com, were contacted in cooperation with park officials and asked to provide a list of all caches hidden in the park and in possible future expansion areas. This information was used to find the caches and to evaluate them according to different characteristics, such as their distances from the nearest trails, their hiding places, their surroundings, the surface type at their locations and damages to soil and vegetation found at their hiding places. Field work, during which each cache was visited using a GPS unit (Garmin GPSMap 60CSx), was carried out on 18 weekdays, from August 14th to October 23rd 2015.

Location of geocaches

Altogether, the hiding places of 208 caches and the coordinates of 86 so-called stages, which in some cases must be visited in order to find a cache's final location, were surveyed. The majority of them was placed in Vienna (71%: 153 caches, 55 stages), although the capital's share of the national park only makes up about one quarter of its total area. The remaining 29% (55 caches, 31 stages) were found in those park areas belonging to the federal state of Lower Austria.

According to zoning data provided by park officials, most of the visited coordinates were located within the park's so-called "nature zones" (47%), followed by "nature zones with management actions" (29%) and "outer zones" (9%), which is the least environmentally sensitive of all three zoning categories. The remaining 15% could not be assigned to a zoning category using ArcMap due to their location on desig-

nated expansion areas, their placing just outside the national park boundaries (in a buffer of max. 10m) or due to patchy zoning data.

Distances from trails

The distances of the examined caches and stages from the nearest trails ranged from 0m to over 400m. The former was typically found with so-called “virtual stages”, which only require answering questions about the coordinates’ surrounding areas and where no actual containers or physical clues are hidden. In eight cases it was not possible to find the cache containers or their probable hiding places and therefore no distances from the nearest trails could be determined. Of the remaining 286 caches and stages about 40.2% were located within 0-5m from trails and another 23.4% within less than 10m.

Surrounding areas, hiding places and surface types

The coordinates’ surroundings were mostly assigned to the categories “(floodplain) forest” (39%), “forest outskirts” (28%) and “developed area”, which is characterized by buildings or other artificial man-made structures (18%).

Amongst the hiding places, living trees and large shrubs were the most common ones (36%). Eight caches were even hidden in heights that can only be reached by climbing the respective trees using special equipment. Artificial structures such as information boards and signposts did also prove to be common hiding places (35%), followed by deadwood (28%) and hiding places between or under large stones (1%).

Most locations were assigned to the surface type “natural area” (71.4%), followed by “use area” (e.g. picnic areas or areas surrounding information boards) (22.1%) and “hardened surface” (6.5%).

Damages found at cache locations

Damages were detected at 108 locations, with “damage to woody vegetation”, mostly caused by nails and wires used to attach geocaches to trees, and “bare dirt” being the most common types (40% each). However, since “bare dirt” did often occur in combination with the surface type “use area”, predominantly no natural areas were affected by this type of damage. Other damages such as “trampled vegetation” (11%) and “eroded soil” (9%) were less frequent.

Conclusions

The results of this survey show that geocaching is a widespread leisure activity in the Donau-Auen National Park, mainly concentrated in areas within the city boundaries of Vienna. Although a large share of caches and stages is located along trails, some of them require walking off-trail for longer distances or even climbing up trees, which is both not in line with desired visitor behavior. Looking for these caches might disturb wildlife, damage sensitive vegetation and even bears the risk of spreading invasive species in previously unaffected parts of the national park. Up to now, caches found by park officials used to be removed without further notice, which did not prove to be efficient. It is likely that the cache owners simply believed them to have gone missing and therefore placed a new cache in the same location. In the future,

the respective cache owners should be contacted before their caches are removed. Therefore, awareness raising needs to be a significant part of any management strategy related to geocaching (Reams & West 2008). This is also underlined by Gantner et al. (2014), who found that, while geocachers do seem to be generally aware of wild-life disturbances, they do not consider geocaching itself to be a leisure activity that is potentially the cause of such disturbances.

Considering these points should help with developing a positive way of managing geocaching in the Donau-Auen National Park, allowing this leisure activity in a regulated fashion without impairing the natural environment.



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Evaluating conflict potential in the marine and coastal areas of the Kimberley region of northern Australia through public participation GIS

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Marine spatial planning (MSP) has been emerging as an approach to plan and maintain a balance between different human uses and conservation goals. Large, remote areas present a number of challenges for conservation managers. The Kimberley region in northern Western Australia extends ten degrees of longitude, eight degrees of latitude, and in our study spanned over 13,300 km of complex coastline. The region is remote, with a low population, and a history of economic development including agriculture, mining, fishing, and more recently oil and gas exploration. It is also renowned for its rich Aboriginal culture and heritage, biodiversity and wilderness (Wilson, 2014; Wilson, 2013). Most conservation planning, including MSP, suffers from the lack of social data (St Martin and Hall-Arber, 2014), hence the aim of this study was to evaluate, through the well established method of public participation GIS (e.g. Brown and Pullar, 2012), areas of conflict potential using human values associated with the marine and coastal region of Kimberley.

Methods

The first step of the investigation was field based; where a range of stakeholders were interviewed to elucidate values they held for the area. Participants marked locations (polygons) on hard copy maps and through the interview process, associated one or more values they held with each place. The second step in our analysis was to generate areas of higher than average intensity of each particular value (heat maps). The third step was to develop conflict matrices, with values categorized as consumptive and non-consumptive, and the degree of conflict potential based on the extent of social norm violation and goal interference, as determined by the researchers. Fourthly, cross tabulation of the values and plotting using a grid-based net across the study region was used to generate conflict potential maps. Lastly, the boundaries of current and proposed marine protected areas were superimposed across the conflict potential maps.

Results and Discussion

Seventeen held values were elucidated from the 167 interviews with stakeholders who either visited or lived in the Kimberley region. Most valued were biodiversity, the physical landscape and Aboriginal culture. This set of 17 human values included

consumptive, non-consumptive, direct and indirect uses (MEA 2005). Our results show that firstly, the entire space within the study area was valued for one or more values. Secondly, at least a third of existing marine protected areas were mapped as experiencing medium to high conflict potential (Fig 1.). These were all near-shore, with large, remote offshore marine protected areas showing very little evidence of conflict potential. As Aboriginal culture, biodiversity and physical landscape values were most marked by the respondents, careful consideration of the social impacts of future developments associated with access is essential. Our findings also highlight that there is an important base for societal support for marine protected areas in the region.

Thirdly, participatory mapping based on interviews provides social data for the 'missing layer' in MSP (St Martin and Arbor-Hall, 2008). Such data are needed if the social concerns of stakeholders are to be recognized and included in spatial planning. The other methodology contribution of our approach is a means for making visually explicit where conflict is most likely.

Conclusions

Participatory mapping complemented by extensive field interviews is a powerful method of evaluating existing human values over large marine spaces and provides quantitative inputs into modeling of conflict potential in marine spatial planning.

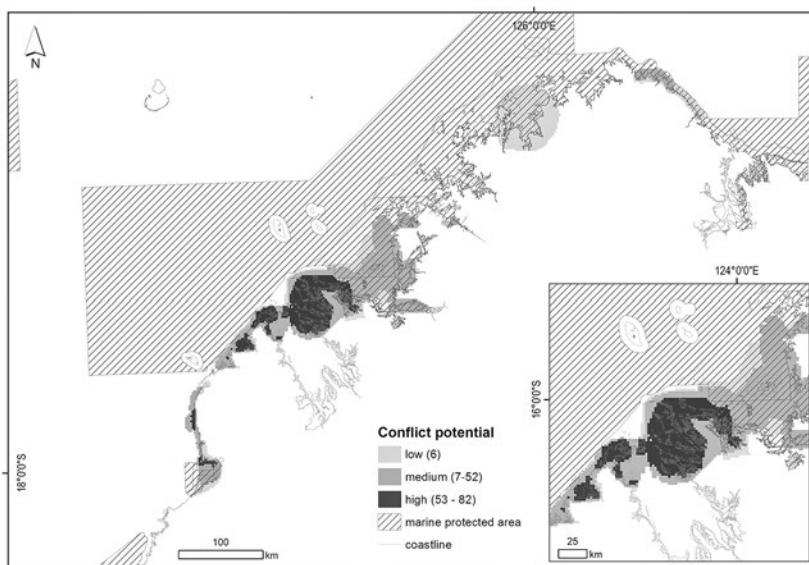


Figure 1. Illustration of conflict potential based on direct use consumptive values and all other values in the context of existing marine protected areas along the Kimberley coast.



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USE OF ICT IN NATURE PROTECTION

Geocaching – A harmless recreational activity of digital natives or a threat for forest conservation?

Case studies from Bavaria

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What is Geocaching?

Geocaching is an outdoor game using the internet and a GPS to seek small containers called “(geo)cache”, that have been hidden by players of the game. These small hidden boxes contain a logbook and “treasures”, items of modest monetary value for trading and exchanging. Players finding the cache enter the date when it was found and sign the booklet with their code name and a comment in the logbook. Coordinates of the hidden caches are posted on the internet such as geocaching.com. There are also items that are supposed to move from cache to cache to reach a certain place, so-called “Travelbugs” or “Travelcoins”. Their moves are also logged and can be followed online (Groundspeak 2014). In 2014, around 343,000 active German Geocachers were registered on the most popular geocaching.com platform, and around 327,000 caches were available (Project Geocaching 2014), so there is approximately almost one cache per square kilometer on average in Germany.

Forest managers in Bavaria often had no idea about this activity until hunters and other stakeholders like nature conservationists complained about persons sneaking around in the forest at unusual times behaving in a strange manner (Käufer 2014), disturbing wildlife and habitats such as tree cavities. In interviews carried out in urban proximate woodlands (Lupp et al. 2016), about only one out of 300 interviewees indicated geocaching as a reason for their visit to the forest. However, geocachers may not always admit their activity when interviewed because the cache should be hidden from “Muggels”.

Material and methods

The Forstenrieder Park and Forst Kasten, a 5,000 ha urban woodland in the south of Munich was selected as a study area. In 2014, around 60 geocaches were listed in Geocaching.com for this area. 21 of them were assessed in detail using based on successful logs of the caches. Using the logbook, the frequentation of the caches can be assessed this way. To detect possible conflicts with conservation issues, a catalogue of criteria and indicators was developed (Table 1). The selected caches were visited on-site and indicators were documented, considering overall disturbance, disturbance of biodiversity, especially nesting birds and bats, as well as interference with wildlife and its management.

Table 1. Extract from the criteria set to assess potential impacts of geocaching. Brockard 2014, simplified

| Criteria | Indicator | Assessment |
|---|--|--|
| Potential disturbance by searching for geocache | Log numbers | · Number of logs since 2010 both on geocaching.com and logbooks in caches |
| | search time | · Interpretation of comments in the logs · Own search time for the cache |
| | Distance to public trails | · Distance between cache and marked trail or forest road |
| Potential impacts on biodiversity | Placed in a protected area away from marked trails | · Comparing coordinate with data of protected areas and evaluation at the cache |
| | Traces of Trampling | · Width and length of cacher trails |
| | Vegetation losses at hides | · Analysis of visible vegetation losses and species |
| | Nearby habitats and resting places of birds and bats | · Habitat structures for birds and bats around the cache and along cacher trail |
| Potential impacts on wildlife and hunting | Quiet zones for game | · Habitat structures suitable as prime locations for game around cache |
| | Game feeding and hunting constructions | · Hunting constructions visible from cache and cacher trail |
| Potential conflicts with other recreationists | Distance to recreation hotspots | · Distance between hide and recreation hotspots · Own searching time at recreation hotspots |

Results

Each of these analyzed caches was logged between 0.12 and 0.55 times per day on average (Brockard 2014). Besides trampling disturbance of vegetation around the hide, most of the assessed caches in the Forstenrieder Park seem to cause little to moderate interference with wildlife and conservation issues (Brockard 2014), though the assessment of potential habitats was conducted in summer, and not all of the potential habitats, such as cavities, can be detected when trees are foliated. However, the peak of the geocaching activities is in spring and correlates with the breeding and nesting time of almost all bird species. For example, the medium impact geocache ‘Smaragdpfad’ (‘Emerald-Trail’) was logged in on average around 4 times per month between November and February, and 11-12 times per month in the nesting and breeding months of April, May, June and July.

Negative example Guttenberger Wald in Würzburg

Over the years, also more challenging geocaches requiring climbing equipment gained increased popularity. In forests, those caches are hidden in the canopy of the trees. Notably, bats staying in a day-roost inside tree cavities or under loose bark can be seriously disturbed, even if they are not directly threatened (Kerth et al. 2006).

Guttenberger Wald is a deciduous forest dominated by old beech (*Fagus sylvatica*) and oak (*Quercus robur*) forests in the vicinity of Würzburg. A number of deadwood trees provides shelter and roosts especially for bats and is a Natura 2000 site. In late 2012, a series of nine climbing caches was detected on the Geocaching.com platform. All of them were placed within a home range of Bechstein Bat (*Myotis bechsteinii*). Unmistakable traces like trampling, ripped off branches and geocaching containers in the canopy were detected. All nine caches had been logged 0.64 times per day on average. Bat conservationists and forest authorities tried to contact the cache owner and the reviewer (a voluntary person supervising placement and description of caches before they are posted). It took 14 days until the caches were delisted and removed.

Conclusions

Although so-called reviewers permit caches to be listed on the caching platforms, this review system has a number of deficits. Only a few guidelines and simple sets of criteria exist and they do not provide explicit information about the suitability of certain sites for placing geocaches. Spatial information for suitable and unsuitable sites as well as training opportunities for reviewers would seem to be appropriate approaches to minimizing conflicts with forest conservation issues.



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Application of GPS-tracking to analyse the spatial behaviour of cable car users – a case study from the summer season in the Tatra National Park, Poland

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Introduction

Cable cars in mountain areas are often associated with winter tourism, in particular with skiing activity. However, cable car operators and touristic regions see large potential in extending their seasonal offers to all-year-round ones (Richins & Hull, 2016).

Easy access of alpine zone may attract large number of tourists. However, in natural vulnerable areas, there is a need to control visitor flows in order to mitigate and/or reduce their environmental impacts. Understanding visitors' behaviour in the proximity of cable car infrastructure is crucial for effective management of such sites. Application of adequate visitor monitoring techniques enables gathering comprehensive information on tourist traffic and its characteristics (Cessford & Muhar, 2003). Within the last decade GPS-tracking has become a well-established data collection method used in various fields for documenting the traces of moving objects and people (Shoval and Isaacson, 2007; Taczanowska et al. 2014).

The aim of this study was to explore the spatio-temporal distribution of visitors in a popular cable car destination - Kasprowy Wierch in the Tatra National Park. The main focus of this paper is the analysis of individual trip itineraries of the most numerous visitor group in the study area – cable car users purchasing return tickets.

Study area

The summit of Kasprowy Wierch (1987 m.a.s.l.) is situated in Central Eastern Europe in the main ridge of the Tatra Mountains, at the national border between Poland and Slovakia. The Tatra Mountains are the highest range within the Carpathian Mountains and lie within two independently managed national parks: Tatrzanski Park Narodowy (TPN) in Poland and Tatransko Narodny Park (TANAP) in Slovakia.

Kasprowy Wierch (KW) belongs to the most popular destinations in the Tatras. KW can be reached by cable car and hiking trails. In the summer season 2014 (July - September) nearly 300 000 visitors has been registered in the area, making 19,4% of the total tourist traffic in the Polish Tatra National Park (Taczanowska et al. 2014).

Methodology

GPS-tracking of cable car users was a part of a larger visitor monitoring project in the Kasprowy Wierch area comprising several data collection techniques: 1) automatic counting (Eco-Counter pyroelectric sensors), 2) manual counting; 3) on-site interviews; 4) GPS-tracking 5) registry of cable car tickets 6) registry of entries to the national park (TPN).

Between 26.06.2014 and 30.09.2014 at 7 locations a continuous automatic counting of visitors was done. Additionally, on 17 sampling days at 12 locations direct observations (manual counting) of visitor flows was carried out. During the sampling days tourists were interviewed in the field using structured questionnaires (PAPI survey technique). Survey was combined with a documentation of visitors' trip itineraries via GPS-loggers (100 devices: Holux GPS logger) and map sketches.

As a result, visitor load data and 1250 GPS-tracks linked to visitor characteristics were collected in the field. Data were pre-processed and analysed using ArcGIS and SPSS software.

Results

Between July and September 2014 a total number of 292 493 visitors moving towards Kasprowy Wierch (KW) were registered in the cable car and on recreational trails leading to KW. 80% of people used cable car, whereas 20% were using hiking trails to get to the summit and back. Cable car users with return tickets were the most numerous tourist group in the Kasprowy Wierch area. Between July and September 2014 the share of specific ticket types among cable car users was as follows: return tickets „up&down” = 59%, on-way tickets „up” = 26%, on-way tickets „down” = 15%.

In the summer season 2014 on average 3179 visitors per day arrived to KW area. The maximum tourist traffic was observed in August 2014 where daily number of visitors exceeded 7000. Two most intensively used path segments were located next to the upper cable car station (cable car station – Sucha Pass; cable car station – meteorological station/summit of KW). Third most heavily used path segment was located between Sucha Pass and the summit of Beskid. The maximum daily tourist traffic volume in the study area has been observed on 13.07.2014 at a path segment between the cable car station and Sucha Pass (7236 visits/day). Similar tourist traffic was observed at this location several times in July and August 2014 (> 6500 visits/day). Maximum hourly tourist traffic volume was observed here on 13.07.2014 between 1 – 2 p.m. (1250 visits/hour). Visitor load at path segments located next to the cable car station was on average 5-10 times higher than the visitor load at other hiking trails in the area (e.g. trail linking Kasprowy Wierch and Czerwony Wierch or Liliowe Pass and Świnica).

High concentration of visitors on trails in the surrounding of cable car station was caused mainly by tourists with return tickets. In contrary to common opinions,

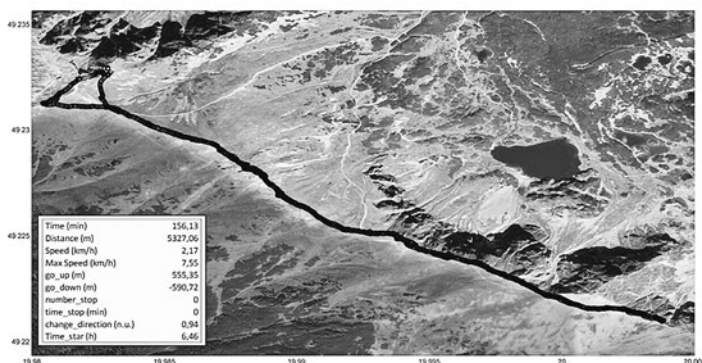


Figure 1. An example of a visitor route recorded via GPS-logger in the Kasprowy Wierch area in the summer season 2014. Total number of registered routes $N = 1250$.

this group of visitors is rather active and hikes on average 1.6 km during a 1.5 hour stay in the mountains. Among 1250 recorded GPS tracks 140 different trip itineraries were distinguished. 73% of tourists with return ticket directs their first steps towards Sucha Pass, while one quarter of tourists decides to hike up to the meteorological station. 2% of visitors stays in a close proximity of the upper cable car station. Only 27% of tourists with return ticket reach the proper peak of Kasprowy Wierch; 29% turns back after arriving at meteorological station, and 44% choose other destinations (e.g. Beskid peak). Figure 1 presents an example of recorded visitor route and the movement parameters.

Discussion & Conclusions

Tourism in the Kasprowy Wierch area is a dynamic phenomenon, characterised by significant spatio-temporal changes. The number of sold cable car tickets (especially return tickets) has the most significant influence on visitor load on trails within 750 m radius from the upper cable car station. The type of individual trip itineraries (influenced by the terrain, tourist information or lack of such information as well as the time restriction of return tickets) also affects the spatio-temporal distribution of visitor flows in the area. Tourist information is mostly dedicated to long distance hikers in the national park and not well-designed for visitors taking a short stroll around the cable car station. Some visitors use selected path segments several times due to lack of adequate information, which causes additional concentration of people on recreational trails. Creation of touristic “retention zones” such as view platforms, dedicated resting places could contribute to a better control of visitor load in a close proximity to cable car infrastructure.

Comprehensive information concerning individual routes contributes to a better understanding of the behaviour of tourists visiting this part of the Tatra National Park. The results can be used as a base for further research concerning environmental and social impacts in the Kasprowy Wierch area and may assist management of this popular tourist destination in the protected area.



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A novel GIS –based approach to reconcile the needs for nature conservation, tourism and recreation

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Introduction

Nature-based tourism is considered important cultural ecosystem service, which can have indirect positive impacts on biodiversity through nature protection (Balmford et al. 2015). However, the direct impacts of tourism on nature are negative (Cole & Landres 1996; Tolvanen & Kangas 2016) challenging the land-use planning of tourism areas. Sustainable land use planning should ensure conservation of biodiversity, social acceptability of land management actions and use of nature resources in an economically sustainable way. Therefore, there is a need for multidisciplinary approach that simultaneously considers ecological and socio-economic values. Our aim was to develop a GIS-based method, which can increase social acceptability and ecological sustainability of land-use planning. It benefits from existing spatial ecological data and combines it to spatial information on people's values and needs concerning the use of the area. The study was carried out in a project "Socio-ecological tools for the planning of tourist destinations in Kainuu (VAAKA)" in North-Eastern Finland (Tolvanen et al. 2014). The project's pilot areas were tourism resorts, which are located close to protected areas.

Methods

We compiled existing spatial ecological (e.g. species, habitats) and cultural information (e.g. traditional landscapes, nationally remarkable relics) of the study area to calculate ecological and cultural value. For calculations we divided the study area to 1 ha cells. To calculate the social value we collected spatial social knowledge through internet-based Public participation GIS (PPGIS)–survey (e.g. Brown & Kyttä 2014). In the survey participants were asked to mark important places for their activities on the map and indicate the frequency of the activities, mark pleasant and unpleasant sites and reason for the sites being selected, and mark development proposals regarding land uses (tourism, forestry, conservation). Survey was open for everyone. To recruit local as well as tourist participants we advertised the survey in newspapers, social media, through local project partners, and specific campaigns arranged

in the study area. A paper format of the survey was also available, to increase the response rate of those participants who did not want to use the internet version. The ecological, cultural and social information was combined with spatial analyses to locate ecologically, culturally and socially valuable areas with possibly conflicting land-use pressures. Based on the assessed values and their joint analysis we created a classification system which can be used to rate different areas into different land use classes based on their suitability.

Results

Approximately 36% of the study area obtained ecological value (fig 1.). The sites with highest ecological values were located in conservation areas, but there were more than cells obtaining ecological value outside than inside conservation areas. Based on the available spatial data altogether 221 culturally valuable sites were located in the study area and were used in calculation of cultural value. Altogether 288 persons replied to the survey and provided 682 markings. Of the respondents, approximately 60% were tourists and the rest were local residents. Respondents marked 278 important places for their activities, most common activities being sports, hiking and nature observation. There were 270 markings for pleasant (fig 1.) and 40 markings for unpleasant

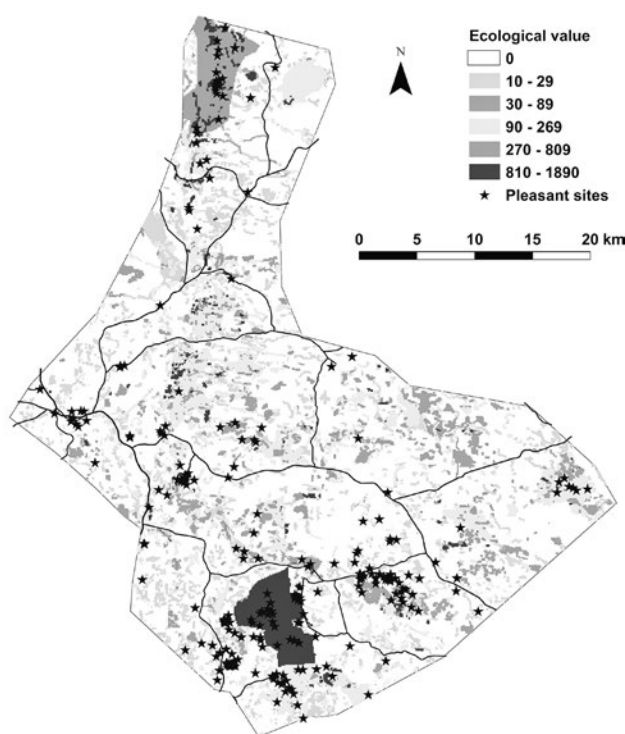


Figure 1. Ecological value and pleasant sites in the study area. Ecological value indicates the conservation and biodiversity value of different sites ranging from 0 (no value) to 810-1890 (very high). Pleasant sites were mapped by local and tourist participants in PPGIS-survey.

ant sites. Beautiful scenery was the most common reason for a site being pleasant and damaged environment for unpleasant sites. Nearly 100 markings involved suggestions on the land uses. Most commonly respondents marked areas where they don't want forestry or tourism infrastructure. The social values markings were mostly concentrated near tourism resorts and recreational areas. Pleasant sites were often located in the sites with ecological values (fig 1). Based on the joint analysis of different data layers each 1ha cell could be classified to one of 4 categories describing its suitability for tourism development based on ecological, cultural and social values. The sites that had all three values and also high intensity of use were regarded most suitable for tourism development. The sites with highest ecological values were regarded unsuitable for tourism development to safeguard their biodiversity values.

Discussion

We developed a GIS-based method that considers simultaneously ecological, cultural and social values. Locating ecologically valuable areas is important for preventing biodiversity loss. However, the use of ecological data is often constrained, as the data is scattered among several actors and may require expertise. Our study gives promising results on the joint-use of multiple ecological datasets and further linking them to spatial information on cultural and social values. PPGIS method offers a participation tool to collect spatial information on values and needs (Brown & Kyttä 2014). The method proved suitable for collecting data from different stakeholders in rural tourism development area. The results indicated that ecologically valuable areas were also important for recreation and can provide cultural ecosystem services. We encourage the use of GIS-based method in land use planning as the spatial overlay of different values can reveal potential synergies and conflicts between land uses, which is important for the coordination and reconciliation of land uses.



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Using GPS data from Web 2.0 platforms to assess informal trail network and its impacts in protected areas

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Introduction

Originally trail inventories and visitor surveys were conducted by recording information onto paper maps, but with the trivialization of Global Positioning System (GPS) surveys started to be implemented using different types of GPS devices (Marion et al., 2012). Recently with the incorporation of GPS hardware into consumer communication devices, common users started to be able to upload, search and download vast amounts of volunteered geographic information (VGI) from web-based services (Jiang and Thill, 2015).

VGI represent today a significant form of user-generated content compiling information about locations (e.g. places of interest), a phenomena or information (e.g. GPS tracking of bike and hiking routes), and can be stored into interactive track management services (e.g. Web 2.0 platforms) (Rinner et al., 2008).

The present explores the use of GPS-based visitor tracking data organized in a Web 2.0 platform as an alternative resource to assess the spatial distribution of informal trails networks and their level of impacts in protected areas. It has its application in Arrábida Natural Park (PNA), an important protected area in Portugal, located 37 km south of Lisbon, where informal trails are a constant management concern due to a lack of a structured and formal trail system, leading to some impacts and extensive areas of disturbance.

Methods

GPS-based data collection and spatial analysis

Based on Mendes et al., 2012 method, a core set of data was collected from a web-based GPS tracking platform called GPSies.com (GPSies) on March 19th, 2015, using a searching radius of 35 km from Palmela city and considering 10 activities (hiking, mountain biking, walking, motor biking, sightseeing, running, cycling, climbing, geocaching and racing bike) that are normally developed in roads, paths and trail systems. After the elimination of duplicates and entry errors, the park boundary polygon was used as a base layer and all tracks that didn't cross the park limits were removed. Besides, in order to absorb the GPS spatial errors of tracks collected by assisted GPS and smartphones under different atmospheric conditions and canopy cover, a 15 m buffer width of the formal park infrastructure (official roads and trail network) was created. Lastly, an interception between all tracks downloaded passing through the park limits and the 15 m buffer area was accomplished using ArcMAP 10.3. The result was a shape-files compiling all GPS tracks from activities that used the formal roads and trail system and in opposite the potential informal trails.

On-site visual survey of informal trails

To understand if the potential informal trails shape-file generated represented the existing situation, additional data was collected during a 10-day field survey, between July and September 2015. Informal trail mapping was performed in the most important parts of the park using a handheld GPS unit, together with an estimation of the average tread width and the division of mapped trail segments into different condition class categories based on a visual survey.

Trail-based fragmentation assessment

Post-processed GPS data from field work was then converted into shape-files and used to calculate different landscape fragmentation metrics index's (number of patches; mean patch size; large patch index; mean perimeter: area ratio) that allowed further assessment and description of spatial impacts associated with informal and formal trails within the park. The management zone map and other available ecological information's were used to summarize and compare the different fragmentation levels across the area.

Results

The final dataset downloaded from GPSies consisted of 7157 individual tracks, representing a total accumulated of 52745 km, with 4004 tracks (8230 km) passing through the limits of the study area. From this, 7007 km were considered using the park formal infrastructure and the remain 1223 km configured potential informal trails (Figure 1).

From the informal trail fragments verification, a total of 41 segments were mapped, totalling 133 km with different combination of condition classes. Informal



Figure 1. Spatial distribution of the formal park infrastructure and potential informal trail within Arrábida Natural Park

trails ranged in width from 0,48 to 3,34 m, with a mean of 0,86 m. The condition of informal trails was generally poor, with 68% of their total length exhibiting significant impacts to vegetation and soils due by trampling activity.

When using park zonation plan for calculate the level of landscape fragmentation it was possible to notice an increase in the number of patches present for all zones when comparing fragmentation caused by formal park infrastructure (N=116) with results obtained when considering the informal trail network (N=479). These results represent all the potential management conflicts between current uses and each management zone.

Conclusion

The results shows that VGI stored in Web 2.0 platforms can provide important clues regarding how the territory is being used, making it a valuable and alternative resource to evaluate the spatial distribution of informal trails and assess the fragmentation effects of trail networks. Like this sustainable management action can be instigated in order to minimize the creation and proliferation of visitor-created informal trails as a result of outdoor activities within recreational and protected areas.

Acknowledgements

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USE OF ICT IN VISITOR TRACKING

Incorporating the digital footprints of visitors in protected area use and impact monitoring: Case studies from the USA and Australia

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Introduction

Advances in mobile and internet-based technologies have encouraged examinations of non-traditional spatial data products and innovative data collection methods for research in a variety of disciplines. User-generated spatial content (UGSC) is increasingly leveraged to help address questions involving human-environment interactions (Sui, Elwood, & Goodchild, 2013). Protected areas (PAs) are an especially relevant context in which to explore the capacity of UGSC given the central role PAs represent in biodiversity conservation and ecosystem service provisioning, including recreation and tourism. To fulfill management objectives designed to minimize use-related impacts to natural resources, while providing opportunities for visitors, managers require timely and accurate data on not only the extent of different resource impacts, but also the precipitating or contributing factors such as visitor use activities, densities, and distribution (Hammit, Cole, & Monz, 2015).

The time needed to collect systematic visitor data in PAs, as well as challenges associated with sampling in large, open systems, can serve as a barrier to obtaining such data. Additionally, staffing or financial constraints may necessitate the need to prioritize other research objectives or concentrate monitoring to select locations of concern. This prioritization is vital in protecting ecological and site integrity and ensuring adequate sample sizes, but may not always capture emerging trends or seasonal variations. Emerging trends may lead to unintended negative impacts as research has shown such impacts can happen quickly and after disproportionately small amounts of use (Hammit et al., 2015). The purpose of this research is to explore one UGSC product, geotagged photographs, as a source of publicly-available spatial data to quantify and model visitor use distributions within PAs as a function of environmental and managerial factors.

Relevant Literature and Methods

Geotagged photos are often created and shared by users not formally part of a research effort. Research applications are relevant to many disciplines, including transportation, urban planning, recreation, and tourism (García-Palomares, Gutiérrez, & Mínguez, 2015; Wood et al., 2013). Many studies have focused on urban or developed area applications (García-Palomares et al., 2015), with emerging research involving more natural locations, like PAs (Wood et al., 2013). Wood and others (2013) used data from Flickr, an online photo sharing website, to estimate visitation rates at 836 natural and cultural recreation sites in 31 countries. They found the number of uploaded photos was positively correlated with empirical visitation counts, con-

tending that geotagged photos can serve as a reliable proxy for PA visitation rates. Geotagged photos have also been used to approximate visitor movements and distributions within a PA. Orsi and Geneletti (2013) employed a gravity model to estimate visitor flows for the Dolomites UNESCO World Heritage Site, Italy, based on popular locations determined through high densities of geotagged photos validated with on-site counts.

As applications of geotagged photos continue to grow in both urban and natural locations, so too is there a need to further investigate the capacity of geotagged photos as a source of visitor use data for integrated human-environment interaction analyses. Maximum entropy (MaxEnt) models have recently been applied to visitor distributions using geotagged photos to identify significant environmental and managerial factors (Westcott & Andrew, 2015). The ranking of factors identifies which variables most greatly influence distributions and how changes may affect subsequent distribution patterns and resource pressures. This study contributes to the understanding of UGSC and MaxEnt modeling for PA management by asking the following research questions:

1. Does the spatial distribution of visitor use within a PA, as estimated using geotagged photos, change significantly at varying temporal scales and;
2. What environmental (e.g., land cover, topography, water bodies) and managerial (e.g., trails, visitor centers, campsites) factors most influence visitor distributions within a PA?

Study sites

Hawaii Volcanoes National Park, USA (HAVO) and Kosciuszko National Park, Australia (KOSC) were selected for inclusion due to their global conservation significance (e.g., designations as UNESCO Man and Biosphere Reserves), unique landscapes protecting endemic and endangered species, and year-round and com-

Geotagged Photo Locations for Hawaii Volcanoes National Park

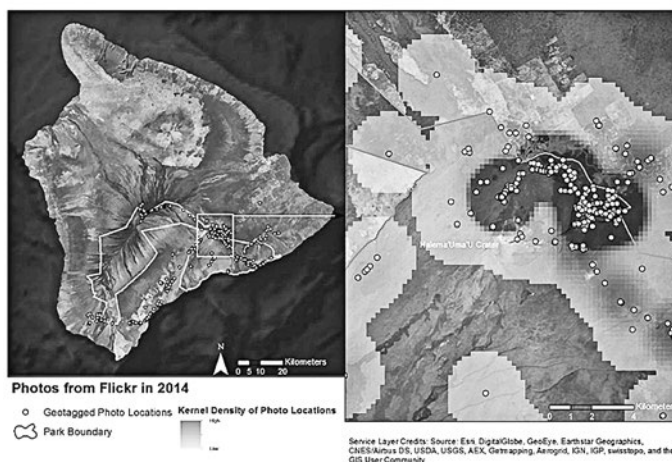


Figure 1. Locations of geotagged photos taken in and around Hawaii Volcanoes National Park in 2014.

plementary recreation and tourism appeal. Using the statistical software program R to query data from the Flickr application programming interface (API), all publicly-available geotagged photographs taken between 2011 and 2015 within a search area containing the park boundaries were selected for inclusion. Key attributes associated with the photos included geographic coordinates, date and time taken, and camera/device type. Figure 1 illustrates the preprocessed data for HAVO from 2014. Additional geospatial data, including locations of visitor infrastructure for distribution modeling and empirical tests of mobile device spatial accuracy, will be collected between July and October, 2016.

Results

Results include visualizations and statistical assessments of visitor clustering and distribution at varying spatial and temporal scales. Preliminary findings from Max-Ent distribution models leveraging publicly-available data will provide a ranking of which environmental and managerial factors contributed significantly to visitor distribution, as well as to inform discussions for additional variables in subsequent model iterations.



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Using trigger trail cameras for visitor monitoring – Applications in Bavaria

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A demand for qualitative data to evaluate visitor management actions

The evaluation of visitor management actions is dependent on profound data about visitor flows and visitor numbers (Clivaz et al. 2013). Stakeholders in the Urban Forest 2050 project were interested in more qualitative data to evaluate their visitor management and offers for specific target groups. Managing authorities were interested to get numbers of joggers, Nordic walkers and dog walkers, as well as prams and wheelchairs. Also user numbers of dog walkers and especially off leash dogs was considered important, since they are a source for potential conflicts with both other user groups and cause interference with wildlife. Finally, also the share of the persons reading information boards had to be assessed. A number of visitor counts and monitoring with camera-based systems have been described (e.g. Janowsky & Becker 2003). Rapid technological development has led to a wide availability of trigger trail cameras for wildlife observation at budget prices, so we opted for these cameras to test options and limitations of such cameras for visitor monitoring. Two urban proximate forests in Freising and the southwestern mountain slope of the Grünten Mountain in the southwest of Bavaria were selected as a study area.

Material and methods

In Germany, strong privacy regulations have to be respected when conducting research with camera-based systems according to § 6b BDSG (Bayerisches Landesamt für Datenschutzaufsicht 2013). To generate camera data according to the privacy regulations, we attached a transparent strip of plastic to the lens. According to privacy regulations and suggestions of Czachs & Brandenburg (2014), cameras were mounted 4 m above ground. The cameras were adjusted so that the trigger range of 20 m covered as much of the trail as possible. To count in well-frequented areas and catch fast moving persons such as bikers, a fast trigger speed and a wide range of the club-shaped zone that activates the camera for taking single pictures is vital to gain good results. We tested three different models, Dörr Snapshot 5.1 with GSM-Mod-

ule, Cuddeback C3 and the Reconyx Hyper Fire. The latter is one of the fastest trigger speed cameras available at the market: We used this camera for monitoring an informal mountain bike trail at the Grünten. Both a simple system evaluating pictures with dual-screen evaluation of pictures and manual counting by listing them into an Exel file and a more elaborated system attributing selected pictures with events fully visible using XnView for later assessment in R statistics was applied.

Results

Compared to other means of visitor counting and monitoring systems such as sensors, although partly blinded, a remarkable depth of information can be achieved with trigger cameras, by the shape of the body, often also gender can be distinguished. In the Grünten study, also the share of mountaineers with inappropriate equipment for rough demanding alpine terrain could be determined.

A model for visitor numbers

Linear relationships between the amount of pictures taken and passing persons could be demonstrated for all cameras based on counts of selected days (see Figure 1). The relationships are different for every site and for each camera model, however. The equations derived from the linear regression models allow to predict visitor numbers from the number of pictures taken. However, on peak days (first sunny weekend in April 2015, warm and sunny holidays in November 2015), the actual number of visitors were underestimated since group sizes tend to be larger on such days. No specific equations could be developed for the different user groups. While

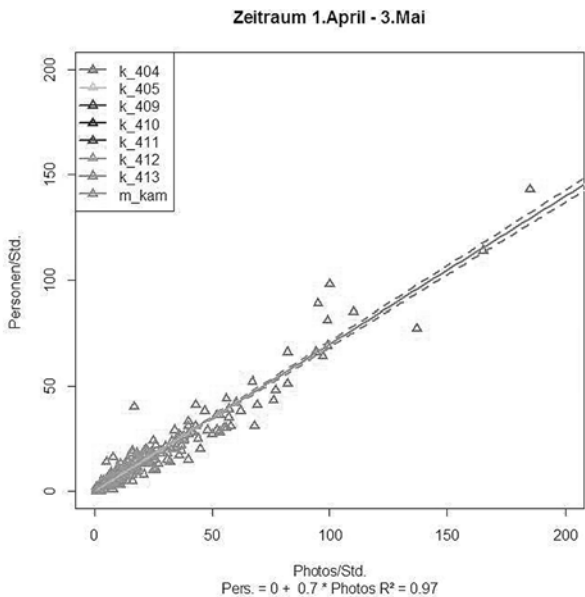


Figure 1. Correlation between passers-by and pictures taken by the trigger camera, Freising

for hikers and strolling persons weaker linear correlations were detected, there is none for groups such as dog walkers or joggers.

Conclusions and implication for practice

Trigger trail cameras provide in depth and very detailed information about outdoor recreation activities and allow assessing various monitoring and evaluation questions. Also ex-post evaluations of data sets are possible. Due to a huge amount of data generated by the cameras, they are best used for short term monitoring questions. Strong correlations can be drawn between pictures taken and passing persons at least in all of our study sites, so numbers of passers-by can be well predicted by looking at the numbers of pictures taken by the camera. To get high accuracy especially for faster moving objects, selected camera should provide very fast trigger speeds and quick recovery. However, privacy regulations have to be respected and the use of cameras is perceived critical at least by the German public. The method therefore has to be well communicated in press and media and needs also strong support by all stakeholders to avoid critical voices from the public.



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Feasibility of using mobile phone GPS for visitor monitoring in a national park: a case study in Oku-Nikko, Japan

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Introduction

Global positioning system (GPS) tracking has become a promising method for visitor monitoring in protected areas around the world. High-resolution data, including not only simple patterns of visitor movement but also walking speed and duration of stops, can be collected by distributing GPS receivers to individual visitors. This method, however, also has disadvantages, such as the high cost of distributing a large number of GPS receivers, risk of loss, and constraints on visitor movement for device distribution and collection.

Our study focused on using the GPS equipped in many mobile phones today as an alternative tool. The use of mobile phone GPS functions could reduce the noted costs, risks, and constraints, because this method would use visitors' own devices. Meijles et al. (2014) mentioned that the use of smartphone GPS functions could improve data acquisition, but to the best of our knowledge, no research has yet been published on the use of GPS in mobile phones and smartphones for visitor monitoring in a protected area. Our objective was therefore to test the feasibility of these uses of the technology.

Methods

Study site

Our study site was in the Oku-Nikko area of Nikko National Park in Japan (36°46'N, 139°26'E). Oku-Nikko is characterized by striking scenery and diversity of plant species, making it a popular area for hikers. Visitors can use a shuttle bus for transfer within the study site, as they are not permitted in with their own vehicles.

Interview survey

To investigate visitor's attributes, in September 2015, we conducted interview surveys near three bus stops that serve as the primary starting points for hikes. Questions covered parameters such as respondents' age, duration of stay, means of transportation, frequency of visit to the area, and frequency of visits to other natural areas. Prior to the questions, we asked respondents if they were willing to allow us to collect GPS data from their mobile phones for the study while in the area. Respondents who answered "no" were asked for their reason(s), and they only participated in the interview survey.

Collection of mobile phone GPS data

In Japan many people use smartphones that operate on a global standard, but an older 3G standard of mobile phones unique to Japan is also still popular here (referred to as “feature phones,” or *gara-kei*). Free applications were readily available for smartphones to record GPS data, so we asked smartphone users to use those existing apps, and then send us the recorded GPS data when they left the area. However, no such apps existed for feature phones, so we developed a special system by which visitors would access our website, and their feature phones would send GPS data automatically to our server as long as access to the website continued. Visitors were able to terminate the access and data transmission at any time.

Data analysis

We scrutinized the validity of the survey in terms of (1) efficiency of data sampling, (2) bias of sampled data, and (3) implementation difficulties. Specifically, we (1) examined the ratio of visitors who did not want to join the survey, their reasons, and the quality of collected GPS data; (2) used generalized linear mixed models, incorporating visitors’ attributes as fixed effects, sampling locations as random effects, and visitor’s inclination to join the survey (yes or no) as the response variable; and (3) summarized the practical challenges we faced when doing the survey.

Results and discussion

Efficiency of data sampling

The ratio of visitors who participated in the GPS survey was 15% (17/115). We actually obtained data from 12 of them, and the percentage of intact GPS data was 58% (7/12). Consequently, the final sampling rate was 6% (7/115). The percentage of intact data was a level comparable to earlier research using GPS receivers, e.g., 38% (Meijles et al. 2014) and 59% (Taczanowska et al. 2008), but our eventual sampling rate was very low due to the small number of participating visitors.

The top reason not to participate was “no time/inconvenient,” which would probably be the most typical response to this type of survey. However, the response rate was over 90% when we conducted a similar interview survey in this area during the same season. The only difference between the two surveys was whether or not GPS information was collected. This implies that the answer “no time/inconvenient” indicates a psychological barrier to participate in a technically unfamiliar survey. Furthermore, privacy concerns appeared explicitly in our survey, unlike previous studies using GPS receivers (Meijles et al. 2014; Taczanowska et al. 2008). Our results demonstrate a challenge specific to the use of GPS in mobile phones for visitor monitoring.

Bias of sampled data

Our statistical analysis showed that the sampled data was biased; for example, younger people, groups (not alone), smartphone users, and first-time visitors to this area tended to be more likely to join the survey. Visitors’ attributes were statistically different between participants and non-participants, indicating that the results of the survey could not represent the whole population.

Implementation difficulties

One of the major practical challenges we faced was functional differences in mobile phones between carriers, models, operating systems, and versions. It was difficult for every investigator to master all the functional differences and be able to respond to technical questions from visitors. This constraint impeded the smooth implementation of the survey.

Conclusion

We concluded that mobile phone GPS functions cannot be used for visitor monitoring in the study area at present because of low sampling efficiency, the bias of sampled data, and the diversity of mobile phones. These challenges appear to be related to people's insufficient familiarity with information technology, which might be generally common in Japan. These factors will not likely change in the near future. The development of GPS logger applications that are much easier to use and compatible with any type of mobile phone could make a difference. Further investigation in other protected areas could also provide new insights.



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Methodological questions raised from visitor monitoring in the Czech Republic

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The Nature Conservation Agency of the Czech Republic (NCA) manages 25 protected landscape areas and the most of national nature reserves and monuments. Visitor monitoring using modern automated counters began in 2009 and has developed so far into a centrally controlled system. In 2016 there are more than 100 permanently monitored profiles. Data and its evaluation is outsourced, two companies have been successful in the contract competition. Basic methodology is given in contracts, but the companies differ from each other in detail. Similar visitor monitoring is realised in four Czech National Parks as well, know-how is shared between NCA and NP authorities. Adjustment of new contracts rises several methodological questions discussed in the contribution. The aim is to share the best practice and notify scientists about questions to be solved by applied research.

Requirements for methods

Methods used for visitor counting (including data collection as well as evaluation) should meet following requirements:

- They should produce the best available quality of the information.
- Their results should be clear to protected areas managers, who have usually only basic knowledge in visitor monitoring methods.
- They must be detailed enough that companies can calculate the closing price of the contract for a competition.
- They must be performable for contractors and not rise the price too high.
- They must be reviseable to easily detect, whether obtained results meet the contract terms and conditions or not.

According to current Czech legislation and NCA lawyers the price is the only evaluation criteria in the contract competition.

Concrete methodological questions

Calibration

Questions and current settings at NCA:

1. How often and in what season the physical calibration should be done? At the beginning of monitoring at a profile and then every 2 years. Always twice: in a high season and in low season, but it seems the mid season would be better instead of the low season because of too low numbers in the low season.
2. How long should be done the physical calibration? Not defined, the contractors perform calibration for 6 hours.

3. What calibration coefficient values range is acceptable? 0.75-1.5; values outside this range should result in profile redesign.

Calculation and application of the calibration coefficient is a subject to a detached contribution (Monteiro & Vitek).

Individual visitors number or passes count?

At a typical profile, number of passes is registered and presented, as there is no way how to detect repeated visitation of the same individual visitor. Such numbers are the only useful e. g. for detection of trampling effect on vegetation. At some special profiles, e. g. at a staircase of a lookout tower, the passes count is divided by two as it is clear, that everyone must go once up and once down. Such recalculation discourages comparison of results from different type profiles and definitely does not provide true number of individual visitors, as the same visitor could come to the place more times in a year. But only such recalculated values can be compared to numbers of sold entrance tickets and similar data.

Estimation of numbers for failure periods

During failure periods a counter gives false data. It could be caused by various reasons. As NCA does not require GSM data transfer due to its financial demands, contractors should check the counter status at least every 2 months. Therefore the failure periods could last up to several weeks. Continuous data series are needed for trends detection and cumulative values comparison (e. g. monthly periodicity), what encourages an estimation of missing data. No methodology for such estimation is set by NCA and sometimes the opinions differ between NCA and a contractor. The missing data are being calculated in correlation with a similar profile using correlation coefficient that reflects the ratio of visitor numbers.

Questions and solution proposed by NCA:

- Which periods should be used for correlation? Two weeks before and two weeks after the failure period should be fine for shorter failure periods, longer time for longer periods.
- Which profile to correlate with? If data from the same period in last year(-s) is available, then a profile with the most similar time behavior during this period should be used. Otherwise a profile with the most similar time behavior during the monitored period should be used. Profiles chosen only by similar visitation rate or the nearest profile may not give appropriate results.

Optimum contract period

From the administrative point of view, the easiest way for NCA is to sign contracts for individual years from January 1st till December 31st. This causes following problems:

- A contractor could change each year at the same profile.
- As downloading data from the counter could be dangerous for the technology or the area when covered by snow or in frosty soil, sometimes the data are available later then after standard three months.

- Most of the data are being downloaded and evaluated in the same period from January till March and submitted to NCA usually on March 31st. This makes the responsible people very busy these times.

Suitable solution would be to sign contracts for approximately three year periods that will end in spring or early summer – diversified according to altitude of the profiles.

Conclusions

The proposed solutions are not stated as the best way. Upon experience from other areas or appropriate applied research they can be set differently. Whatever reactions are welcome.

First Experience with Automated Counting System in the Krkonoše Mts. National Park

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The Krkonoše Mts. (Giant Mts.) are situated on the north border of the Czech Republic. Even the mountains are not too high (the highest top called Sněžka Mt. is only 1603 m a. s. l.) the locality forms a first barrier in the south and east direction from sea for the prevailing winds. The climate there is therefore very oceanic, characterized by humid and foggy weather, rich in precipitations. In the winter the surface of protuberant objects in upper parts is often covered by thick layer of ice because of the humid winds. We have started counting with automated counters at 27 localities since the year 2012. 22 of them has been situated at the entrances of the most protected area of the national park (the first zone), which is predominantly situated in the upper part of mountains, close or above the tree line. The movement of visitors is regulated there because these parts are highly visited. 4 of these counting points have been also combined for counting of cyclists or motor vehicles. Last 4 localities have been placed in less protected parts of the national park – 3 for motor vehicles, and 1 for cyclists. The used technology is the pyro sensors for counting of passing pedestrians, ZELT Greenways for cyclists and Car/Bus MULTI system – all from the Eco-counter company (<http://eco-compteur.com/en/>). Due to local climatic conditions (described above) most of the counters do not work in the winter (from November to May), because they are hidden under the snow layer, or in winters with less snow run just for certain days. For that reason our partner ensuring the technical support (Nadace Partnerství <http://www.nadacepartnerstvi.cz/>), placed telescopic columns on four counting points, because the locality also is highly visited in winter for cross country skiing and ski touring. But those counters are also running occasionally, because of often ice layer growing from humid winds. This ice must be than repeatedly mechanically removed. Other “small” complication comes from the width of local trails which allows two or three people walking besides. We decided not to use counting slabs because we cannot exclude the occasional transit of heavy vehicles – they are used for transport of hurt visitors by mountain rescue service, and some of them are used as the only access for the touristic chalets. Therefore, in our data analysis, we have to count with these limits and imperfections of the system.

The first results show some constant trends: in the part of the year without snow has been the most visited month August, next July; the least visited month November and April. The highest numbers of passing visitors (pedestrian and cyclists) in total were marked on trails to the Sněžka Mt., the spring of river Labe, the Luční bouda Chalet, the Obří důl Valley and the Jelenka Chalet, which are very favorite and tradi-



Figure 1. *The telescopic pedestrian counter, the end of winter*

tional touristic destinations in long view. They are located close to the state border and they are also often visited by Polish tourists (unfortunately we do not have data from Poland). The numbers of transits in favorite places take more than 10 000 per months, in less favorite places from several hundreds to thousands. The most visited days within week are Saturday and Sunday. Tourists are also distributed during the day, the most amount of people is passing counting area from 11 a. m. to 4 p. m. Some of counting points show also certain connections to the schedule of cableways. The monitoring of motor vehicle transit is used as the control against abuse of the allowed entrance. We can say, that traffic in some places is quite high and will require future actions from the Park Administration.

From longer view we can say, that the behavior of tourists has been very stable – on one side is this fact closely connected with the starting points of accommodation and on other side are these destinations so famous and unique that there is no reason for changing preferences in coming days. In this abstract we would also like to point out the technical problems and limits with automated counting for similar area to the Krkonoše Mts.

Visitor monitoring in practices. Few examples from the Tatra National Park (Poland)

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The Tatra National Park (TNP, south Poland) comprises the entire Polish part of the Tatra Mountains (200 km²), the highest and most western part of the Carpathians. In both Polish and national parks, human activities are restricted to especially designated areas, such as hiking and skiing trails or climbing areas. The rest is protected as nature reserves; access to them is allowed only with special permit from the national park administration; however, illegal trespassing is quite common. Particularly in TNP, human influence is really high, with about three million tourists visiting the park every year (data from TNP).

Almost since the beginning of the Tatra National Park, visitor monitoring has been an important issue. Initially, it was mainly based on direct counting and only supplemented with research surveys. Since 1993, most of the information on tourist traffic in the Polish Tatra Mountains comes from the sales statistics of admission tickets to the park and the cable car to Kasprowy Wierch. The first attempt at using state-of-the-art technology for visitor monitoring in the TPN was made in the winter of 2006/2007, when automatic cameras were installed for that purpose. In the summer of 2007, infrared pyroelectric counters were first used to determine tourist traffic on hiking trails.

The accuracy of the pyroelectric sensors was further verified on some of the routes on which the sensors were mounted. The verification was carried out several times by direct observers who assessed the scale and distribution of tourist traffic. Despite the high performance achieved under experimental conditions and guaranteed by sensor manufacturers, there are several limitations in terms of their practical use in the field for visitor monitoring, especially in high mountain environment, above timberline. In the case of visitor monitoring with the use of automatic cameras, more accurate results are obtained if they are programmed to video recording rather than picture taking. However, the inability to register quickly moving people and objects must still be considered.

In 2015, the Tatra National Park used pyroelectric counters to assess the intensity of tourist traffic in two valleys which are visited by huge number of tourists each summer season. In theory, the pyroelectric counters are also capable of counting any quickly moving persons or those who stay close to others. The system was also able to collect data regarding the number of people moving in each direction.

In both valleys, 2 counters were placed close to each other (at about 0.5 m apart) and were set to the “counting crowd” mode. They gathered data (tourist count) for 6 months between 21 April and 18 October 2015. The data collected using pyroelectric counters were compared against the number of tickets sold at the each of the entrances to the valleys.

The applied method was based on the assumption that pyroelectric counters placed at two valleys (Kościeliska and Chochołowska) of similar nature should show similar daily counting lapse. Data from ticket sales reports from the Kościeliska valley were used to calibrate counters placed just over the entrance points and to estimate the lapse (error) for the number of tourist walking on the road in the valley. The same lapse (error) was used to calibrate the counters at the Chochołowska valley. In addition, since ticket sales for the Chochołowska valley are not managed by the Tatra National Park authorities and only monthly ticket sales reports are available, those assumptions were used to estimate the number of tourists entering this valley on daily basis.

In the summer of 2014, GPS Loggers were used within the scope of a supplementary project to a large tourist-related research project during which the area of the Kasprowy Wierch summit was studied. Since Kasprowy Wierch summit may be reached by cable car accessed at Kuźnice, it is an area with high numbers of visitors. The research was to show the distribution of people who use the cable car to reach Kasprowy Wierch and to return to Kuźnice. 100 devices were distributed among the visitors and they were asked to carry them while in the Tatras. The collected data allowed showing patterns of tourist use of the area around the Kasprowy Wierch summit, and it can be used for any future tourist-related research.

Between 2013 and 2015 automatic cameras were used in several locations throughout the Tatra National Park, in the areas closed to tourists. Cameras were placed on forest roads, former walking paths (which are officially closed), paths and places frequented by wild animals. If any carrion was found, cameras were installed in those locations. At first, the principal objective was an attempt at assessing illegal human penetration of any area closed for tourism. However, in the course of collecting movies and photos from the cameras, the project was extended to include wildlife monitoring and specifically the gathering of information about rare animal species such as brown bear, wolf, lynx and wild boar. During the abovementioned period about 5,000 data entries (both movies and photos) were collected, with most of them documenting human presence in the areas closed to tourists (about 3,600). Most of the wildlife entries documented deer, fox, marten and other common species, but there was also some documentation of all the three large predators: brown bear, wolf and lynx living in the Tatra National Park. Naturally, the highest illegal human traffic was documented in the most easily accessible areas such as forest roads and the officially closed walking paths which are still in good condition. Some illegal human activity was also documented in the core zone of the Tatra National Park, which is of crucial importance for wildlife and nature protection. Fototraps can monitor both illegal human traffic (illegal tourism) and wildlife at the same time.

Developing standard procedures for visitor counters calibration in Czech Protected Landscape Areas

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Introduction

Monitoring visitor use is critical to protect the protected area resources for future generations and provide high-quality experiences for visitors (Loomis, 2000; Manning, 2008).

In the Czech Republic, protected landscape areas (PLAs) are one of core components of the conservation strategy and, as such, visitor data are needed to inform and support sustainable management of these areas. With this effect, automated counting devices have been used since 2009 as means for estimating visitor use and today there are more than 100 automated visitor counters located in 17 protected landscape areas (out of 26 PLAs in total) and other protected areas managed by the Nature Conservation Agency of the Czech Republic (NCA).

The fact that visitor estimate is being conducted is very positive but concerns regarding visitor data accuracy have emerged among State Nature Conservancy authorities. This is due to the fact that there's a gap on standard methods to collect and calibrate automated visitor counters as visitor estimation has been performed by two contracted companies. In response to this concern, this paper reports on the preliminary stages of a study that intends to contribute to the standardization of visitor monitoring procedures, regarding collection and related calibration issues, in three Czech PLAs: Blaník, Brdy and Jeseníky.

Materials and Methods

Study sites

Considered PLAs (IUCN category V) are located in the Olomouc and Central Bohemian Region and their selection follow a direct recommendation of the NCA. All sites contain marked trails for pedestrians and cyclists, well-established infrastructure available during summer and winter season, and natural attractiveness, making them increasingly popular tourism destinations within the country.

Visitor numbers for the study sites are monitored since 2009 (Jeseníky), 2014 (Blaník) and 2016 (Brdy), respectively, by two contracted suppliers using different pyroelectric devices (Jeseníky - 12 profiles, Blaník - 2 profiles; Brdy - 14 profiles) and performing distinct calibration procedures to correct direct data from automated visitor counters. As such, the distinctive methodological procedures applied are generating particular calibration coefficients (CC) and producing estimates of the numbers of visits that are difficult to compare on an regular basis among PLAs.

Management and methodological concerns

To develop the main problem and objective of the study, the following methodological questions were considered based on NCA management concerns:

- What range of CC values are acceptable, when the NCA hires third party services?
- What are the factors influencing the CC values (e.g. material; service; managerial; local characteristics, etc.)?
- What is the best way of using the CC when two or more direct observations have been performed and the CC value differs?
- What is the best scheme for calibration measurements?

Thus, the study focuses on calibration procedures rather than theoretical approaches, that will be tested and implemented through the year.

Methodological Approach

In order to achieve the proposed objective of development a standardized visitor monitoring system (collection and calibration survey) that can be implemented as a part of the management routine, the methodological approach is divided in three sub-stages (Figure 1):

- Collection of visitor numbers from automated counters. As devices are owned by two private companies, data from the existing automated visitor monitors will be requested together with assessed CCs for further analysis and comparisons;
- Observation survey of real visitor incidences' at each site, by recording the number of visitors passing through a counter sensor during a 10 hour period and collection of additional variables (e.g. type of use, group size, direction of travel, number of dogs off leash and time of visit). Direct observations will be performed during certain random days (week and weekend) of July and August

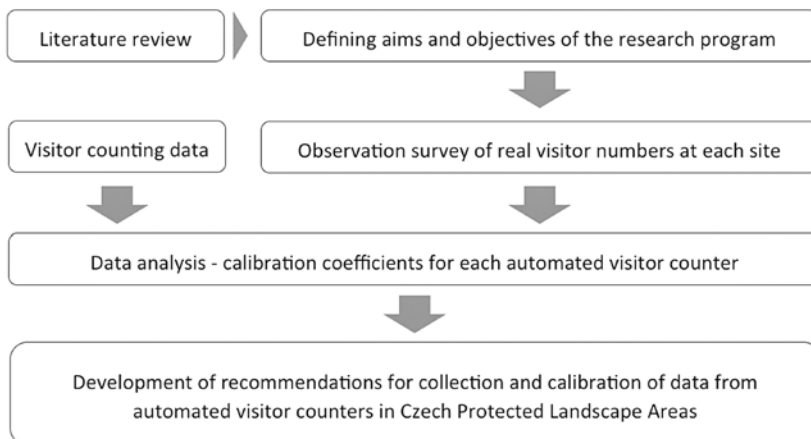


Figure 1. Schematic representation of the methodological stages

- Data analysis to determine CC values for each counter. Results are used to estimate the mean hourly, daily, monthly, and season for each counter with the idea to compare with values assessed by suppliers.

Project expected benefits

Since limited research has been performed lately regarding data collection and accuracy issues on monitoring visitors with automated counters, the proposed project intend to be an important contribution to the current knowledge of trail counter calibration in protected areas.

From the practical point of view, the information produced will be used to establish a standardized methodology to collect and calibrate automated visitor monitors, and thus providing reliable and comparable estimates of visitor use for the management of Czech protected areas in a sustainable manner.

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UNDERSTANDING VISITORS' PREFERENCES AND BEHAVIOUR

Wild thoughts – exploring the meaning(s) of wilderness among Icelandic outdoor recreationists

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Wilderness protection in Iceland dates back to the Nature Conservation Act of 1999 (Jóhannsdóttir, 2016). However, to date no areas in Iceland have been formally protected as wilderness per se, partly because the identification of such areas has so far been very rudimentary. Wilderness areas in Iceland have thus up until now mainly enjoyed protection if present within the boundaries of national parks or other protected areas, in particular within Vatnajökull National Park which covers an area of 13,500 km², mostly in the Central Highland. According to the working criteria adopted by government agencies, the largest potential wilderness areas in Iceland are located in the Central Highland, an uninhabited region in the middle of the island which covers roughly 40,000 km² or 40% of its total land area.

The naturalness dimension of wilderness in Iceland is arguably quite distinct from wilderness as traditionally conceived in a North American or, more recently, European context (Thórhallsdóttir, 2002). The largest difference concerns the almost complete lack of megafauna on the island, where the Arctic Fox is the only indigenous mammal species. The Central Highland is, furthermore, very sparsely vegetated – it is, by and large, a desert. Wilderness protection in the Central Highland can thus, in general, not be based on the presence of wildlife, the preservation of biodiversity or on other ecological considerations. Instead, it is more properly seen as a “perceptual” or “aesthetic” wilderness, whose qualities – as wilderness – are largely derived from diverse and unusual landscapes and abundant geodiversity, coupled with the effects that these have on human beings.

Due to the remoteness and inaccessibility of the Central Highland, it has until recently remained relatively undeveloped. Recent decades, however, have seen increasing pressure from two main sources: hydro- and geothermal power plant development and foreign tourism. Various anthropogenic changes, in particular the proliferation of jeep tracks, can also be linked to the increasing use of the Central Highland by domestic outdoor recreationists, following technology advances both in SUVs and navigation systems (Huijbens and Benediktsson, 2007). Following the establishment of Vatnajökull National Park in 2008, a new and quite heated debate emerged between park managers and environmental conservationists, on the one hand, and a number of outdoor recreationist groups, on the other. This debate centered on the park’s Management Plan where certain restrictions were e.g. placed on motorized travel within the boundaries of the park, restrictions which in turn were primarily based on wilderness considerations.

Research on wilderness as such has so far been very limited in Iceland. Most research projects to date have concerned the attitudes of tourists, mainly of foreign origin (but including some domestic travellers), who have been questioned about certain aspects of their wilderness experiences in Iceland, in particular the effects

of anthropogenic structures and influences (Sæþórsdóttir, Hall and Saarinen, 2011). This paper presents the results of a project directed toward important domestic stakeholder groups who have been effected by recent changes in the legal and managerial dimensions of nature/wilderness conversation in Iceland. It is the first part of a larger project, which will later involve other stakeholder groups as well as the general public, intended to provide more detailed knowledge about the qualities and values at stake in wilderness protection in Iceland, as perceived by the country's inhabitants. Another part of this project involves the development of an improved wilderness map, for planning, conservation and public consultation purposes.

The present study (carried out in the first half of 2016) involved semi-structured interviews taken with members of the four outdoor recreation groups in Iceland who most prone to undertake their activities in the Central Highland; SUV enthusiasts, mountain bikers, long-distance hikers and equestrians. A total of 12 interviews were taken (seven male and five female respondents) with three participants from each group, each interview lasting between 60-90 minutes. The interviews were based on a number of previously defined key topics, such as why participants chose to visit the Central Highland for their recreational activities, what they considered to be the area's defining characteristics and values, and whether they perceived it (or some specific part of it) as a wilderness. Participants were encouraged to add new topics for discussion that they themselves considered relevant either for outdoor recreation, nature conservation or the Central Highland.

The preliminary results of the study indicate a strong consensus amongst participants concerning the value of the Central Highland and the importance of its continued existence as a largely undeveloped area. The values of the Central Highland, of wilderness and of outdoor recreation were found to be highly intertwined and interdependent. Although most participants were knowledgeable about the legal definition of "wilderness" in Iceland, they used this term with a broader meaning, referring to the Central Highland in general and, indeed, to some areas outside the highland boundary. The most important values related to outdoor recreation in the region concerned sociality (travelling with a group of likeminded individuals), psychological rejuvenation, and physical health, the development of skills and prowess, and increased knowledge. The psychological benefits of outdoor recreation in the Central Highland were primarily related to opportunities for solitude and quietness. The most often mentioned characteristics of the Central Highland were natural beauty, landscapes, diversity, openness and pristineness. The value of wilderness in the Central Highland was primarily seen as its uniqueness as being a large, pristine area, its importance as a resource for tourism and its heritage value for the Icelandic people.

The participants had larger differences of opinion concerning the conservation of the values and qualities of the Central Highland. Members of certain groups (SUV drivers and bikers) voiced opposition to the current Management Plan of Vatnajökull National Park and complained about the lack of proper consultation procedures during the development phase of this plan. A core concern here is government-imposed restrictions on "travel freedom", in particular via motorized transport. Most participants were, however, in favour of establishing clearer guidelines for tourism

and outdoor recreation in the Central Highland. These guidelines should then be developed through an open and democratic consultation process.



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Skiing unlimited? Acceptance of resort extension by skiers in Tyrol/Austria

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Introduction

Many ski-resorts in the European Alps hope to increase their visibility and attractiveness when expanding their respective resorts by developing new slopes and/or by merging with others. Examples like the Zermatt-Matterhorn-Ski-Paradise in Switzerland, the “Helm-Rotwand” in Sexten Italy, or the Ski-world “Wilder Kaiser” and the “Skicircus Saalbach -Hinterglemm - Leogang - Fieberbrunn” in Austria illustrate this trend. The main motives for the expansion and cooperation are expected marketing opportunities, synergetic management, and a higher overall financial stability (Zegg 2015). Also, climate change adaptation seems to be an argument in favor of increasing resort sizes (Steiger and Abegg 2013). The expansion or merging of ski resorts leads to impacts into the sensitive alpine environment and a permanent disturbance by the new infrastructure. The presented study aims to analyze the perception of the winter tourists and daily skiers concerning these changes and discusses recommendations for future resort development.

Methodology

Against this background we asked a representative sample of German and Austrian winter tourists, as well as daily visitors about the perception and acceptance of this development. Since this issue is of high relevance in Tyrolean ski resorts we have chosen this area for our research. The respondents were recruited from representative panels in Germany and Austria. Overall the survey consists of 2161 respondents (1186 respondents from Germany and 975 from Austria, (60,1% tourists, 28,3 daily visitors, 11,6% skiers with a seasonal ticket). The respondents were to rate their motivation for winter sport activities and past sportive behavior and state their perception of climate change and answer demographic questions.

Results

For all respondents nature experience and health improvement are the main motives for skiing in the Alps. Daily visitors are more focused on the activity itself than the tourist who is also interested in the region and the experience to be in the mountains.

We asked the respondents whether they would accept a reduction of a protected area in order to expand the ski resort and to stabilize its competitiveness and economic stability. One third of all respondents (37,5%) are against any development. Most of the respondents however support the idea that the impact should be possible if it would be compensated by an increase of the protected area somewhere else

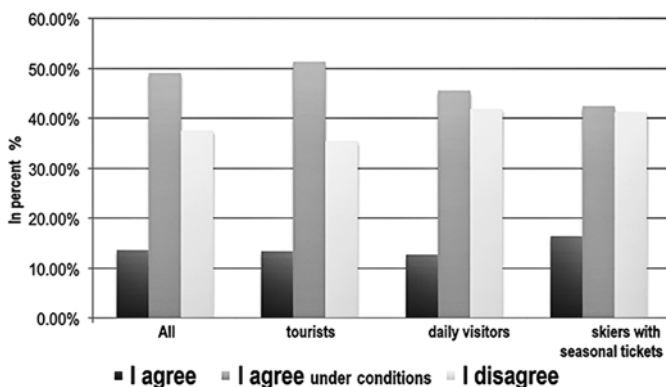


Figure 1. Expansion of a ski resort into a protected area

(49,0%). Those respondents who live far from Tyrol argue more in favor of the development than those from Austria.

Indebt analyses revealed significant differences between various segments. Looking at the group of daily visitors (including skiers with a seasonal ticket) we found the following segments:

The *beginners* (27,7%) are interested in many different winter sport activities. They are also interested in cross country-skiing or snow-shoeing. They have overall little time for winter sport activities. Selecting a ski resort they focus on the price level, nature and the accessibility. About 38% are completely against an expansion of a ski-resort into a protected area.

The *savory skiers* (36,8%) are very much committed to their sport. They love to combine the nature experience with spending time with family and friends. They look for perfect conditions on the slopes. They argue in favor of a compromise and believe that the expansion of the ski resort can easily be compensated (53%).

The *skilled skiers* love their sport and perform it as often as possible. Nature experience and social motives are of little relevance. They also argue in favor of an expansion of the ski resort but ask for an adequate compensation (53%).

The *young and wild skiers* (22,7%) are also a segment which is very committed to their favorite sport. They combine social motives, the improvement of their driving skills and action when skiing. The interest in nature and landscape is rather low. Therefore 26% would allow the expansion of the ski resort into the protected areas without any compensation measures.

Within the group of tourists we found five different segments:

The *average sport tourist* (29,7%) is very committed to its sport and attracted by additional infrastructure such as a halfpipe, a fun park or free-riding opportunities. Infrastructure for ski resorts is important and therefore the acceptance for an extension is rather high.

The *nature oriented winter tourist* (21,7%) is mainly attracted by the landscape and the winter experience. They are not interested in winter sport activity only, but also in others such as cross country, snow shoeing and ski touring. This segment votes strongly against any further expansion of ski resorts.

The *demanding family* (19,2%) is interested in resorts which are characterized by an attractive offer for family and kids. They also prefer an attractive landscape and nature experience. This group travels with children older than 6 years and belongs to a higher income class. They are sensitive towards further impacts and the expansion of a ski resort.

The *price-sensitive sport tourist* (19,2%) focuses on downhill skiing and snowboarding only and is characterized by excellent skills. Nature experience is less relevant. This segment seeks for a high diversity of ski slopes, an attractive mix of difficulties and good snow conditions. If an expansion of a ski resort is compensated, it is acceptable for most of them.

The *price-sensitive family* (9,2%) is characterized by a high amount of beginners. This segment focuses on learning the desired activities (downhill skiing and snowboarding), suitable slopes and less on landscape and nature. This is also reflected in their evaluation of an expansion. They tend to agree to any new development (37% in favor of development).

Conclusions

Overall the skier are sensitive towards the additional consumption of landscape for the development of new slopes or connections to other resorts. The majority would support a solution where the impact is properly compensated e.g. by an enlargement of the affected protected area.

However the preference and acceptance of an expansion of a ski resorts are influenced by different factors such as distance to the tourism destination, commitment to the sport and the desired experience.



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Perceptions and behavior of winter sports participants in Regional Natural Park of Bauges

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The development of ski touring and snow shoeing has led to an increasing human presence in mountains in wintertime. Wintertime is a difficult time for wildlife, due to rough weather conditions that cause animals difficulty to move and higher energy expenditure at a time where food is scarce. Yet, territory managers have very few data concerning the perception of wildlife by visitors. In addition, their impact (extensive travelling, displacement of feeding and resting areas) on wildlife is difficult to quantify. A research program has been led on the Bauges mountain range in order to deal with these issues. As local managers became interested in the impact of winter recreational activities, the Regional Natural Park got involved in the campaign « Respect to Protect » to promote a more respectful visitor behaviour. Thus, a partnership was set up with EDYTEM lab in order to get a better understanding about these visitors, their types of practice and their perceptions. .

A growing trend: the increase of outdoor sports with potential impacts on ecosystems

In the field of sport sociology, studies show that sport continues to increase significantly all over the world, with diverse forms of practices (Borgers & al., 2015). Studies highlight various forms of practice within the same sport. In the field of outdoor sports, studies have focused on free flight, an activity practiced during the summer, in low (Corneloup, 2003) and high mountains (Lefèvre, 2004). However, no study specifically addresses the diversity of practice within participants of winter sports (skiing and snowshoeing). In addition, while wildlife representation by humans has been studied in the realm of geography (Boussin, 2008), few studies focused on the relationships of outdoor participants with wildlife and on whether the presence of wildlife influences (or not) the way they practice their activity.

In some areas, awareness campaigns towards nature-based recreationists are set up. This is the case of the Swiss campaign “Respect and Protect”. However, these conservation measures are not always successful. Recreationists often perceive these measures as an imposition; just restrict their freedom. This apprehension of conservation measures is also different, depending on the practice motivation of users (Immoos and Hunziker, 2015). Thus it appears that recreationists who practice with a performance objective are less interested in the natural environment (Steel & al., 2010). Therefore the protected areas managers need to know the profiles of sport participants to better target communication actions and awareness raising campaigns of users.

The objectives of the study are to:

1. Examine the relation between winter visitors and wildlife.
2. Evaluate if their type of practice is influenced by the perception they could have of wildlife disturbance, and how it could influenced their own behavior.

The study relies on a questionnaire survey and on semi-structured interviews, both led in winters 2014 and 2015

Visitor's profiles

Results show that visitors are mostly men, over 31 years old, with a bachelor degree or higher. The main activity is ski touring, 75% of the people practice the activity more than once a week and 85% of them evaluate their level as "experienced" or "expert". The main reason for practicing the activity is the contact with nature. A correspondence analysis enabled us to identify 4 users' profiles: the stroller, the adventurer, the hedonist and the beginner.

We combined some variables to distinguish two groups within the panel: Visitors who are familiar with the territory and Visitors who are not familiar. Those who are familiar with the territory have been practicing for longer, include more experts, practice more often and practice usually in the Bauges.

Perception of wildlife and disturbance

Two third of visitors have been able to watch wildlife in the Bauges mountain range. Most of them are pleased or even amazed to be able to see animals. About two third of them think they are occasionally a source of disturbance for wildlife. Recreationists associate sudden flight with disturbance. When the animal doesn't show an obvious reaction: if it only slightly moved or changed its behaviour, it is regarded as only a little bit disturbed. If the animal didn't react to the visitor's presence, the visitor usually think they didn't disturb it.

The *Game Bauges reserve* (a protected area situated in the Regional Natural Park) includes *wildlife refuge zones* that are zones where access is strictly forbidden in winter. The study shows that generally visitors don't know about these zones and their location. However, visitors who do know them, tend to respect it.

Finally, this study highlights issues related to the information and awareness campaign for visitors. Some signs are set on site but most people don't see them or don't pay attention to them. Only 15% of the panel knows about the campaign « Respect and protect ». And among those who know it, 48% already paid attention to the issue of disturbance *before* hearing about this awareness campaign.

In conclusion, better understanding of recreationists' motivations, and how they move in space can help to improve communication between managers of protected areas and outdoor sports participants.



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Analyses of overseas tourists in Vatnajökull National Park, Iceland 2010-2015

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The number of overseas tourists visiting Iceland has grown from 500.000 in the year 2010 to nearly 1.300.000 in the year 2015, which means a 160% growth in five years. In 2010 52% of the tourists came to Iceland in the three summer months (June, July, August) but 48% the other nine months of the year (off season). In 2015 only 41% came in the summer months but 59% outside the summer season.

Vatnajökull National Park – VNP was formally established in June 2008 and covered an area of 12.000 km². With recent additions it now covers 13.920 km² or approximately 13,5% of Iceland, making it Europe's second largest national park in terms of area after *Yugyd Va* in Russia. The most visited site within the park is Skaftafell in the south with Dettifoss waterfall in the north coming in second. Website: www.vatnajokulsthjodgardur.is/english

Icelandic Tourism Research & Consulting – ITRC (Icelandic name: Rannsóknir og ráðgjöf ferðaþjónustunnar) have implemented the *Dear Visitors* survey among departing overseas visitors at Leifur Eiriksson International airport since 1996, and constantly the whole year round since 2004 and up to the present (2016). In average 3.000-4.000 answers pr year. 97% of all tourists to Iceland come through that airport.

ITRC have been working for the *Vatnajökull National Park* since 2009, totally seven reports (one pr year), the last one covering the year 2015. The results have shown a rapid growth of overseas tourists to the park, especially after 2011, and an extraordinary growth in the south part of the park (Skaftafell and surroundings) in the darkest winter months (January, February, November, December). The results also show that the character of visitors to the park are significantly different from the visitors to Iceland, especially in the northern part of the park.

In the lecture the overseas tourist to Vatnajökull National Park and to the two most visited sites within the park (Skaftafell and Dettifoss waterfall) will be compared to all visitors to Iceland. The analyses will mainly focus on the following:

- age groups
- reasons for visiting Iceland
- first time in Iceland or repeated visit
- length of stay in Iceland
- mode of transportation (rental car, own car, tour bus, scheduled bus...)
- travelling arrangements (private travel, self-drive tour, group tour)
- travelling with (alone, spouse/partner, friends, children, colleagues)

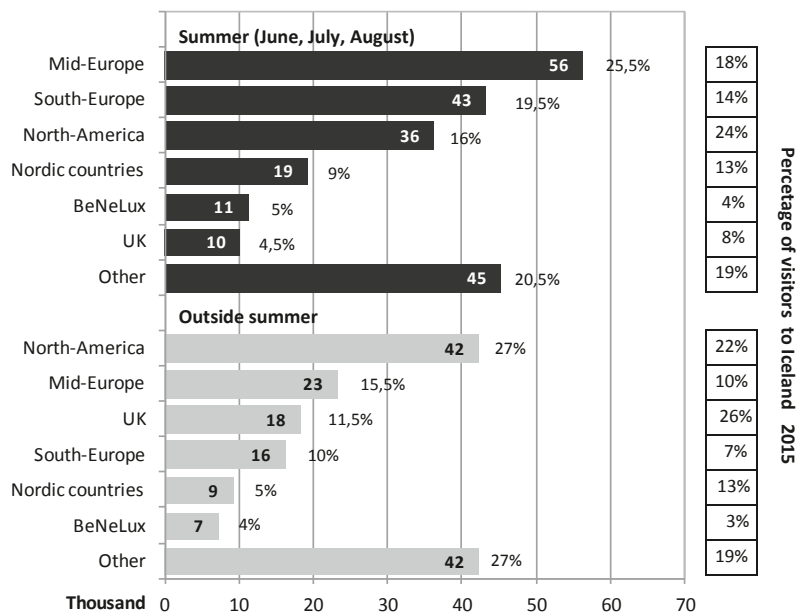


Figure 1. Estimated number and percentage of overseas visitors by market areas to Skaftafell in Vatnajökull National Park in 2015; in summer and outside of summer. Compared to the percentage of all visitors to Iceland by market areas. ¹

The lecture will try to answer the questions. What can explain this rapid growth of foreign visitors to Vatnajökull National Park in the last few years? Why has the growth been more extreme outside the summer season?

The importance of Vatnajökull National Park as the biggest protected area in Iceland will also be discussed and how the database/knowledge on overseas tourists in the park can be transferred to protected areas in other countries.

¹ Source: The Dear Visitors survey 2015. Icelandic Tourism Research and Consulting.

Relating daily change of visitor number to crowding perception and overall satisfaction in Nature Park Telašćica, Croatia

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Nature Park Telašćica is a protected area situated in the southeastern part of the island of Dugi Otok. It has been protected since 1980 due to valuable plant and animal life, geological and geomorphologic phenomena, and valuable archaeological heritage. There are strong daily and seasonal oscillations in visitor numbers. Seasonally, visitor numbers peak from mid-July to mid-August. During that period, visitor numbers peak daily between 11:00 h and 15:00 h because numerous excursion ships bring large numbers of visitors into the Park during that time.

Large number of visitors at a same time, often resulting in crowding, has been hypothesized to be detrimental to visitor experience. The perception of crowding, however, does not correlate linearly with the actual number of people, but highly depends on the context of the experience. While in concert halls only extremely high densities reduce experience (and some crowding may be essential to a positive experience), even small crowds can be detrimental to an experience in nature, where solitude is sought for. Salt lake Jezero Mir locality of the Park has been suggested to be susceptible to such detrimental effects of crowding because it is a relatively small area frequented by 82% of the Park's visitors.

To test how oscillations in visitor numbers influence visitors' perception of crowding and their overall satisfaction, we continuously monitored visitor movement to and from the Jezero Mir as a part of HRZZ project ACCTA. Visitor movement was then correlated to the results of short, time-stamped exit questionnaires. The continuous monitoring of visitor movement was performed using an Android application developed for this particular purpose. Each passing of a visitor was recorded by logging the time and direction of the movement in the app, and was done simultaneously on three locations surrounding the lake: the entrance to the beach, and two exits/entrances from/to the footpath. From these data, the visitor number at the locality was calculated. To facilitate the survey, the exit questionnaires contained only three questions, translated to eleven languages. The visitors were asked to grade on a nine-point Likert scale their (i) perception of crowding, (ii) how disturbing the crowding was to them, and (iii) overall satisfaction. After grading, every survey was time-stamped by the surveyor.

The monitoring was conducted on two full days, 31.07. and 13.08.2015. In total, 362 questionnaires were collected, of which 356 were complete and included in the analysis. On the first day 84 questionnaires were collected from visitors exiting the

beach, and 44 from visitors exiting the footpath around lake, making the total of 128. During the second day, in total 228 questionnaires were collected (171 beach exit, 57 footpath exit). Each day at least 10% of the visitors exiting the lake area were surveyed.

The analysis of the movement data showed high flow rates of the visitors, both in and out of the locality. Fewer visitors were recorded during the first day compared to the second one. Around 8% of the people reached the lake through alternative routes. The instantaneous number of visitors on the locality varied up to 672 during the first day, and 1041 during the second day. The maximum number of visitors on the locality was recorded around 13:00 on both days.

Preliminary statistical analysis of the questionnaires data was performed. The Pearson's correlation test showed significant ($p < 0.01$) but small negative correlation between the visitors' evaluation of disturbance and overall satisfaction. Also significant ($p < 0.01$) but small positive correlation was found between visitors' perception of crowding and level of disturbance by the perceived crowding.

To investigate the influence of visitor number oscillations, the data was grouped in hourly time-slots and tested with ANOVA. The visitors' perception of crowding differs significantly between time-slotted groups. For the day in which the larger number of visitors had been recorded, significant difference between time-slotted groups was found for the disturbance by crowding. Nevertheless, none of the groups showed significant decrease in visitor satisfaction, suggesting that – despite relatively large crowding – visitors' positive experience was not reduced.

The two groups of visitors, those arriving by excursion ships (excursionists) and by other means (non-excursionists), might have different expectations and therefore different reactions to crowding. The method used in the study was, however, not sensitive enough to detect the differences in satisfaction levels between the two groups during the peak hours.

During the peak (because of the ratio of excursionists and other visitors) almost the whole sample consisted of guests from excursion ships. While non-excursionists might have been bothered by crowding, the excursionists might have retained satisfaction despite large crowding. Since the excursionists came from an even more crowded ship, what might have seemed as a crowded beach to non-excursionists, might have been a welcome change for the better to the excursionists. This decrease in satisfaction of non-excursionists could not have been detected during large crowds because they constituted only a small fraction of the sample at that time. Non-excursionists constituted the whole sample during times when excursion ships were *not* present. Then, however, there was also no crowding, hence no decrease in satisfaction due to crowding could have been reported.

While the average satisfaction level is always good, anecdotal evidence suggests that non-excursionists were negatively impacted by crowding. While excursionists bring significant earnings to the PA, non-excursionists are more important to the local economy (lodging, restaurants, etc) and their happiness may be a priority. Hence, if non-excursionists are impacted by excursionists, the management should consider crowd control by either reducing the number of excursionists, or educating the non-excursionists on when to expect crowding and suggesting visitation during

off-peak hours. The latter alternative is clearly much more economically rewarding, and provides enjoyment to a greater number of visitors.

Acknowledgements

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Exploring environment-experience relations in Oulanka National Park using participatory mapping

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Managing recreational use in conservation areas targets the outcomes of outdoor recreation. A worldwide aim of conservation area managers is to enhance the benefits of outdoor recreation while preventing or mitigating its negative impacts (Driver, 2008). Managers are, however, not able to create these outcomes on behalf of visitors. They can only provide opportunities – environments and activities – that will encourage desired outcomes and improve visitors' experiences. Therefore, we need to understand how conservation area visitors perceive and interact with the settings they encounter. Geographically accurate information on recreational outcomes aids this understanding and helps managers focus on specific areas of concern.

This study uses novel spatial techniques to more accurately measure and analyze visitor experiences. Field research was conducted in Oulanka National Park (NP) and its surrounding areas. Oulanka NP is located in northeastern Finland near the Russian border and the Arctic Circle. It is the fourth most visited national park in Finland with approximately 200,000 annual visits. The park allows numerous outdoor activities, including: hiking, canoeing, skiing, fishing and wildlife viewing. Despite the park's pristine landscape, recreation infrastructure in Oulanka NP is well developed.

The connections between environment and recreational outcomes are examined based on the geographic locations of different types of beneficial experiences and visitors' place-based evaluations of the impacts of recreation. The first stage of the study analyzes the extent to which different types of recreation settings facilitate different kinds of positive experiences, because for example, settings that are categorized as remote are traditionally hypothesized to support visitors' feeling of independence (Clark & Stankey, 1979). The second stage of the study maps locations where visitors find the impacts of recreation to be unacceptable in terms of the quality of their experiences. This is surveyed because visitors' tolerance of tourism impacts are considered to be dependent on where the negative impacts are perceived (Hammitt & Cole, 1998; Vaske, Donnelly & Lehto, 2002).

Method of mapping visitor experiences

Two types of surveys were used to collect data on visitors' experiences. A self-administrated on-site visitor survey was conducted according to Parks & Wildlife Finland's standardized visitor survey methodology from February to October 2014. In addition, visitor survey participants who volunteered their email address participated in a web-based Public Participation Geographic Information Systems (PPGIS) survey. 170 of the 257 volunteers completed the PPGIS survey.

Respondents to the PPGIS survey were asked to drag and drop predefined point- or line-shaped spatial markers on a map of the study area. To measure beneficial experiences, visitors were asked to drop a point marker labelled 'I visited this place' on the map. After dropping the marker, a pop-up window asked them to identify one or

more experiences they encountered in that particular location from a predefined list. Options included *physical wellbeing*, *relaxation*, *learning about nature*, *nostalgia*, *excitement*, *social bonding*, *independence*, *escaping daily routine*, and *other*. To map visitors' perceptions of recreational impacts, participants were asked to place a predefined marker on the map at the specific location where they encountered an impact (*erosion*, *littering*, *treatment of the natural environment*, *too many visitors*, *behavior of other visitors* or *other*) that disturbed their visit. The mapped information was then analyzed using spatial statistics.

Beneficial experiences

To compare the mapped experiences against the setting type in which the experience took place, the study area was classified into different setting types based on their level of development and remoteness. Chi-square statistics were used to determine if any of the mapped experience types were disproportionately represented in a given setting type. As Figure 1 shows, visitors most commonly experienced relaxation, physical wellbeing and social bonding during their visit to Oulanka NP. As expected, beneficial experiences were concentrated around the most visited places along the park's designated trails. However, visitors' experiential outcomes did not differ based on the type of setting in which they occurred.

Perceived negative impacts

The composition and configuration of the perceived negative impacts of recreation were analyzed using social landscape metrics (see Brown & Reed, 2012). The impacts of recreation were particularly visible around Juuma, but the number of negatively evaluated impacts was notably smaller in the other frequently visited areas of the

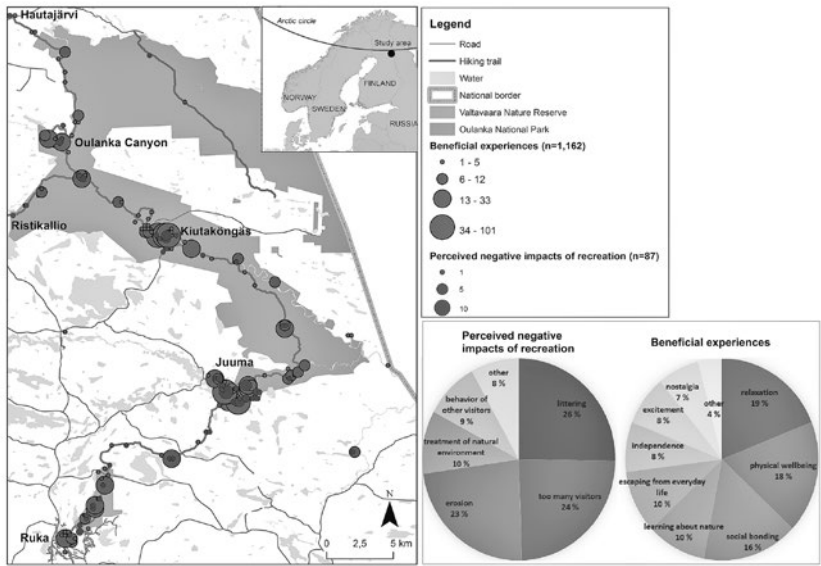


Figure 1. Number of mapped visitor experiences (per 250*250 grid cells) in Oulanka NP

park (Figure 1). In general, visitors identified littering, too many visitors and erosion as the main issues disturbing their visit to Oulanka NP. The impact most often assessed as unacceptable varied across the study area.

Conclusion

The study shows that the level of development and the remoteness of the recreation setting does not clearly distinguish visitors' beneficial experiences of the place. As the experience can be similar regardless of the setting type, facilitating particular types of experiences is complicated. Opposite to beneficial experiences, negative impacts of recreation varied across the study area, emphasizing the importance of place-based monitoring of these kinds of outcomes. For managers, the utilized PP-GIS methods provide a spatially explicit way to ascertain where management practices should be implemented to best prevent negative perceptions of the effects of recreation.



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Perceptions of individuals and organized stakeholders on immigrants' barriers to nature-based recreation

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Nature-based recreational areas provide important functions for today's society. In particular, for people living in dense urban areas, outdoor nature-based areas offer opportunities for recreation and relaxation and therefore support healthy lifestyles, thus contributing to the physical and mental wellbeing of their users. Such spaces are usually open for the general public, though several access barriers have been identified for different user groups. Immigrants from non-western countries are recognized to be underrepresented in larger recreational areas, though often these people are very visible in public parks in cities. This underrepresentation has been recognized by recent scholars (Jay et al., 2012; Kloek, Buijs, Boersema, & Schouten, 2013). **Forest Policy and Economics**, page: 4-11, volume: 19, source: Scopus, abstract: Migration and growing ethnic diversity pose new questions for forest and nature policy and research, especially on the equality of access to natural areas. This paper compares national approaches in policy and research on ethnic minority groups' access to natural areas in four Western-European countries: the United Kingdom (UK), and several socio-economic, socio-spatial and ethnic cultural factors have been identified as determinants. As nature based recreation areas are often financed from public funds, decreasing such access barriers is a matter of social justice.

Project context

The Wienerwald Biosphere Park is located in the Austrian federal provinces of Vienna and Lower Austria. Its catchment area includes districts where local communities are characterized by a high number of people with migration background. Several ethnic communities are recognized to be underrepresented as user groups of the park. In Austria, as yet little research exists on barriers for immigrants from non-western countries in access to recreational areas and outdoor recreation. Therefore, a research project was initiated to investigate barriers in access to the Wienerwald Biosphere Park for people from the Turkish and the Chinese community in Vienna and Lower Austria (Höglhammer, Muhar, & Schauppenlehner, 2015). While socio-spatial barriers can be reduced by planners and the park management, socio-economic and ethnic-cultural influences are often addressed on an institutional level.

Thus, within the research project, interviews were conducted with both individuals from the Turkish and the Chinese community and representatives from institutions in the field of: (1) integration, (2) the park management and forestry sector, (3) cultural organizations of the two communities, and (4) health and sports associations. In total, 19 organized stakeholders and 80 individuals (40 from each ethnic community) participated in qualitative interviews.

Results

When comparing interviews with individuals and organized stakeholders, it becomes clear that different statements and perceptions about access barriers are offered by persons holding different roles with organizations. Our results show that on the level of organized stakeholders and park management, little knowledge exists about the actual needs or expectations of the communities concerning leisure and recreation. In contrast to this, interviews with individuals showed a strong appreciation of nature and of spending time in natural areas by people from both the Turkish and Chinese communities. The Wienerwald Biosphere Park is considered to be a suitable place for preferred activities, though it is often not considered due to its reputation communicated by park authorities.

Furthermore, the migration process itself was identified as having a considerable impact on leisure and outdoor recreation participation. Several barriers, such as personal stress and insecurities about the future, were identified in interviews with individuals. These barriers were also identified by most of the stakeholders as hindering outdoor recreation participation, though these were not connected to measures on an organizational or planning level. Within organizations working in the field of integration, a strong focus on language and labor could be recognized, though leisure is not an integral part of current integration policies. Simultaneously, if people's motivation for migration is labor, a strong focus on work often hinders people from thinking about leisure possibilities in the new country (Höglhammer et al., 2015). Leisure research itself has been predominantly Western centric. This paper considers leisure within two ethnic communities (Turkish and Chinese).

Discussion

Our research project showed that for people with a migration background very specific socio-economic barriers exist, many influenced by the migration process itself. Specific preferences for leisure activities could not be traced back to ethnic backgrounds – though ethnicity has a strong influence on one's access to public land. As such, we conclude that different perceptions about leisure preferences due to one's ethnic background create stronger socio-economic and ethnic-cultural barriers on an organizational level than on an individual level. Involving communities in planning processes is seen as essential to break down barriers for these user groups, notably because this would also provide information about needs and preferences on a planning level. Furthermore, the cooperation between institutions representing different fields, especially including cultural associations from different communities, is necessary to increase access to outdoor recreation and thus to support healthy lifestyles. Furthermore, integration policy in today's increasing diverse

society should incorporate leisure as an important parameter and acknowledge the potential of areas such as the Wienerwald Biosphere Park for supporting identificational integration.



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Comparison of local and foreign visitor's choices in two national parks in Latvia

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Introduction

The park managers should be aware of the needs of their visitors so that they are satisfied with their experience during the visit. The park managers should balance the needs of nature preservation and interests of visitors in order to ensure preservation of nature values for the next generations because every visit leaves some kind of impact on the visited territory (Eagles 2009, Beardmore 2015). The European Charter for Sustainable Tourism in Protected Areas (ECSTPA) is of good assistance in retaining this concept in practical management.

The goal of the present article is to show needs of local and foreign visitors and assessment of their visits in two national parks (NP) in Latvia. One of them, the Kemerī National Park (KNP), has earned (2012) the certificate of ECSTPA (Livina&Atstaja, 2015).

Study areas and methods

Latvia has four NP, of which the KNP and the Gauja National Park (GNP) are close to the Latvian capital, their entrance gates are up to 50 km from Riga.

The GNP is Latvia's oldest national park (1973) and has ambitious goals to become the most visited destination outside Riga in 2018. The territory of the GNP is inhabited and, including its entrance gates (Sigulda, Cesis, Līgatne, Valmiera), had a total of 110,000 residents in 2015.

The KNP was established in 1997 and its main value is bogs and wetlands. The previous visitors' survey was conducted in 2012 as a part of preparation task for the ECSTPA.

Visitors' survey in the KNP was conducted between July and November 2015 in the Latvian, English and Russian language and in the GNP between June and October 2015 in Latvian and English. The basic method of the research was survey, but because of the large number of questions it could be interpreted as a structured interview – a qualitative method. Respondents were surveyed in different locations of the KNP, GNP objects, transport hubs, choosing different days of the week, weather conditions, times of the day and special public events. For the GNP the main locations of the survey were Sigulda, Līgatne, Valmiera, however, survey of visitors in remote objects of the park are lacking to ensure good coverage.

Results

The comparative results of study are in table 1. Visitors highly appreciated the educational and infrastructure work invested in the KNP, which can be seen in the visitors' wish to recommend the park to others. There was a large number of visitors who had not visited

the KNP before (41% of local residents were for the first time in the KNP, and 9.5 percent of visitors to the GNP were first-time visitors in the group of local residents).

58.5% of the KNP visitors had a repeated visit and 41.4 percent of them said that the waste management and cleanliness in the park has improved, 42.9 percent said that it has remained at the same level as earlier, 4.5 percent said that the situation has deteriorated, and 11.6 percent said that they could not tell the difference.

Commenting on their assessment, foreign visitors to the KNP most often praised the intact, beautiful nature, the unique landscape (sightseeing towers). The respondents named serenity, tranquillity of the location, the fact that there are not many other tourists. They also praised infrastructure, maintenance and safety of infrastructure, friendly people. In their criticism, several foreign tourists underscored that there has been no bike rent, and there was poor accessibility with wheelchairs. Several foreigners underscored that it would be important to translate the basic information on stands also in Russian (at least contact information, emergency services).

Many visitors of KNP pointed at the necessity of toilets, waste bins, catering services. The questionnaire for the local visitors of the KNP included a question about the waste management principle they would support. Unfortunately, just 22.9% of respondents supported a principle that visitors bring away their own waste, and 77.1% supported a principle that there is a waste bin at the beginning/end of the nature trail or entrance/exit of the object. It means that much work should be devoted to environment education of the visitors.

For the interest of the administration of the GNP, the Latvian respondents also had to answer a question about their support for sports events in the territory of the GNP. 82.8% of all respondents supported the idea and 9.2% did not support it. Meanwhile, 8% of the polled people did not have an answer to this question.

More than half of respondents were positively surprised and satisfied with their experience in KNP. In evaluation the average mark from Latvian visitors for a trip to the GNP was 8.27 in a scale of 10, KNP was 8.43. Foreign visitors had a positive confirmation on their expectations when visiting the nature park. None of them had a negative confirmation on their expectations. 35.7 % even believed it exceeded their expectations in GNP.

Table 1. Comparative review of study results.

| Indicators | Foreign visitors in KNP | Local visitors in KNP | Foreign visitors in GNP | Local visitors in GNP |
|---------------------------------------|-------------------------|------------------------|-------------------------|------------------------|
| Number of respondents | 32 | 194 | 42 | 105 |
| Net Promoter Score | 10 (moda) 8 (median) | 8 (moda) 9 (median) | 8 (moda) 8 (median) | 8 (moda) 8 (median) |
| The length of visiting park (%) | | | | |
| Up to 1 hour | 6.3 | 6.0 | 2.4 | 2.9 |
| 2-4 hours | 56.3 | 70.0 | 50.0 | 41.0 |
| Full day | 28.1 | 16.0 | 33.4 | 45.7 |
| 2 or more days | 9.3 | 8.0 | 14.2 | 10.4 |
| Significance of ECSTPA certificate, % | 18.8 | 22.6 | n/a | n/a |

| Indicators | Foreign visitors in KNP | Local visitors in KNP | Foreign visitors in GNP | Local visitors in GNP |
|---|-------------------------|-----------------------|-------------------------|-----------------------|
| Significance of the Natura 2000 label, protected area | 28.1 | 21.6 | 64.3 | n/a |
| Mode of transport (%) | | | | |
| Car | | 79 | | 68.6 |
| Train | | 7 | | 3.8 |
| Public bus | | 2 | | 8.6 |
| Tourism company coach, rented bus | | 9 | | 11.4 |
| Bicycle | | 2 | | 3.8 |
| On foot | | 1 | | 4 |

Conclusions

The visitors' survey shows that determined activities of the NP have brought results because many residents chose to visit NP, and the repeated visitors mostly said that cleanliness and infrastructure in the KNP has improved.

It is important for visitors that their basic needs for food and toilets are met, and work should be continued to improve these aspects. At the same time, the infrastructure development density and increase of the number of visitors to the already crowded objects should be revised, creating ways to divert visitors to less popular objects. One of the unresolved problems is accessibility of territory of both NP and links between objects by public transport.

Visitors' largest expenses include travel expenses, catering and entrance fees. As the GNP has more catering service providers and sites with entrance fees than the KNP then visitors' expenses are larger in the GNP.

There are no sharp differences in the opinions of foreign tourists and local residents, with the only exception being that foreign tourists more often name the significant role of intact nature.

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Environmentally friendly visitation to Sečovlje Salina Nature Park

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Mediterranean Salinas are national areas of exceptional cultural, economic and aesthetic values, where biodiversity can be regulated and maintained. Active salt pans are a good example of cohabitation between economic activity, tourism and conservation needs. And it is perhaps this very fact that keeps them alive, given that economic aspirations are more than negligible in these areas.

Protected areas offer their visitors several natural and other qualities and are, at the same time, increasingly co-created by tourism and recreation. Most of them have acquired their protection status owing to their well-preserved natural environment and presence of exceptional natural and cultural assets. They are distinguished by cohabitation of different land use types, which are characterized by occasionally conflicting interests that are not always in unison with each other.

One of the commonest activities is visiting of the pans, which is already traditional in protected areas and a significant prospect for future development. Visiting of the pans, however, is not significant only from the economic and educational aspects, but also draws attention to the significant recreational role of protected areas, which provide high quality spending of spare time for the locals as well as for the visitors coming from predominantly urban areas.

The Sečovlje Salina Nature Park is a national territory of high natural, cultural, economic and aesthetic values, the biodiversity of which can be maintained and regulated through sustainable management. The visitors in Sečovlje Salina Nature Park are invited to experience the Park through various forms of guidance (information centres and points, information boards, trails, mobile applications), guided tours, workshops in nature, creative workshops and different education programs and lectures. Most suitable forms of recreation are those subjected to the Park's basic purposes. Our guests are recommended to visit the park on foot. To them, the park boards are intended, whereas from June 2016 onwards the Nexto mobile application, which enables an individual guided tour of the park, will also be available to them. The mobile guide is a good technological solution, as it helps us to conserve nature and cultural heritage without invasively encroaching upon it. The higher the number of the mobile application users visiting the natural features, the lower the number of information boards in the Park, which are unnecessary and often spoil the environment.

Monitoring of the Park's visitors has been introduced in Sečovlje Salina Nature Park and a study on environmentally friendly transport carried out in the Park, when attempting to check the reasonableness and usefulness of electric vehicles for transportation by the Park's visitors.

The carrying capacity was estimated on the basis of the carrying capacity indicators for the sustainable visitation scenario. They were selected based on subjective judgment regarding the specific features of the area under consideration.



Figure 1. Aerial view of the wooden trail in the Fontanigge area within Sečovelje Salina Nature Park (Photo: I. Škornik)

In 2015, we started to construct visitor infrastructure to become the first Slovenian managed nature park with no motorized access for visitors. For this reason, 2 new wooden trails have been placed parallel to the roads which are reserved for electric vehicles and bicycles and constitute the only access, but distant enough to reduce noises to the minimum. The itineraries have been placed over the water and provided with a wooden fence. A small electric vehicle and bicycles are available for those who are not able or do not wish to walk and a tourist electric “train” will soon be introduced to transport tourists to the Museum of Salt-making.

The main objective of Sečovelje Salina Nature Park is a more respectful use of the environment, to enable the visitors to discover the beauty of these places and to enjoy every single detail without outside interference.

Our long-term objectives of the Park’s management are directed towards protection and sustained conservation of natural beauties and thus biodiversity of Sečovelje Salina, as well as towards protection of cultural heritage and the characteristics of littoral cultural landscape of Slovenian Istria.

In accordance with the biodiversity conservation strategy in Slovenia, “tourism” can pose a development opportunity for the areas with high natural assets, although only under the condition that it does not diminish biodiversity, reduces utilization of non-renewable sources and follows the principles of sustainable visitation, which has to include preservation of diversity, characteristics and beauties of nature and landscape. Sustainable visitation of protected areas should be understood as an opportunity and not as pressure or threat.

Measuring recreation benefits of forest quality change with contingent behavior model

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Introduction

Non-timber functions of forest, such as recreational and aesthetical services, are not traded on ordinary markets and their monetary values are not directly known. The economic methods employed for monetary valuation of non-market goods involve two main categories: stated and revealed preference techniques. When using a revealed preference technique, e.g. travel cost method (TCM), we rely on observed behavior of individuals; stated preference techniques rely on stated behavior of individuals conditional on presented hypothetical situations. Our study combines these two techniques into a joint model.

Generally, there are two main approaches which combine stated and revealed preference data. The first approach is the random utility framework of trip choice modeling (Adamowicz et al. 1995). We employ the second approach, i.e. the contingent behavior model, which combines modelling of actual behavior and contingent behavior of the same individuals, using either pooled or panel data models. Englin and Cameron (1996) were the first to use a panel data approach in a study of the economic benefits of recreational fishing in Nevada. The pooled data model was followed by Eiswaerth et al. (2000), who used a Poisson model to estimate the economic benefits of protecting water levels at Walker Lake, Nevada.

In this study, a single site travel cost model is applied to infer recreational values placed by visitors on Jizerské hory Mountains (JH), one of the oldest landscape protected areas in the Czech Republic. Observed and stated behavior of recreationists are analyzed and used to estimate welfare changes associated with four hypothetical programs that improve or degrade the environmental quality in the area. The hypothetical scenarios are (i) decline of the forest quality of the existing spruce wood in the near future because of continuing air pollution (70% of spruce forest destroyed), (ii) change of forestry composition to 80% of broad-leaved trees which are more resistant to air pollution than spruce wood, (iii) the designation of the bird area as a Natura 2000 network which will cover 40% of the area and increases the number of birds, and (iv) charging an entrance fee into the bird area of 30 CZK.

Individual data about respondent's current visit to the area, actual number of trips to the recreation site and stated behaviors expressed as the number of trips realized to the site under hypothetical conditions were obtained by administering an on-survey. The survey incorporated visitors participating in summer recreational activities (hiking and mountain biking) and resulted in 312 completed questionnaires.

Models

Applying TCM, we suppose that the individual's utility depends on the consumption of market goods, the number of trips to the recreation site and the environmental quality of site (Kolstad 2000). We also assume a weak complementarity of the trips and the environmental quality of the recreation site (the individual's utility is not influenced by environmental quality if the individual does not visit the site). Furthermore, the number of visits is increasing with the environmental quality (Alberini & Longo 2005).

Using a recreation demand function based, we can measure the willingness to pay for a change in environmental quality of the recreation site. The model directly incorporates changes in recreation behavior (no. of visits) contingent on four hypothetical scenarios of environmental quality change. The estimated demand function allows us to assess the consumer surplus (CS), which is an approximation of the recreation welfare that is associated with a visit to the recreation site and the welfare change attributed to the proposed variation in environmental quality.

We employ count data models: a Poisson (P) and a negative binomial (NB) specification, and also a more flexible generalized negative binomial model (GNB) that allows the overdispersion parameter to vary according to the characteristics of the visitors.

Results

The count data models were estimated using a maximum likelihood method and are reported in Table 1. The coefficient of the travels cost variable is significant and negative, according to the economic theory. Its magnitude ranges between -0.0015 (P) and -0.0004 (NB). The numbers of trips increase with the respondents' age and decrease with the distance to the substitute recreation site. The visitation is higher for one-day trips compared to overnight (more days) trips. The number of trips tends to be higher among visitors with higher income and lower for people with university degree and for people living in the capital city, Prague. The length of the trip has a positive influence on the number of trips to the JH Mts. With increasing number of people living in the household, the visitation rate to the JH Mts. decreases.

Table 1. Parameter estimates for on-site count data models

| Variable | P | NB | GNB |
|--|------------|------------|------------|
| Travel costs | -0.0015*** | -0.0004*** | -0.0005*** |
| Distance to the substitute recreation site (in km) | -0.0002*** | -0.0005*** | -0.0005*** |
| One-day trip (binary, 0=overnight trip) | 0.3069*** | 0.5979*** | 0.5815*** |
| No. of people living in the household | -0.0930*** | -0.0520** | -0.0656 |
| Respondents' age | 0.0110*** | 0.0108*** | 0.0103*** |
| University degree (binary) | -0.1538*** | -0.2890*** | -0.3020*** |
| Respondent living in Prague (binary) | -0.2903*** | -0.3378*** | -0.3176*** |
| Individual income (in thous. CZK) | 0.0226*** | 0.0231*** | 0.0226*** |
| Length of current trip (in km) | 0.0114*** | 0.0132*** | 0.0142*** |

| Variable | P | NB | GNB |
|---|------------|-----------|------------|
| Mountain biker (binary) | 0.1523*** | 0.2084*** | 0.1850** |
| Scenario 1 (forest quality decline) | -0.1437*** | -0.1943** | -0.1981** |
| Scenario 2 (broad-leaved trees increase) | 0.0094 | 0.0165 | 0.0148 |
| Scenario 3 (designation of a bird area) | 0.0409** | 0.0541 | 0.0537 |
| Scenario 4 (proposition of entrance fee) | -0.1553*** | -0.1226 | -0.1183 |
| Constant | 2.0289*** | 1.5601*** | 1.6460*** |
| Alpha (overdispersion parameter) | | 1.0988*** | 1.1551*** |
| No. of children in the household | | | -0.1451*** |
| University degree (binary) | | | -0.2410*** |
| Male (binary) | | | 0.1529* |
| No. of observations | 1 475 | 1 475 | 1 475 |
| Log-likelihood | -14 610 | -5 149 | -5 138 |
| Pseudo R2 | 0.313 | 0.057 | 0.059 |
| Chi2(14) | 13 331 | 627 | 645 |
| AIC | 29 250 | 10 330 | 10 313 |
| BIC | 29 329 | 10 415 | 10 414 |
| Notes: P - Poisson model, NB - Negative Binomial, GNB - generalized NB * = $p < 0,1$; ** = $p < 0,05$; *** = $p < 0,01$ | | | |

Since there is significant evidence of overdispersion, the NB model is preferred to the Poisson model. The GNB model allows the overdispersion parameter (alpha) to vary according to variables that reflect visitor's characteristics: number of children, university degree and gender. All respective coefficients are highly significant, revealing that the use of the same overdispersion parameter for all observations would be overrestrictive. The GNB model is therefore preferred for the recreation data and is used also for interpretation of the results.

The four binary variables corresponding to the hypothetical scenarios represent the key variables for placing a monetary value on particular changes in environmental quality that were presented to the respondents. As shown in Table 1, the only scenario with a significant influence on the recreation demand in the GNB model is the project affecting negatively the quality of the spruce wood. As expected, its coefficient is negative.

We use the travel cost coefficients reported in Table 1 to calculate welfare measures in terms of the CS users derive from having access to the park. The average CS per season (in 2005 US dollars) associated with an access to the JH Mts. ranges from USD 271 (P) to USD 971 (GNB). The consumer surplus per visit is from USD 29 to USD 90, respectively. The results show that if the spruce wood scenario was implemented, the welfare change based on the GNB estimates would decrease by about USD 200 on average over the sample. The corresponding value per trip and person is of USD 18. The other scenarios do not significantly change the recreation behavior

(Table 1), and the effect on the recreation welfare is therefore not significantly different from zero.

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Profile characteristics and satisfaction of Kornati National Park visitors

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Introduction

The Kornati Archipelago is situated in the Croatian part of the Adriatic Sea. It stretches over an area of 320 km² and includes 149 island, isles and reefs. Part of the Archipelago encompassing 89 land units and adjacent marine area with total 217 m² was proclaimed National Park in 1980 due to exceptional geomorphological features, anthropogenic terrestrial vegetation, rich marine biodiversity and oceanographic specificities.

Tourism was gradually introduced in the Kornati Archipelago in the 1970s. This was the period of the major changes in the lives of the local people up to that time, which had a strong impact on the overall appearance of the Archipelago. The development of tourism activities was made possible with the appearance of fast-motorized boats, making the Archipelago more accessible. The local people turned to tourism and adapted their small houses for tourist accommodation and opened taverns and restaurants.

The predominant form of tourism is boating and sightseeing with short or long stays, adhering, however, to the rules of the protection and conservation of the natural and cultural values. Other forms of tourism pertain to diving visits, hospitality and catering (restaurants and taverns) and accommodation in small houses.

The Kornati Archipelago is visited exclusively by boat. Visitors of Kornati National Park (Kornati NP) can be divided into two basic groups: visitors in individual arrivals (own or a rented boat) and group visitors (visit organized by a legal or natural person). To enter Kornati NP a ticket is paid per boat, regarding of its length (individual visits) or its capacity (group excursion visits). According to tickets sold in 2015, majority of visits are individual (13.846 boat tickets) while group visitors (excursion boats) are represented with 720 group visits.

In 2015, after process of *Sustainable Tourism Development Strategy for the Broader Kornati National Park Area and Action Plan* development made in close cooperation with 40 local, regional and national stakeholders, Kornati NP was awarded with European Charter for Sustainable Tourism for a 5-years period.

Lack of knowledge about Kornati NP visitor's structure and their satisfaction with quality of services provided by Public Institution "Kornati National park" and other stakeholders was identified by using SWOT analysis during Sustainable Tourism Development Strategy and Action Plan development process.

Aim of the research

Aim of the research is to identify structure of visitors in individual arrivals and group visitors as well as to assess their satisfaction with different elements of visit and offer in order to define measures for its improvement.

Method

Research was conducted by Polytechnic in Šibenik from June until September 2015. by using a structured questionnaire prepared in five languages. The sample includes two profile visitors: group visitors (visitors on excursion boats) and visitors in individual arrivals. The survey was conducted by using a self-filling questionnaire under the supervision of interviewers on several locations in Murter and Kornati NP and online. The research content was defined based on review of domestic and foreign literature. This includes sociodemographic characteristics of visitors; visitors' motivation, loyalty and sources of visitors' information; visitors' expenditure; visitors' satisfaction; intention on revisiting and recommendations. Visitors' satisfaction was analyzed for 13 different categories: park information availability, usefulness of guides and maps for visitors available in the park, usefulness of information on biodiversity, staff professionalism and kindness, quality and maintenance of pathway and tracks, possibility to enjoy in nature, availability of local products, range of available activities, number of other visitors in the park, value for money, availability of contents to persons with special needs and older generations, satisfaction with means of transport to the park and overall satisfaction with the park. Furthermore, recommendations for the improvement were also included in the questionnaire. The sampling was conducted by using a stratified random sampling.

Results

Analysis of 349 filled questionnaires showed that the overall structure of the visitors is dominated by highly educated visitors of middle age, with a monthly income of up to 2,000 €. The largest number of visitors were Germans (19.1%) followed by domestic visitors (17.6%). The primary motivation for visitors' arrival is resting and relaxation (62.9%) and enjoying the nature (60.6%). Visitors are mostly in their first visit to the Park (the share of group visitors that were in their first visit to the park is significantly higher (81%) compared to visitors in individual arrivals (44%)). More than half of the respondents have intention of revisiting (61% of individual visitors largely express intention of revisiting the Park compared to 43% of group visitors). The main source of information about the park is the word-of-mouth marketing (for visitors on excursion boats 34.8% and for visitors in individual arrivals 41.4%), followed by the internet/web pages and travel magazines.

Visitors' satisfaction by categories is shown in Table 1. Visitors are extremely pleased with the total stay in the Park, especially with the means of transport to the park, the opportunity to enjoy nature, staff professionalism as well as with value for money. More than 70% of visitors rated their satisfaction with aforementioned elements as high or very high. Furthermore, visitors are critical to the usefulness of maps and guides, range of available activities, the availability of local products and the number of other visitors to the park. Their satisfaction is extremely low

on the availability of contents to persons with special needs and older generations and on usefulness of information on plants and animals in the park.

Table 1. Visitors' satisfaction by categories
(Very high – 5, High – 4, Medium – 3, Low – 2, Very low – 1)

| Category | Group visitors | Individual arrivals |
|--|----------------|---------------------|
| Means of transport to the park | 5 | 5 |
| Overall satisfaction | 4 | 5 |
| Possibility to enjoy in nature | 4 | 5 |
| Staff professionalism and kindness | 4 | 4 |
| Value for money | 4 | 4 |
| Park information availability | 2 | 4 |
| Usefulness of guides and maps | 2 | 4 |
| Range of available activities | 1 | 4 |
| Quality and maintenance of pathway and tracks | 3 | 3 |
| Availability of local products | 1 | 3 |
| Usefulness of information on plants and animals | 1 | 3 |
| Number of other visitors in the park | 1 | 3 |
| Availability of contents to persons with special needs | 1 | 2 |

Conclusion

The results of this research confirmed heterogeneity in visitors' profile characteristics and indicated strengths and weaknesses of Kornati National park authority and other stakeholders in terms of visitor's satisfaction with different elements of visit and offer. This research has provided valuable information needed for improvement of Kornati National park visitor management system as well as management in general. We believe that method used to assess structure and satisfaction of visitors will be recognized as efficient tool for other protected areas on their way toward creating sustainable tourism development.

A Study on Comfort Evaluation using Brain Waves and Questionnaire Survey in Outdoor Spaces

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Introduction

Modern society can be stressful, and there is growing interest in the creation of comfortable living space. Many studies of urban space have focused on ways of creating relaxing space and comforting environments. For example, green space at highway rest facilities has been found to ease driver stress (Iwasaki et al., 2007). In recent years, devices for measuring biological information that were originally used in the field of medicine have become generally available and are being used in a variety of research fields. Research into the evaluation of urban space is no exception, and many researchers are now using biological information to quantify the effects of spatial recognition on the human body. Examples are the measurement of salivary amylase levels (Nakagawa et al., 2014) and brain waves in moving subjects (Miura et al., 2005). Here, we quantified the difference between the healing effects and stress-reduction effects of green space and general street space (including space at a train station), by using inexpensive EEG (electroencephalography or “brain wave”) machine. Our aim was to quantitatively verify the healing and stress-reduction effects of these spaces by using EEG measurement and a psychological analysis performed with a questionnaire survey.

Study Methods

We used four observation points: the side of a road, a train station forecourt, a closed green space, and an open green space (Fig. 1). For our measurements we used a relatively inexpensive and portable simple EEG machine.

We used the following method to measure brain waves. Subjects donned the EEG machine, which then recorded their brain waves while they performed mental arithmetic (30 s) → landscape appreciation (60 s) → video viewing (30 s). After we had observed the subjects’ brain waves, we performed a questionnaire survey at the same



Figure 1. Observation points used in the survey

time as the subjects appreciated the landscape at each site. The survey items in the questionnaire covered each subject's living environment, the degree of stress in the environment in which they had grown up (5-stage evaluation), and the subjects at each observation point. There were 22 subjects, all of whom were students aged from 16 to 22 years.

Results

In the case of four urban spaces used frequently by the general public, we examined the differences between the results of a questionnaire survey of the respondents' subjective images and the potential effects of their consciousness on brain wave observations. We obtained the following results: 1) The match between the results of the questionnaire survey and the brain wave observations was as high as 90% in the open green areas, whereas in the enclosed green space it was about 70%. Although green space in general is considered to have a relaxing effect, the enclosed green space seemed to be less relaxing because of a feeling of pressure. This result was consistent with those of existing conventional studies. 2) In the questionnaire survey, the preferred reasons given by subjects who answered that they relaxed in enclosed green space were "the presence of tall trees" and "many sidewalks have street trees," and the "dimness of the forest." These reasons explained the differences in preference between these subjects and those who relaxed in open green spaces. 3) In the case of the train station space and the roadside space, there was a large discrepancy between the EEG results and those of the questionnaire survey: even though the questionnaire survey indicated that the respondents felt stressed, the EEG results showed that they were likely to be relaxed.

Acknowledgment

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Exploring visitors' desired benefits in Paklenica National Park, Croatia: Development, validation and management implications of measurement instrument

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Introduction

In recent decades, a number investigations that addressed visitors' desired benefits in protected areas have attracted considerable attention from various research teams (Ballantine & Eagles 1994; Pierskalla et al. 2004; Weber & Anderson 2010). Despite the differences in methodological approaches and the statistical techniques employed, the key findings revealed that the desire to enjoy and admire nature, learning about cultural and natural features, escaping and solitude, social affiliation and personal achievement were considered as the most important benefit sought to bring visitors to protected areas.

The main purpose of this study was to develop a simple and cost-effective measurement instrument to monitor visitors' desired benefits in Paklenica National Park in Croatia. Precisely we used a literature-driven approach to test the relevancy of five hypothesized benefit dimensions, composed of eighteen recreational experience items, on the general visitor sample. These were: *Enjoy nature*, *Novelty and learning*, *Socializing*, *Escape and solitude* and *Personal achievement*.

The specific objectives of this study are:

1. To test the data fit of the two competing models, orthogonal and correlated.
2. To test the reliability and convergent validity of the proposed measurement scale.

The following hypotheses are developed:

- H1. The model with correlated benefit dimensions will fit the data significantly better than the orthogonal one.
- H2. The set of measurement items will show satisfactory internal consistency and ability to measure distinct benefit sought by visitors.

Material and method

The population for this study consisted of 342 visitors, 18 years and older, who visited Paklenica National Park (Croatia) during the month of August, 2014. Data were collected from visitors by means of a self-administered questionnaire using a face-to-face approach.

Visitors were requested to rate how important were each of eighteen preselected recreational experiences for their decision to visit the Paklenica National Park. The ratings were operationalized using the 5 – point Likert scale ranging from one (1 – not important at all) to five (5 – extremely important). The recreational experiences items were drawn from previous research that used the REP scale (e.g., (Crilly et al. 2012; Pierskalla et al. 2004).

Confirmatory factor analysis (CFA) and model estimation were conducted with the aid of the “lavaan” package (Rosseel 2012) “type”: “article-journal”, “volume”: “48” }, “uris”: [“http://www.mendeley.com/documents/?uuid=fb303371-5deb-4532-8667-714ad190a036”] } }, “mendeley”: { “formattedCitation”: “(Rosseel 2012 for the “R” language and the environment for statistical computing (R Core Team, 2013). The first phase involved testing for acceptable model fit (orthogonal vs. correlated). The fit indices were selected with the corresponding recommended values: maximum likelihood χ^2 , relative chi-square (χ^2/df), CFI; SRMR; RMSEA. The second phase included testing for reliability and convergent validity (i.e., adequate factor loading).

Results and discussion

The goodness of fit indices revealed that the orthogonal model, to a considerable extent, failed to properly reproduce the data; therefore, it has been rejected. Conversely, although less than perfect, the correlated model showed a satisfactory match to the data in respect to all examined fit indices. The assessment of the model fit, as a part of CFA analysis, supported the study hypothesis (H1), reinforcing the notion of

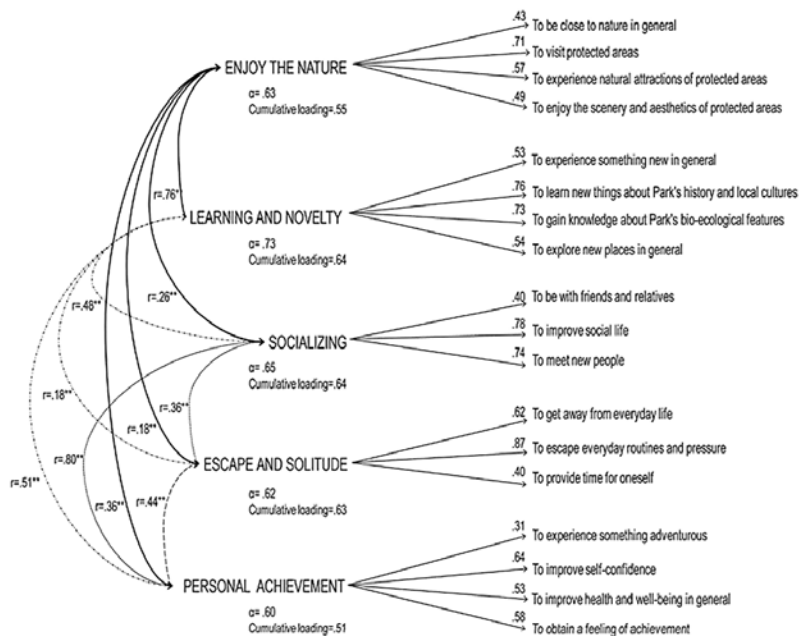


Figure 1. Inter-correlations, reliabilities and standardized factor loadings for the model with correlated latent benefit dimensions.

the presence of core benefits sought that are the most important to visitors across different protected natural settings.

With the exception of the latent dimension, *Novelty and learning*, the remainder of the benefit dimensions received moderate but acceptable α values ranging from .60 to .73 (Robinson et al., 1991). All factor loadings exceeded .50, suggesting that the measurement instrument acquired convergent validity (Hair, J., Black, B. Babin, B., Anderson, R. and Tatham 2006). This empirical evidence supported the second study hypothesis (H2), suggesting that measurement items were reliable and capable of measuring the distinct benefits sought by visitors (Figure 1).

Conclusions

This study has demonstrated the practical implication of the literature testing approach in the development and validation of the measurement instrument to identify visitors' desired benefits in protected areas

Although this study has been focused specifically on the management demands of Paklenica National Park, it would also be interesting to consider the potential of a developed measurement instrument in terms of the application to other protected areas. Data obtained from such comparative studies could be used by the wider policy making community as valuable inputs for the development of integrated frameworks for monitoring, evaluating and reporting the management effectiveness of networks of protected areas at the site, or at the national, regional or trans-boundary levels.



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VISITOR CONSTRAINTS AND LIMITATIONS IN NATURAL AREAS

Latent demand and constraints to water-oriented outdoor recreation in Denmark

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Background

Denmark is a small and highly coastal country with 7,300 km of coastlines and over 400 islands as well as many lakes and streams. Consequently, the outdoor recreation patterns are particularly linked to the coastal and marine environments. Based on a national survey, this paper focuses on assessing latent demand and constraints in relation to water-oriented outdoor recreation.

Previous national surveys show that 12 % of the adult Danish population had not visit forests within the last year in 2008 (Jensen 2012) while 9 % had not visited any nature area (Jensen 2014). However, knowledge of the constraints to outdoor recreation participation in a Danish context is limited. As participation in outdoor recreation has many positive personal and societal effects, a deeper understanding of the constraints for participation is important for planners and managers.

Aim

The aim of the paper is to analyze latent demand and constraints to participation in water-oriented outdoor recreation among three groups: 1) water-oriented outdoor recreationists, 2) land-oriented outdoor recreationists, and 3) non-recreationists.

The study explores the existence of a latent demand even among participants due to constraints reducing their preferred participation.

Methodology

The paper is based on a national survey, representative of the adult population (age 18-80) in Denmark, which was conducted through a market research company in 2015. The 10,291 valid responses reflect a 26 % response rate. Data is weighted to be representative of the adult population. Water-oriented outdoor recreation was defined as including all outdoor recreation activities involving water directly (e.g. water sports) or indirectly (e.g. walking along the beach). It was restricted to activities that had happened in Denmark in the 12 months prior.

Results

Participation

The results show that 77.4 % of the adult Danish population were water-oriented recreationists (they may also have done land activities), while 10.0 % of the population only participated in land-oriented activities and 12.6 % did not participate in any outdoor recreation within the last year.

Latent demand for water-oriented recreation

The highest level of satisfaction was found among the current participants in water-oriented outdoor activities where half (49.7 %) fulfilled their demands for participation in water-oriented outdoor activities. However, the other half (50.3 %) experienced either partial, low or no fulfillment of their demand for water-oriented outdoor recreation hereby indicating a latent demand for more participation. The land-only group had a lower level of fulfillment of their needs for water-oriented recreation as 41.8 % was fully satisfied with not doing water-oriented outdoor recreation activities while over half (58.2 %) experienced partial, low or no satisfaction levels. This suggests a rather high latent demand among land-only recreationists for participating in water-oriented outdoor recreation activities. The non-recreationists had the lowest level of satisfaction of their need for water-oriented outdoor recreation with 36.2 % being fully satisfied with not participating. The remaining 63.8 % expressed either partial, low or no satisfaction levels indicating the highest latent demand in this group.

Constraints to participation

The study included 25 different constraints covering both the demand and supply sides, i.e. intrapersonal, interpersonal and structural constraints (Crawford et al., 1991). Differences were identified in constraints among the three groups. The non-recreationists were strongly constrained by lack of time, lack of interest, being too tired, bad health condition, and low physical condition. The land-only recreationists were constrained by lack of time, distance to activity opportunities, lack of interest, bad weather and being too tired. The participants were mostly constrained by lack of time, bad weather, being too tired, distance to activity opportunities, and family obligations.

Discussion

Hidden latent demand and a proposed dynamic model

The study found that latent demand is not solely linked to the non-participants as often depicted in theoretical models. The study shows that all three groups experience quite high levels of latent demand and that the latent demand increases with reduced recreation involvement. Even half of the participants experience latent demand linked to a wish for participating more in water-oriented activities than they currently do. A revised model of latent demand is presented below. It indicates that among non-participants only some have a latent demand while others are generally uninterested in participating. Among participants, there is a group of mostly satisfied participants (dark blue) but also a group with a latent demand for participating more than they do at present due to a range of constraints. There is likely a dynamic between the groups as non-participants may overcome their constraints and become participants, while participants may become more constrained and drop out into the non-participants with latent demand. A similar dynamic may occur between participants feeling content and those with a latent demand for more participation. In our study we also included a land-water dichotomy and it is likely that an exchange takes place where

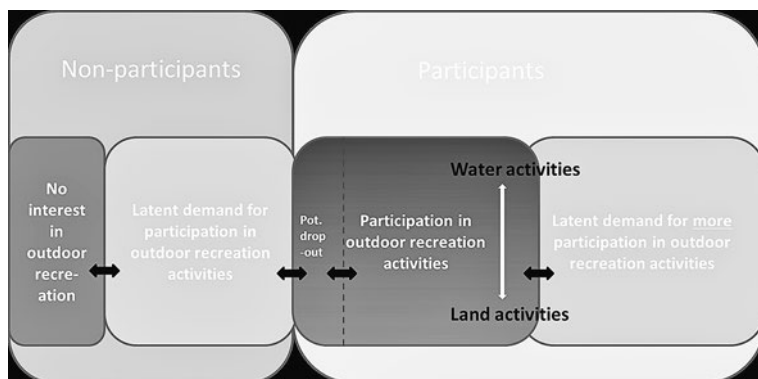


Figure 1. A proposed model of latent demand dynamics

land-only recreationists overcome constraints for water-oriented activities and water-oriented recreationists become constrained and opt for land activities. However, the model does not need this dichotomy to be applicable.

Conclusions

The study found a high participation in water-oriented outdoor recreation in Denmark but also, that both water-oriented, land-oriented, and non-recreationists have a latent demand for participation in water-oriented outdoor recreation. The study identified a relatively high latent demand among participants for participating more in water-oriented outdoor recreation. All three groups experienced constraints but they are of different importance across groups.

Most constraints were linked to the demand side of intra-personal, inter-personal and structural barriers. It appears difficult to reduce the overall pressures from lack of time, family obligations and being too tired and health problems. However, some constraints linked to lack of swimming skills, lack of companions and economic constraints may be reduced through educational, social and economic initiatives.

In contrast, a limited number of the constraints were linked to the supply side. Improvements through planning, development, and management in amount, quality and access to the supply may help reduce some of the constraints for example improving the knowledge on existing opportunities, reducing crowding by establishing more facilities, improving the water quality, or improving access.



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Constraints and Facilitators to Salmon Angling Participation

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Atlantic salmon sport fisheries have declined remarkably in many countries and participation seems to correlate with salmon abundance. We investigated angling participation in the Atlantic salmon sport fishery in Norwegian rivers by incorporating facilitators for participation in a constraint-negotiation model. We specifically look at how resource changes influence the negotiation process and participation. New insight about which factors constrain or facilitate participation, and which negotiation strategies anglers use to overcome them, provides managers and tourism stakeholders with information on how to increase participation and maximize benefits to anglers and local economies.

Method

In this study, we seek new avenues for constraint/facilitator negotiation research. First, researchers have called for looks at other populations and activities to investigate the generalizability of processes identified in previous studies (Hubbard and Mannell, 2001, White, 2008). We address salmon fishing in Norway as a response to this. Second, we use similar constructs and statistical analysis (confirmatory factor analysis and structural equation modeling) as White (2008), who looked at participation in general outdoor recreation activities and visitation of Arizona state parks. However, we expand his model and test it empirically by adding the concept of facilitators from Raymore's (2002) ecological approach to understand the influence on participation, operationalized as being one end of a constraint-facilitator continuum (Kuehn et al., 2013). Our measurement model is shown in Figure 1. For data collection we conducted an Internet survey of Norwegian anglers yielding 3,635 responses, a response rate of 40%.

Results

The structural model confirmed our hypotheses, and support the conceptual constraints-effects-mitigation model of leisure constraint negotiation documented by others. Constraints & facilitators had the strongest impact on participation of all main factors, whereas the structural constraints & facilitator *Quality of fishing* exerted the largest influence on angling participation. The influence of constraints & facilitators was mitigated by use of corresponding negotiation strategies where *Skills, knowledge and money*, but also different substitution strategies were important.

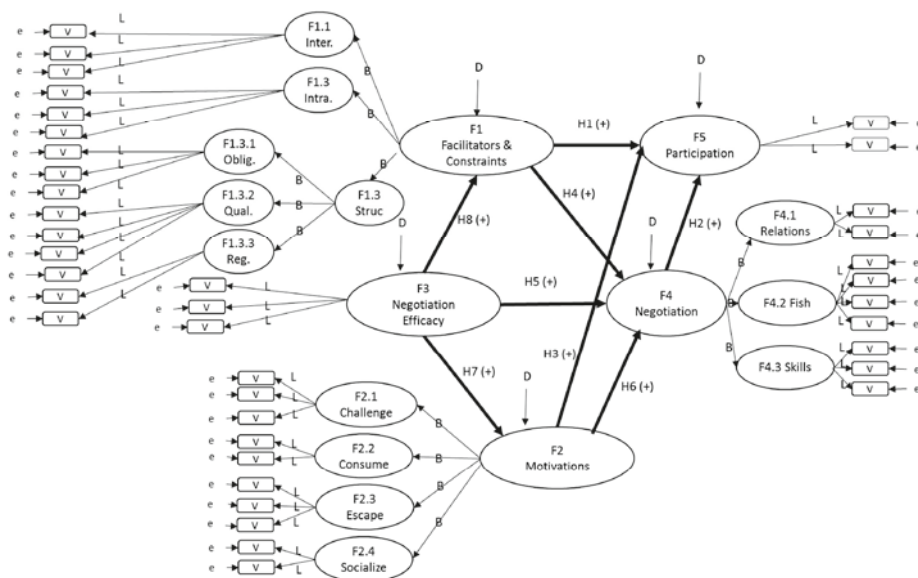


Figure 1. Structural model of fishing facilitators & constraints negotiation with hypotheses and parameters to be estimated

Discussion

Our study pursues and expands the work of White (2008) and Kuehn et al. (2013) by incorporating facilitators in a constraint-negotiation model. The structural model confirmed our hypotheses, and supported the conceptual constraints-effects-mitigation model of leisure constraint negotiation documented by others in a different setting (Hubbard and Mannell, 2001, White, 2008). Constraints & facilitators had the strongest impact on participation of all main factors. The main impact was direct, though some indirect influence through negotiation occurred too. This supports the notion that facing constraints or facilitators triggers two reactions, an inhibitory or furthering reaction on participation by the angler, and a positive indirect reaction on participation from triggering negotiation efforts (Hubbard and Mannell, 2001).

As Schroeder et al. (2012) suggested, the negotiating process may differ between activities and populations. For consumptive activities, the larger spatial-temporal variations in the likely concrete outcomes of the activity (e.g., through quality of fishing and regulations) might explain why motivations played a more important role than negotiation and negotiation-efficacy compared to White's (2008).

Implications for management

To increase participation among anglers in the sample, managers and angling providers/landowners can mainly influence structural constraints & facilitators or enhance the use of negotiation strategies. The structural facilitator *Quality of fishing* can be targeted in two ways: (a) Ensure salmon abundance and natural genetic diversity. Governmental authorities have the means to reduce regional threats to salm-

on stocks both at sea and in rivers. River managers can enhance salmon abundance by maximizing natural smolt production in the rivers through harvest management, habitat management, and habitat improvement (Aas et al., 2011). (b) Provide anglers with longer beats (fishing units) per permit. Angling providers/landowners can collaborate to merge smaller beats into longer, more attractive beats. This also increases catch probabilities as more fish can be targeted, and a longer beat offers possibilities of fishing well at various water levels.

Of negotiation strategies, *Skills, knowledge and money* was the most influential factor. Offering anglers practical fishing courses or guiding services to improve their fishing skills could be one way to increase participation for some. To what degree anglers are willing to pay for such a service or rather want to improve their skills on their own through magazines, websites, films, and fishing buddies is uncertain, as Norwegian anglers are not known for extensive use of guides. The “do-it-yourself” strategy nevertheless indicates usefulness of a website where anglers can find information about how to improve their skills. Salmon angling in Norway is a specialized outdoor recreation activity and a form of niche tourism with thousands of suppliers. Currently there is no main information channel, thus finding information about where to go besides where you have been fishing so far, can be challenging. Information about fishing access should accordingly be gathered and made easier available.



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Outdoor recreation and protection of Iceland's Central Highland: conditions for a consensus among domestic users

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The Icelandic Central Highland cover about 40% of the country, gathering a wide range of landscapes combining large glaciers, vast black sand desert, powerful geothermal areas and rivers, rough lava fields and important wetlands. As a result from such a diversity, the area as a whole consist of an outstanding venue for nature-based tourism and outdoor recreation. Other natural resources are also found in the area, as it has been used since historical times for hunting, fishing or as summer pasture or more recently to produce electricity from renewable sources. Similar to any other use of the natural resource, perspectives of development of the area for nature-based activities are raising serious issues as such highly sensitive environments may be irreversibly impacted by human activities. The establishment of protected areas is presented by various stakeholders as a potential solution to address the issues induced by the exponential growth of tourism. This study aimed to approach the attitudes of outdoor recreationist to the Central Highland and land-use management issues related to its protection. While there seems to be a certain consensus regarding the need to address issues related to the development of tourism in the Central Highland, views gets very polarized when it comes to the idea of a National Park, with a striking gap between opinions expressed by users of motorized and non-motorized activities.

Methodology

As there seems to be a gap in the Icelandic tourism research on domestic users, a main goal was to focus on them, through an online survey which was sent to relevant outdoor recreation groups. The frame of the survey was organized as follow and aimed to collect quantitative data to overcome difficulties related to the language. A first set of questions aimed to collect some data for standard statistical analysis (age/origin/gender/nationality) followed by basic questions about the study area, their relation to it and the outdoor activities they pursue. A second part focused on the identification of values and threats to the Central Highlands, as well as a general perception of advantages/disadvantages of protection. A third part was oriented on the position of the respondent on specific statement through the use of a 5 point Likert scale (disagree – rather disagree – neither disagree nor agree – rather agree – agree). Some comments were also collected through the survey as well as email addresses for those interested to take other surveys related to land use issues in the Central Highland.

Results

The study led to the collection of about 1350 responses, 375 email addresses and 150 comments, showing a high interest in the issue area for the respondent. The vast majority of them had a great knowledge or experience of the study area, opening great

perspective for further research. The analysis of the results permitted to highlight three major outcomes:

1. Tourism and energy sectors are both seen as major sources of threats to the Central Highland, but they appear to be difficult to actually compare in terms of scale (importance of the impact) and urgency (probability of occurrence).
2. While there seems to be a consensus regarding the need to protect the area as a whole, there is a significant polarization of the results as soon as the concept of a National Park is used, with a striking difference between the attitudes of user of motorized and non-motorized activities.
3. The lack of control on the diffusion of the survey on social networks is unevenly reaching specific groups of outdoor recreationist, diminishing the representativeness of the sample as a whole, but increasing the interest in the study of “polarized segments” of users.

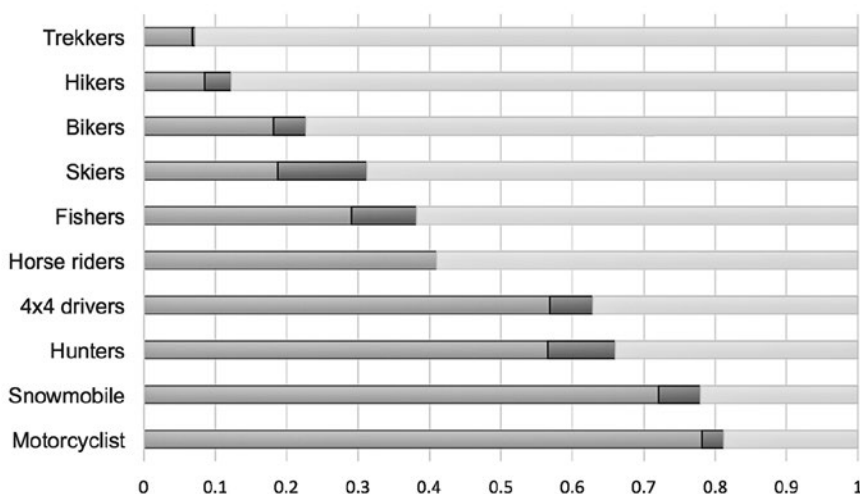


Figure 1. Attitudes of the different types of outdoor recreationist to the project of National Park in the Central Highland, by predominant activity carried out (red: negative attitude / yellow: neutral attitude / green: positive attitude)

Discussion

The issues approached through this survey had to be relatively broad as it is the first time this method was used in Iceland and it had to be accessible for a large number of users of the study area. Strategic choices had to be made concerning the selection of issues, and there are limits to the interpretation of the results, but the high interest and the knowledge of respondents in the study area opens many opportunities for further research. This first study permitted to set the general context of the research by providing relevant information on the views of domestic users on the protection of the Icelandic Central Highland.

Concerning the sample, it is strategic to approach all types of outdoor recreation within this study, and it might be particularly interesting to extend the sample

to more organization gathering outdoor recreationist (caving, kayaking, flying, bird watching), and a specific effort should be done to reach more users from underrepresented groups (horse riders, fishermen). The collection of qualitative data might be particularly relevant to complete the present research, and further research can focus on other types of stakeholders of the study area (driver, guides, ranger, warden and farmer).

In regard to management issues, as it appears that the concept of “National Park” is rather polarizing, another option could be to approach the topic without specifically being focused on the National Park project, in order to find the common ground among these stakeholders regarding the protection of the Icelandic Central Highland.

The identification of threats to the study area can also in the future be approached at a much higher resolution, and being dedicated to specific projects or areas, as the sample got an excellent knowledge of the study area and often refer to those projects or areas in comments.

It could be relevant to give the respondent the opportunity to submit a question they would like to answer in a similar survey, permitting therefore to integrate them in a proactive manner in the research, since there is a high interest in the topic.

Cultural differences in outdoor recreation: A case study of Saklikent National Park in Turkey

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Introduction

Personal characteristics of the visitors including cultural and socio-demographic background have been found to have an influence on the normative interpretation of outdoor recreation use patterns and perceptions (Manning 2011). In a more technical sense, norms are cultural rules that guide behavior (Sayan et al. 2013). Research in outdoor recreation found that culture and demographics influence peoples' motivations, expectations and preferences in the outdoor recreation (Fleishman et al 2004, Sasidharan et al. 2005, Buijs et al. 2009, Sayan et al. 2013). Culture has generally been addressed by examining similarities and differences among recreationists based on race, ethnicity, and nationality (Manning 2011) and formulated by standards of quality. One branch of normative theory and methods—structural characteristics models—has special application to park management and formulation of standards of quality in particular (Vaske and Whittaker 2004). In the context of park management, this model works by asking survey respondents (e.g., park visitors, residents of surrounding communities, and the general public) to evaluate the acceptability (or other evaluative dimension) of a range of recreation-related impacts to park resources or the quality of the visitor experience (Manning 2011). The resulting data are generally graphed so that impacts are displayed on the horizontal axis and evaluations are displayed on the vertical axis. The resulting line connecting the evaluation scores is often called an impact acceptability curve or simply a norm curve. The point at which the norm curve falls out of the acceptable range and into the unacceptable range (i.e., crosses the neutral point of the acceptability scale) may be considered a minimum acceptable standard of quality. Norm intensity—the strength of respondents' feelings about the importance of an indicator of quality—is suggested by the distance of the norm curve above and below the neutral point of the acceptability scale.

Study Area and Design

Data for this study was collected in Saklikent National Park in southern Turkey. The park comprises 1,643 hectares of rugged natural landscape including slot canyons which was created by a combination of tectonic movement, karst sedimentation and erosive force of a river. At Saklikent, about 300,000 visitors annually are drawn to the Eşen River which is deeply embedded in the surrounding canyon. The park is heavily used by foreign and Turkish tourists and local people in the summer season. Visitors must walk a short distance on the suspended trail to the canyons where they take photographs, play in the water, and walk upstream when river levels allow. A visitor survey was conducted in 2010. The survey questionnaire included a series of seven photographs showing a range of visitor use levels from no visitors present to 36 visitors. All seven photographs were shown to respondents on one poster. Re-

spondents were asked to rate the acceptability of each photograph on a nine-point scale ranging from -4 ("very unacceptable") to 4 ("very acceptable"). A response rate of 88 % was attained.

Findings

All of the visitors examined the same set of photographs depicting a range of visitor use levels from no people to a maximum of 36, and they were asked to rate the acceptability of the scenes displayed. Our findings indicate differences among these groups of park visitors as follows:

- The norm curves of foreign respondents exhibit the typical reversed S-shape in which there is a negative relationship between acceptability and the number of visitors shown in the photographs (Figure 1).
- The norm curve for Turkish respondents is very different: they give negative scores on average to photographs with no individuals (which is the only negative evaluation) and positive scores to photographs with between 6 and 30 people. They represent low-norm intensity.
- A multiple tolerance norm is supposed to exist for Turkish respondents. Since their norm curve crosses the neutral line, for approximately 5 and 36 visitors.

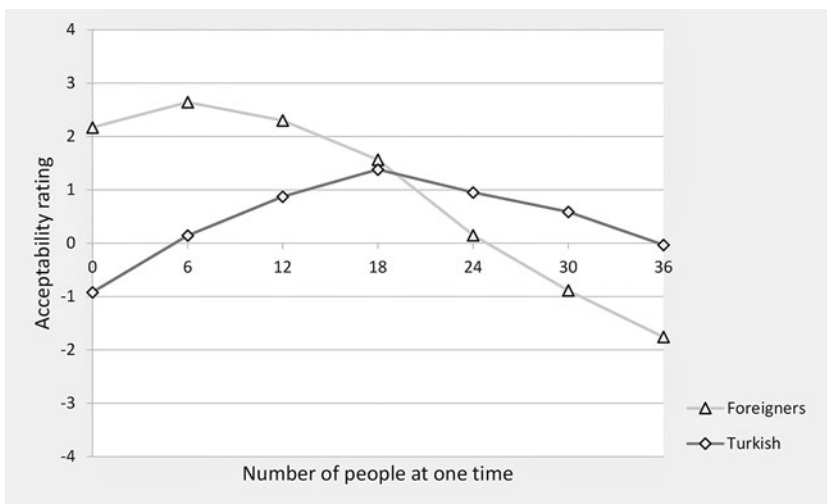


Figure 1. Social norm curve for Saklikent National Park canyons

Conclusions

There is big difference for the perception of crowding between foreign tourists and Turkish visitors. However norm intensity of foreigners is not so high and Turkish visitors represent quite low norm intensity. Turks are more socially oriented than the foreigners. This could explain why they give lower scores to photographs with few visitors and higher scores to photographs with many visitors as compared with respondents from abroad. The differences in the preferences and perceptions of foreigners and Turkish visitors to Saklikent could be used to develop an integrated management system for that park, in which both resource protection and visitor experience are considered.



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Immigrants' urban outdoor recreation: Explorative case studies in Turkey and Germany

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Introduction

Migration is a global fact which is driven by many complex and inter-related economic, social, political, environmental reasons. Europe has become 'a continent of immigration' in the course of the last half century, and European societies have experienced growing ethnic and cultural diversity (Okólski, 2012). Accordingly diverse social groups with various cultural backgrounds interact in everyday life. Besides several economic and social challenges, the role of outdoor recreation on urban green spaces (UGS) deserves consideration in the social inclusion of immigrants. UGS are public places for recreation, stress relief, outdoor recreation activities and places for interaction and encountering other people. In contrast to dense built environment of the cities, meeting and communicating on urban green can be platform for breaking social segregation (German-Chiari and Seeland, 2004, Seeland et al., 2009, Leikkilä et al., 2013).

Personal characteristics of the visitors including cultural and socio-demographic background have been found to have an influence on the normative interpretation of outdoor recreation use patterns (Manning, 2011). Immigrants participate in recreation activities, but sometimes in different ways than the members of the host community due to their diverse habits, preferences and behaviour. However little is known about these differences in recreation habits and preferences in the urban environment of continental Europe. In contrast, there is a large body of relevant literature in North American outdoor recreation research for example explaining differences in recreation behaviour in urban settings and in the national parks in the United States and Canada. Thus we initiated an international collaboration between Turkey and Germany to a) explore urban outdoor recreation patterns of immigrants, b) investigate the interrelation between cultural background and recreation patterns and c) analyse the role of UGS for encountering people of different migration background.

Study Design

An explorative case study design was implemented to investigate outdoor recreation for immigrants. The first case study was carried out in Antalya Turkey from September to November 2014 and second in Berlin Germany from June to August 2015. The main idea behind the exchanged visits is that interviewing with German migrants in Antalya and Turkish migrants in Berlin is expected to be more fruitful and language barrier-free with native researchers. Antalya is a popular destination for German migrants. Around 40,000 German and German speaking immigrants live in the Province of Antalya and the majority is retired people. It is a popular holiday desti-

nation for German tourists as well. Berlin, as being the capital city of Germany, hosts around 113,000 Turkish descent migrants (Statistisches Bundesamt, 2013). Berlin is known as the largest Turkish settlement in one city outside Turkey.

Method

A multi-method approach was appropriated in both cases. We organised a focus group meeting in Antalya with nine members of the community to gather in-depth information about the recreation behaviour and perceptions of German speaking immigrants in Antalya. This step was then followed by five semi-structured qualitative interviews with German migrants with permanent residency in Antalya. Questionnaire for the guided interviews focused on motives, perceptions and preferences of the respondents in Antalya. In summer 2015 we implemented the Berlin case study initially with the stakeholder and expert interviews including social and environmental NGOs. Later we conducted eight qualitative interviews using the same questionnaire which was adjusted to Berlin.

Findings

We explored the drivers and patterns of immigrants' outdoor recreation behaviour and preferences. Main findings and comparative details are listed in Table 1 and further explained in the following bullet points:

- Germans and German speaking community in Antalya represent an example of retirement migration. Most of them are amenity-driven migrants who live in both countries and many of them are dependant to Germany for major health issues. German community in Antalya supposed to be a culturally homogeneous group

Table 1. Comparative results of qualitative interviews in both cases

| | Antalya case study | Berlin case study |
|---|--|--|
| Migration groups | - Amenity-driven migrants - Majority is retired people from Germany - Residence in two places | - Labour migrants and descendants - Largest immigrant group in Berlin - Major residence is Germany - Regular homeland visits |
| Recreation behaviour | Use of UGS on regular basis | Use of UGS on regular basis, but depending on lifestyle |
| Perceptions | "Germans" have different preferences than Turkish people in terms of activities (sports) and behaviour (solitude, relaxation, lower tolerance for noise and crowding) | "Turks" or "Turkish descent migrants" have different preferences than Germans in terms of activities (picnicking, barbecue) and patterns (larger groups, higher tolerance for noise and crowding) |
| Conflicts | Litter on urban green spaces and at the beaches | Litter and dog turds in public parks |
| Potential for inclusion and socializing | - High willingness to integrate into host society - Host community has a high level of acceptance for foreigners - Common interests needed as a starting point - Language as a barrier for interaction - Drink related socializing | - High tolerance of Berlin inhabitants; but discrimination and prejudice exist - High potential for social inclusion (i.e. playgrounds) - Language could be a barrier for the first generation - Food related socializing |

- Turkish community in Germany represent a typical example of labour migration. As being the largest cultural group in Germany, Turkish community is composed of several sub-groups based on ethnicity, religious beliefs and life styles. It is supposed to be a culturally heterogeneous group.
- Tolerance was found to be a precondition for living abroad and inclusion into the host society. Although cultural differences exist for the outdoor preferences, respondents agreed on the willingness of host community to accept foreigners.
- Respondents agreed on the high potential of UGS for encounters and social inclusion process. However they concerned about a) language (as a barrier for interaction) and b) common interests (as a starting point).
- Asymmetric conflicts exist between different user groups based on activities in the park and preferences for park conditions. In this sense the less tolerant or highly sensitive people or parties are more affected from the conflicting situations.

Conclusion

Results demonstrated that tolerance is the precondition for living in the foreign countries and for a successful integration into the host society. Respondents in both cities agreed that these areas have high potential for supporting the social integration process; but they also stated that a) language is a barrier for interaction and b) common interests are needed as a starting point. They agreed that the host community have high willingness to accept foreigners and are helpful. However they also mentioned that cultural differences exist in outdoor recreation. The representation of sub-groups and non-participants is important for an inclusive study to find out the reasons of exclusion and displacement. To evaluate this research gap, we recommend a mixed methods approach including quantitative and qualitative research to better facilitate the representation of sub-groups.



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VISITOR MOTIVATION AND LOYALTY IN NATURAL AREAS

Where do the tourists in Iceland go?

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Introduction

Tourism remains a seasonal phenomenon and each destination experiences some kind of seasonal imbalance, financial or physical (Bigović, 2012). Destinations can be affected by different number of peaks in seasonality and it is important to distinguish between the true seasons of the year (Butler, 2001). Knowing the number of visitors is the basic unit for measuring tourism seasonality (Lundtorp, 2001). The importance of knowing how many tourists visit destinations is well known by managers and good and accurate visitor data are valuable for planning and managing the destinations (De Cantis et al., 2015).

Tourism has increased greatly in Iceland in the last few years. In 2010 490 thousand foreign tourists arrived annually but in 2015 the number had risen to 1.300 thousand. The tourism industry has now become one of the three pillars of Icelandic economy together with the fishing industry and the power intensive industry. The bulk of this increase has been in the capital area in and around Reykjavík. Even though a considerable increase has occurred outside the traditional summer season, seasonality and uneven distribution of tourists around Iceland is considerable. Both the government and the tourism industry see this as a major problem which affects businesses and stops tourism from becoming a whole year occupation in all regions of Iceland. It is therefore important to have accurate data on tourist numbers and how tourists distribute around Iceland. This is important for tourism operators when planning their business, for the managers of the destinations when planning local infrastructure and service, as well as for the government when taking actions on how to distribute the tourists better around the country. As stated by Eagles (2007) *“Any phenomenon that is not measured and reported does not exist politically. Governments, societies, communities and individuals place more value on that which is documented”*.

The aim of this work is to measure where the tourists go at different times of the year. The numbers that visit the destinations will be compared with the number of tourists departing from Keflavík International Airport. Iceland is a unique destination in that Iceland is an island with practically only one access point, Keflavík International Airport (KEF), where 97% of the visitors pass through so tourist visiting the country can be quite accurately counted. The airport is in the capital area 45 minutes from the centre of Reykjavík.

Methods

A common way of computing visitor numbers and seasonality is to use regional overnight stay data. These are available in Iceland collected by Statistics Iceland as well as border surveys collected by the Icelandic Tourist Board. This data describes well where tourists stay, but not which destinations they visit. The difference is pro-

nounced in Iceland now as a large number of tourists visit the country for a few days, staying in Reykjavík and take day trips from there.

Counting vehicles that arrive at a destination is a common method of obtaining the number of visitors that visit a destination. Most of the important Icelandic destinations are unique in that they have only one access road. Using proper methodology it is therefore possible to count the visitors to the destinations with considerable accuracy (Ólafsson and Þórhallsdóttir, 2015). The number of visitors computed from vehicle counters in four destinations will be used and compared with data on departing visitors in Keflavík International Airport to analyse where foreign visitors in Iceland go at different times of the year.

The destinations

Four destinations were selected for this presentation and the results are shown in Figure 1. Þingvellir is a UNESCO destination 50 km from Reykjavík. It is both an important historical site and a geological site showing continental drift. Þingvellir is on a very popular tourist route, the Golden Circle that includes Geysir a geothermal area with a hot spring, the most visited nature destination in Iceland, and Gullfoss the most famous waterfall in Iceland. Sólheimajökull is an outlet glacier on the South coast 100 km from Reykjavík, popular for ice climbing and glacier walks. Jökulsárlón is a glacier lagoon on the South coast about 400 km from the capital area. There are scheduled daytrips along the South coast from Reykjavík to both Sólheimajökull and Jökulsárlón every day of the year. Hraunfossar is a picturesque waterfall in the West about 100 km from Reykjavík.

Results

Figure 1 shows the percentage of the foreign visitors that arrive through Keflavík Airport that visit each particular destination each month of 2015. Approximately 50% of the visitors that visit Iceland each month go to Þingvellir. The seasonality at Þingvellir is not high. From April to September a similar number visits Jökulsárlón but the seasonality is considerably higher reflecting the longer distance from Rey-

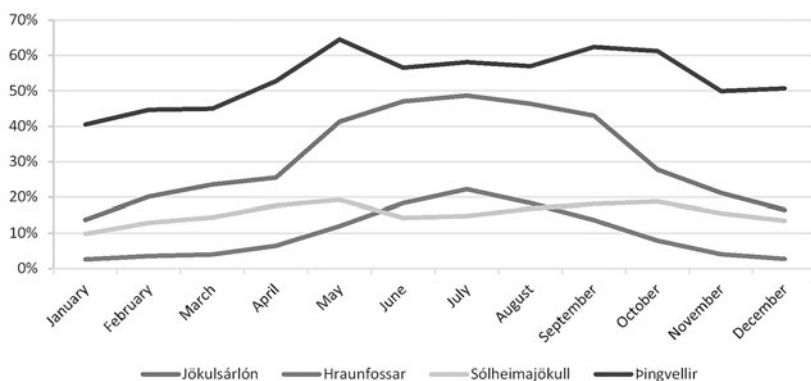


Figure 1. The ratio of visitors to destinations compared with departures of tourists from Keflavík Airport

kjavík and sometimes difficult travel conditions during the winter. The number of visitors at Sólheimajökull is lower than at Jökulsárlón during the summer, but similar during the winter. Hraunfossar are visited by similar number of visitors as Sólheimajökull during the summer, but considerably fewer in the winter. This probably reflects the fact that Hraunfossar is not on a popular day trip route as are the other destinations.

Conclusion

Work is now in process to acquire visitor numbers from the typical tourist destinations in Iceland. With data on the number of visitors from destinations around Iceland it will be possible to analyse the distribution of visitors in Iceland and the seasonal difference in visitor distribution. Knowing the number of visitors is one of the important factors that can make it possible to distribute the visitors more evenly around the country in all seasons. Distributing the tourists more evenly around the country will contribute to make better use of infrastructure, increase profitability for local operators, help creating whole year employment, as well as make the travelling experience of tourists more satisfying.



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Tourism seasonality in Iceland

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Introduction

Tourism is a seasonal phenomenon even though travelling habits are changing and few destinations, usually cities, are unaffected by some kind of seasonality. School holidays and the weather in the host country are thought to be the most influencing factors for people's decision to travel, especially during the winter time (Butler, 2001). Unpredictable weather and darkness can add special excitement to the journey and make the destination interesting (Lundtorp et al., 2001).

People are breaking free from previous holiday habits. The experiences tourists are seeking are also changing. People now want to experience something new and adventurous and have an exclusive experience (Koc and Altinay, 2007). Northern Europeans who used to spend their summer holidays on the beaches of the Mediterranean are now going further away during the summer break, and additionally taking short holidays during the winter period (Rosello et al., 2004). This diversification of travel practices is more visible in countries with cold climate and influences all parts of planning and management of tourist destinations (Baum and Lundtorp, 2001).

Objectives

Tourist seasonality is typically analysed from the number of visitors, arrivals, departures or from overnight stay data (Lundtorp, 2001). Overnight stay data has been used in Iceland to analyse seasonality regionally. The overnight stay data show where the visitors sleep but does not measure the impact tourists have on the destinations they visit. In Iceland off season visitors tend to stay in different regions from the ones they visit. Therefore new methods or approaches of analyses are needed.

The objective of the presentation is to analyse tourist seasonality using data from vehicle counters in thirteen destinations. Half of the destinations are in Vatnajökull National Park and the other half are popular destinations in South and West Iceland.

Destinations

The destinations are different and have different annual visitation numbers. Geysir, the most popular destination in Iceland, is a hot spring area and Þingvellir, a national park, are on the popular route, the Golden Circle. Both destinations are in about an hour drive from the capital area. Seltún is a hot spring area near Keflavík International Airport. Hraunfossar is a picturesque area in the West where spring water streams out of the lava. Djúpálónssandur on Snæfellsnes Peninsula in the West is a rocky coastal area. Sólheimajökull is an outlet glacier that is popular by recreationists for ice climbing and glacier walks. The destinations in Vatnajökull National Park are also nature destinations. Jökulsárlón, Fjallsárlón and Hoffellslón are glacier lagoons in the South. Svínafellsjökull in the South gives the opportunity to experience a glacier at close quarters. Skaftafell in the South is a natural area close to Iceland's

highest mountain, Öræfajökull (glacier) that provides a wide natural experience. Heinaberg in the South is a rocky area at the edge of Vatnajökull glacier and Dettifoss in the North is the most powerful waterfall in Iceland and probably in Europe.

Methods

The number of visitors is the basic unit to measure tourism seasonality. In this presentation it will be analysed by the Gini coefficient in a number of tourist destinations. The Gini coefficient is a well-known tool to measure inequalities and is derived from the Lorenz curve. When all measurements are equal the Gini coefficient is 0, but a complete inequality gives the value 1 (Lundtorp, 2001). The Gini coefficient will be compared to other data about the destinations that is the annual number of visitors and the visitation from May 1st to September 30th (Table 1).

Results

By using the Gini coefficient to analyse seasonality in various destinations it can be seen that the lowest seasonality is in destinations on the Golden Circle, Þingvellir and Geysir, as well as in Sólheimajökull (Table 1). From May to September 54% of all foreign visitors visit Geysir, the most visited destination in Iceland, 59% visit Sólheimajökull and 61% Þingvellir.

Jökulsárlón and Svínafellsjökull in Vatnajökull National Park have the same Gini coefficient, but the number of visitors is very different. Destinations close by and on the same travel route, for example Skaftafell, Fjallsárlón, Heinaberg and Hoffellslón have different Gini coefficients, but the visitor numbers are very different.

Table 1. Seasonality in twelve destinations.

| Destination | Gini coefficient | Annual number 2015 | Visitation from May to September |
|------------------|------------------|--------------------|----------------------------------|
| Geysir | 0,21 | 1.240.404 | 54% |
| Sólheimajökull | 0,28 | 198.783 | 59% |
| Þingvellir | 0,29 | 695.583 | 61% |
| Jökulsárlón | 0,41 | 448.181 | 74% |
| Svínafellsjökull | 0,41 | 88.471 | 71% |
| Seltún | 0,45 | 136.750 | 74% |
| Skaftafell | 0,48 | 433.059 | 80% |
| Hoffellslón | 0,52 | 20.368 | 80% |
| Hraunfossar | 0,55 | 152.830 | 84% |
| Heinaberg | 0,56 | 6.710 | 79% |
| Djúpalónssandur | 0,57 | 99.137 | 86% |
| Dettifoss | 0,62 | 139.272 | 91% |
| Fjallsárlón | 0,62 | 159.653 | 88% |

Conclusion

As can be seen from the data there is a difference in seasonality in the destinations, even though they are close. Destinations few kilometres apart have completely different seasonality as computed by the Gini coefficient. That indicates that it is necessary to analyse seasonality on a smaller scale than that of destinations rather than large regions. This is particularly true if the purpose is to use the data for destination management or protection.

To get a complete picture of the situation in Iceland more data is needed from destinations in the North where the seasonality is higher than in the South as can be seen from Dettifoss. The transportation system can influence the seasonality, the mountain roads up North are sometimes closed during the winter because of bad weather and snow.

The results show that seasonality cannot be fully described with the Gini coefficient. Annual visitation numbers are also important.



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The Multi-dimensional Components of Visitor Loyalty to Protected Areas

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Introduction

Visitor loyalty is important for protected areas not only for the revenue received from entrance fees and other charges but also for political support for their continued existence (Rodger et al., 2015; Weaver & Lawton, 2011). For this reason extensive research reported in the literature examines not only visitor loyalty but also the factors (such as service quality and visitor satisfaction) that may increase visitor loyalty (Moore et al. 2015).

Typically visitor loyalty is presented as a single construct, measured using survey questions about the likelihood that visitors will perform actions such as revisit the area, recommend it to other people, or say positive things about the area. These are widely considered to be measures of the same theoretical construct, typically called loyalty or behavioural intentions. This approach is almost exclusively taken in studies using methods such as Structural Equation Modelling (SEM) to investigate the factors that influence loyalty (Moore et al., 2015; Rivera & Croes, 2010). Exceptions include Weaver & Lawton (2011) who describe loyalty using four factors: positive attitudes, referral and repeat visit intentions, volunteering intentions, and advocacy and financial support intentions.

This paper adds to our understanding of loyalty as a complex construct. Factor analysis is used to demonstrate the multidimensional nature of loyalty and to explore these different dimensions. Implications for loyalty research are discussed.

Karijini Visitor Survey

The multidimensional nature of visitor loyalty is demonstrated with data from a survey of visitors to Karijini National Park in the outback region of Western Australia. The primary attraction of this remote park is its spectacular natural gorges, with plunge pools and waterfalls. Visitors were surveyed as they left Dales Gorge (the major gorge within the Park). Participation was voluntary and over 90% of visitors approached agreed to complete the survey. After removing 8 questionnaires with incomplete answers to the 8 loyalty questions (see Table 1), results are based on 328 visitors. All questions were measured on a 7 point Likert scale from very unlikely to very likely to take the action within the next 12 months.

The loyalty measures in Table 1 are presented in order of likelihood to take the action, from highest mean to lowest mean. Results from factor analysis with one, two and three factors are shown with loadings for each measure to each factor (so in the case of the three factor solution there are 3 columns corresponding to factor loadings with each of the three factors). Note that the one factor solution has a chi-

squared value of 199 (with 20 degrees of freedom). This ratio of chi-squared to degrees of freedom of 10 is highly significant ($p < .001$) and suggests one factor is insufficient to capture the relationship between the loyalty measures.

The third factor is necessary to capture the first loyalty measure, visit another national park in Australia. This measure is an important aspect of loyalty to protected areas because while individual locations may be important, loyalty to the brand 'national park' is important to managers of national park systems, as is the case in many countries. This suggests a constellation of loyalty concepts from loyalty to an individual destination, to loyalty to destinations managed by the same organisation and even to protected areas internationally. Note that loyalty to an Australian national park has loadings less than 0.3 for the other factors in the three factor solution and to all the factors in the one and two factor solutions, suggesting this measures a different loyalty construct to the other loyalty questions.

Similarly, the loadings for both the two and three factor solutions suggest measures L2 (say positive things about the park) and L3 (recommend the park) measure a different loyalty construct to the other questions.

Table 1. Factor loadings for 1, 2 and 3 factor solutions (N = 328). Factor loadings above 0.5 are in bold.

| Loyalty measure | 1 factor | 2 factors | | 3 factors | | | mean |
|--|------------------|-------------------|-------------|------------------|-------------|-------------|------|
| L1. Visit another national park in Australia | .246 | .141 | .208 | .095 | .115 | .988 | 6.69 |
| L2. Say positive things about this park to other people | .415 | .034 | .925 | .072 | .930 | .080 | 6.65 |
| L3. Recommend to friends and relatives that they visit this park | .466 | .177 | .696 | .210 | .678 | .059 | 6.59 |
| L4. Talk to other people about the importance of this park and other protected areas | .664 | .540 | .336 | .544 | .293 | .190 | 5.53 |
| L5. Visit this park again | .505 | .522 | .113 | .516 | .080 | .111 | 4.96 |
| L6. Donate money to help protect this park or similar protected areas | .698 | .725 | .182 | .749 | .151 | -.016 | 4.42 |
| L7. Pay increased park fees to improve park facilities and park management | .573 | .564 | .156 | .576 | .134 | -.021 | 4.11 |
| L8. Volunteer my time to help conserve this park or similar protected areas | .493 | .573 | .028 | .566 | .002 | .038 | 3.10 |
| cumulative percent of variance explained | 36% | 54% | 66% | | | | |
| Chi-squared (df) p value | 199 (20) .000 | 33.1 (13) .002 | | 15.0 (7) .035 | | | |

Implications

Researchers investigating factors that influence loyalty should beware of assuming loyalty is a single construct, both implicitly when discussing loyalty and explicitly when performing analyses such as SEM. This includes removing loyalty measures to satisfy model goodness of fit. Measures L2 (saying positive things), L3 (recommending the park) and L5 (revisit the park) are commonly used to measure a single construct of loyalty however in the Karijini survey L5 belongs to a different construct. This may be due to the remoteness of the park, making revisiting a relatively difficult action to undertake. Similar results have been found for other remote, iconic destinations such as the Galapagos Islands (Rivera and Croes, 2010).

The three factor solution groups measures based on the likelihood of the actions being taken, supporting the idea that loyalty measures can be grouped based on how easy they are to perform (Weaver & Lawton, 2011). There are, however, alternative hierarchies such as the extent to which loyalty applies to a specific location or to a wider brand (such as protected areas generally).



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Diving between continents: Visitor motivations, disturbance and management implications for Silfra, Iceland.

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Introduction

The Silfra fissure in Iceland's Þingvellir National Park is a unique destination. It is the only place in the world where tourists can dive and snorkel in the crack between two continental plates. Dive and snorkeling entries into Silfra have increased dramatically during the last few years, and the potential for disturbance of both the fissure's ecosystem and the tourist experience requires monitoring and managing. This interdisciplinary study aimed to understand the motivations of dive visitors to Silfra and the impact of their dives. A mixed method approach to obtaining data from four key stakeholder groups included observation of divers; questionnaires completed by divers, tour guides and tour operators; and interviews with the Park managers. From the findings, management strategies to maintain the positive experience for divers while minimizing the negative impacts on the fissure are recommended.

Study site

Famous for the tectonic processes that have created the water-filled rift valley of Lake Þingvallavatn, Iceland's Þingvellir National Park (ÞNP) contains several fissures between the North American and Eurasian continents filled with fresh groundwater. The Silfra fissure measures 373m in length at the surface, of which a 280m stretch is used for diving activities. Although mostly narrow (5-8m), Silfra ranges in width from 3 to 20m. The maximum depth in the part of the fissure open to the surface is 40m. A moderate current flows from north to south and at its southernmost end Silfra connects to Lake Þingvallavatn.

Methods

To assess factors that influence motivations and experiences of diving in Silfra, in August 2015 we surveyed divers after their dive (n=61), operators of all major companies running diving tours (n=6), and dive guides (n=10). Respondents were asked to rank four factors (dry-suit diving, geology, biology or visibility) that influenced their decision to dive in Silfra and answer questions about their understanding of the im-

pacts of their dive. Þingvellir National Park officials were interviewed regarding the use of Silfra as a dive-site.

In September 2014 the underwater behavior of 35 divers was observed to assess the mechanisms and consequences behind diver-related ecological disturbances. The observer recorded each diver using a JVC GC-WP10 HD camera for five minutes while they were in the fissure. The videos were analyzed and the mechanisms of disturbances were counted and identified by source (fins, hands, equipment or body), target (algae or sediment), type (contact or current) and severity (minimal or severe).

Results and Discussion

Motivations

The main motivation for visitors who seek Silfra as a destination is its unique geology followed by its clear underwater visibility. Reputation may be largely responsible for this, as Silfra has been named in numerous dive-magazines and websites as one of the world's best dive sites. Guides considered visibility the most important and geology the second most important factor for their client's decision to dive in Silfra. Operators mostly focused on marketing visibility first and geology or biology of Silfra second.

Most divers did not consider biology an important factor in their decision to dive in Silfra and guides agreed, ranking biology as the least important factor for their clients decision to visit. This suggests that even if biological decay occurs in the fissure, it is unlikely to affect the popularity of Silfra as a tourism destination. Of greater concern to all stakeholders was overcrowding at the destination.

Disturbance

During the five minute observation period, 91% of the 35 divers caused at least one disturbance. This is similar to ratios presented in studies on diver-related disturbances in marine systems, where the majority of observed divers were found to cause at least some disturbance (Barker & Roberts 2004; Luna et al. 2009; Uyarra & Côté 2007). Disturbance events averaged 11 per diver ($SD=7.5$), and the total number of events observed was 373.

Most disturbance types occurred by diver-generated current ($N=222$, $mean=6.3$, $SD=6.70$). Disturbance by divers direct contact with the algal cover or sediment were fewer ($N=151$, $mean=4.3$, $SD=3.51$). The majority of disturbance mechanisms were fins ($n=310$, $Mean=8.9$, $SD=7.76$), which accords with studies from coral reef dive-sites (Barker and Roberts 2004; Luna et al. 2009). Fins act as propellers for a diver and are moved quickly through the water, making them prone to disturbing the surroundings, either by contacting organisms or by generating a current resulting in the detachment of algae and the raising of sediment.

The duration of an average dive in Silfra is 38 minutes; therefore, each diver is estimated to cause 81 disturbance events, consisting of 50 algal removals and 31 sediment raising events. Although each diver may only cause relatively small disturbances, the cumulative consequences of multiple divers per day throughout each year could cause permanent damage to Silfra's ecosystem.

Conclusion

Tourist numbers in Iceland are projected to increase, therefore understanding tourist motivations and experiences, as well as the impacts of and mechanisms behind diver-related ecological disturbance are important considerations in developing tourism management plans. As a consequence of fin-generated currents and direct contact, diver disturbance in Silfra results in the removal of algae and the raising of sediment. This ecological disturbance is likely to escalate with increasing numbers of divers. Management of the Park should include monitoring Silfra's biodiversity for changes that may occur as a result of increasing dive-use. Education programs to inform divers about appropriate fin technique and contact behaviour are also recommended.

Not all stakeholders valued ecological aspects of diving in Silfra equally, illustrating the importance of understanding these values better and implementing management strategies specific to diving in Þingvellir National Park. Analysis of stakeholder perceptions indicated that a further increase in visitor numbers may damage the tourism experience; therefore, consideration should be given to limiting the number of visitors allowed into Silfra. These management strategies could simultaneously reduce future ecological disturbance and enhance the quality of the tourism experience. To achieve this, future research should focus on establishing carrying capacities for fissure diving and snorkeling in Þingvellir National Park, and monitoring both visitor disturbance on ecology and satisfaction with experience.



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Recreational activities, place attachment, and intended future visitation under climate change conditions

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Introduction

Climate is changing globally, bringing increasing average temperatures, more precipitation, and more extreme weather events. This is already impacting where visitors' travel, and will likely continue altering visitors' destination selection and behavior in the future (Gössling et al. 2012). Previous studies have shown place attachment is an indicator of future visitation to an area (Ednie, Daigle & Leahy 2010). Place attachment describes how bonded people are to a particular location, both emotionally and cognitively (Altman and Low 1992). Additionally, visitor's attachment to a place can alter their perceptions and behavior, making place attachment important to understand for visitor management (Kyle, Absher&Graefe 2003). This study aims to investigate the relationships between recreational activities participated in, place attachment, and intended future visitation under differing weather and environmental conditions resulting from climate change.

Methods

A two-stage cluster probability sampling design was utilized by choosing random days to administer surveys throughout Maine, USA, and random visitors once on-site (Scheaffer et al. 2012). Visitors were asked for contact information to send reminders about the survey, as suggested by a tailored survey design method (Dillman, Smyth & Christian 2009). The overall response rate was 43.4% (883/2036). A total of 416 visitors to Mount Desert Island (MDI) responded to a self-administered questionnaire after being randomly selected throughout Maine. MDI is the largest island off the coast of Maine, USA, and is home to Acadia National Park, which receives between 2.5-3 million visits annually. Visitors were sorted into clusters using a multivariate two-step cluster analysis based off visitors' identity, dependence, and belongingness to MDI. This analysis yielded three segments of MDI visitors: those who had low, medium, and high attachment to MDI.

Results

Those who had a high attachment to MDI participated in more activities and had greater participation in nature-based activities. The high attachment group participated in a mean of 6.3 activities on their trip to Maine, the medium group participated in 5.08, and the low attachment group participated in 4.63 ($p=0.00$). There were significant differences between percentage of each group that participated in nature-based activities, including: backpacking/hiking, biking, canoeing/kayaking, and viewing wildlife. The high attachment group had the highest percentage of participation in all nature-based activities.

Additionally, many visitors, especially those with low place attachment, indicated they would change their future visitation if certain conditions were altered (Table 1). Those with low attachment to MDI are the most likely to not return to Maine under potential climate change conditions. Those with high place attachment are overall less likely to change intended future recreational behavior with climate change.

Table 1. How varying conditions would influence the decision of visitors to MDI to travel to Maine on future trips, by level of attachment to MDI. Scale: 1 (extremely likely to visit) – 5 (extremely unlikely to visit), with 3 being “no effect.”

| | Attachment to MDI | | | Levene's stat (sig) | ANOVA F/ Welch (sig) |
|---------------------------------|-------------------|-------------------|---------------------|---------------------|----------------------|
| | Low (n=83) | Medium (n=168) | High (n=92) | | |
| Extreme weather events | 4.13 ^a | 4.02 ^b | 3.74 ^{a,b} | .71 (.49) | 4.72 (.010) |
| Hurricanes | 4.44 ^a | 4.42 ^b | 4.09 ^{a,b} | .09 (.91) | 5.14 (.006) |
| Reduced snow | 3.33 | 3.23 | 3.03 | 6.28 (.00) | 2.52 (.082) |
| Flooding | 4.17 | 4.20 ^a | 3.93 ^a | .36 (.70) | 3.08 (.047) |
| Increased presence of ticks | 3.58 ^a | 3.51 | 3.23 ^a | 1.00 (.37) | 3.79 (.024) |
| Increased presence of mosquitos | 3.54 ^a | 3.44 ^b | 3.12 ^{a,b} | 2.70 (.07) | 6.11 (.002) |
| Increased ice storms | 4.28 ^a | 4.07 ^b | 3.79 ^{a,b} | .01 (.99) | 7.45 (.001) |
| High wind gusts | 3.58 ^a | 3.44 ^b | 3.16 ^{a,b} | 2.08 (.13) | 6.08 (.003) |
| Increased rain | 3.65 ^a | 3.44 | 3.31 ^a | .43 (.65) | 3.73 (.025) |
| Heat waves | 3.26 ^a | 3.04 | 2.87 ^a | .63 (.53) | 4.55 (.011) |
| Beach closures | 3.15 | 3.18 | 3.10 | .27 (.76) | 0.36 (.701) |

^{ab} Means followed by the same letter are statistically significant at $\alpha = 0.05$ found using Tukey's Post Hoc test for equal variances, and Games-Howell when variances were unequal.

Discussion

Results are important because tourism is one of the largest industries in Maine and is a critical component of many local economies. Revenue from visitors to Acadia National Park supports the communities on MDI. Therefore, it is important to understand how visitation might be altered under climate change. To keep visitors returning to Maine with potential climate change conditions, it would be beneficial to increase visitor attachment to areas within Maine. Additionally, understanding how the recreational activities participated in affects place attachment is useful for management. To foster place attachment and thus make visitors less likely to change visitation behavior under climate change conditions, it would be useful to market and promote more nature-based activities at the visitor's centers or as part of a tourism advertising campaign.



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A segmentation approach in determining visitor motivation to engage in physical activities levels. The case of Spanish protected areas

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Introduction

In last three decades, the volume of published literature, acknowledged that wilderness and protected areas play an important role in natural ecosystem conservation and provision of wide variety of goods and services necessary for sustaining the wellbeing of human community in general (EUROPARC-España., 2013; Godbey & Mowen, 2010). Increased demand of society for participation in outdoor recreational activities during the leisure time, to date, instigate a number of scholars and community initiatives to focus their attention on promotion of protected natural settings as key “units” for the enhancement of human physical and mental health (Driver, 2009; Keniger, Gaston, Irvine, & Fuller, 2013; Romagosa, Eagles, & Lemieux, 2015). As protected area visitors do not represent one homogenous group (Barić, Anić, & Macias Bedoya, 2016; Farías-Torbidoni, 2011; Mehmetoglu, 2007), it therefore, seems crucial to provide park managers understandable empirical evidences about whether and to which extent visitors differ in terms of willingness to engage in different physical activities levels. Despite that similar investigations have been conducted, the majority of them were focused on visitors to urban parks than wilderness and protected natural settings (Kaczynski & Mowen, 2011; Larson, Whiting, Green, & Bowker, 2014; Veitch et al., 2015). Therefore, the purpose of this article is to segment the visitors to five protected natural areas in Cataluña (Spain), by their motivation to engage in physically challenging activities and then after to examine the influence of socio-demographic, trip, motivational and attitudinal descriptors on segmentation membership.

Methods

This study was carried in five wilderness areas in Cataluña (Spain), including Barcelona, Lleida and Tarragona provinces. Figure 1 shows the geographical location of the five protected natural areas selected. These were: Congost de Mont-Rebei, Port d'Arnes, Puigventós, Montserrat - Can Maçana and Estany d'Ivars. The main aspects considered for selecting these areas as representative were: (i) identical protection status (they all belong to Natura 2000 Ecological Network), (ii) similar size (no more than 1000 ha), (iii) provision of a wide variety of opportunities for participation in physical activities areas (Bedimo-Rung, 2005), (iv) considerable trend in vis-

itation (from 15.000 to 50.000 visitors per year) and (v) managed by the central private organization, Fundaci3n Catalunya-La Pedrera.

Data were randomly gathered from visitors by means of a self-administrated questionnaire with a face-to-face approach (n=1597). Data gathered were transformed and coded using the Statistical Package for Social Science 13.0 (SPSS). The cross tabulations and Chi-square Goodness of fit, at a 95% accuracy level was used to examine the differences between obtained segments in terms of socio-demographic characteristics and travel preferences. To identify underlying motivational domains, 9 variables related to the perceived importance of motivational statements for the decision to visit the parks were factor analysed using Principal Component Analysis (PCA) with varimax rotation. Finally, a series of logistic regression analyses were performed to investigate the influence of a number of predictor factors on the dependent variable, segment membership (*Sportings* versus *Non-sportings*).

Results and discussion

As shown in Figure 1 two distinct segments were identified and named: *Sportings* and *Non-sportings*. Findings revealed that segments differed significantly in the majority socio-demographic, trip, motivational and attitudinal descriptors. Logistic regression analyses indicated that the motivational and trip descriptors had stronger capacity in predicting the visitor affinity for the engagement in challenging physi-

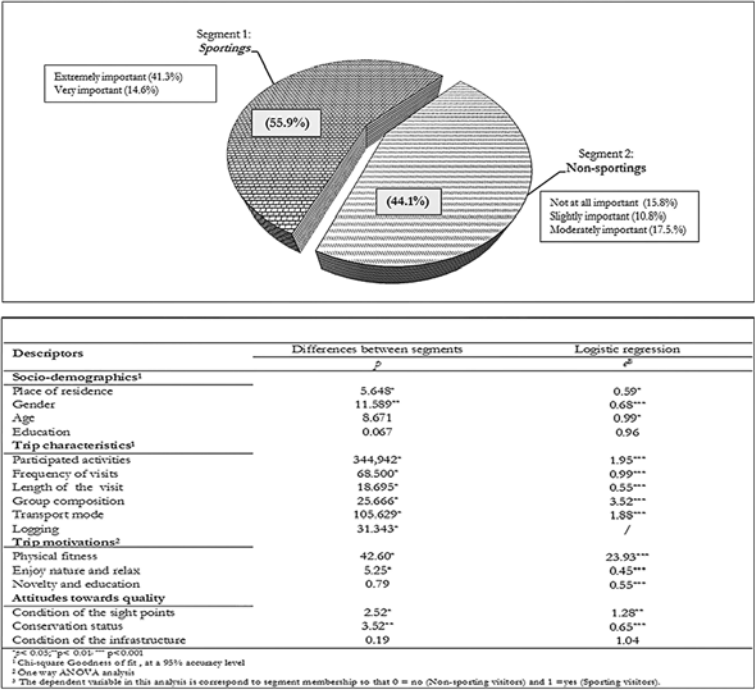


Figure 1. Differences between segments in terms of selected descriptors and their influence on segmentation membership

cal activities than socio-demographic and attitudinal ones did. Implications of study findings related to the formation of effective management strategies for promoting physical activities in protected areas are discussed.



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Segmentation of alpine downhill skiers and snowboarders in mountain protected areas based on motivation factors: a comparison between two skiing areas: Kasprowy Wierch area (TPN, Poland) and Skalná Pleso area (TANAP, Slovakia).

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Introduction and the aim of the study

Comprehensive knowledge about visitor socio-demographic characteristics, combined with visitor motivations and preferences is necessary for successful visitor management in recreational and protected areas (Cessford & Muhar 2003). Visitor profiles based on motivational factors may support design of targeted tourist offer and communication between the management of protected areas and tourists (Konu & Kajala 2012).

The main aim of this study is to segment downhill skiers and snowboarders of two ski resorts located in the Tatra National Parks (TPN in Poland and TANAP in Slovakia) based on visitor motivations.

Study area and methods

The Tatra Mountains are located in Central Europe at the boarder of Poland and Slovakia. The Tatras are the highest range of the Carpathian Mountains and are protected by two national parks: Tatrzański Park Narodowy (TPN) in Poland and Tatranský Národný Park (TANAP) in Slovakia. Both areas attract large number of tourists. Annual tourist traffic in TPN is estimated at approximately 3 million visitors (Czochański & Borowiak 2000, TPN, 2016). TANAP does not have systematic visitor monitoring, therefore there are no annual data on visitation levels (Švajda & Šturcel 2005). Both national parks have several designated skiing areas. This paper focuses on two most popular cable car areas: Kasprowy Wierch (Poland) and Skalná Pleso (Slovakia).

In order to gain information about the motives for choosing particular skiing destination and socio-demographic visitor profile, in 2014 and 2015 the on-site survey (PAPI technique) among alpine downhill skiers and snowboarders was conducted (N=404). Respondents had possibility of a multiple choice between 22 motivation factors, based on Konu & Kajala (2012), Zdebski (1979) and Winiarski & Zdebski (2008). In the next step, the answers were grouped in 13 categories and segments of visitors were formed using cluster analysis (K-mean cluster analysis, SPSS software).

Results

Four cluster segments were identified based on motivation factors: 1) sport and ski oriented group, 2) nature and well-being oriented group, 3) fun and entertainment

oriented group and 4) mixed type with multiple motivations. The first group: sport and ski oriented was the largest group in whole research sample (43%). The sport or skiing reasons were important motive in each cluster but in this group it was the only dominant motive, others aspects were not important for this cluster. The second group was nature and well-being oriented segment (28% in whole sample). Contact with the nature and love for the mountains were important for this group as well as rest and well-being (more than 80%). The third group was called: fun and entertainment oriented (14%). Respondents who belong to this group are predominantly motivated by entertainment (91,1%). Motivations such as rest/well-being or sport reason are also important for them as well as being together with own group. The last cluster was called mixed type with multiple motivations (15%). People from this group were mostly motivated by nature experience, love for the mountains as well as rest and well-being or sport reasons. Cognitive reasons, health, entertainment and ambitious were also important for them, but no motivation has a clear dominant role for this group. There is no major difference between general information about the respondents and the cluster type (Table 1).

Table 1. Cluster type among alpine downhill skiers and snowboarders

| CLUSTER TYPE among alpine downhill skiers and snowboarders | | | | | |
|---|---|--|--|---|--|
| Cluster characteristics | | TYPE 1 | TYPE 2 | TYPE 3 | TYPE 4 |
| | N = 402 (100%) | 43% | 28% | 14% | 15% |
| | Name of the cluster | sport and ski oriented | nature and well-being oriented | fun and entertainment oriented | mixed type with multiple motivations |
| Information about respondents (the most frequent answers among each cluster) | Criteria | dominant motive: sport/skiing – 66.5%, extra motive : ambitious 24.3% | dominant motive: nature experience – 87.4%, love for the mountains – 86.5%, rest/well-being – 81.1%, sport – 87.4%, extra motive: health 56.8% | dominant motive: entertainment 91.1%, rest/well-being 73.7%, sport – 80.4%, extra motive - being with own group – 60.7% | every motives are important for them, a group without main motivations |
| | Research area | KW (49.7%), SP (50.3%) | KW (47.7%), SP (52.3%) | KW (39.3%), SP (60.7%) | KW (54.8%), SP (45.2%) |
| | Gender | f (34.7%), m (65.3%) | f (51.4%), m (48.6%) | f (50%), m (50%) | f (38.7%), m (61.3%) |
| | Age | <35 (45.7%), 35-54 (41%), >54 (13.3%) | <35 (38.7%), 35-54 (53.2%), >54 (8.1%) | <35 (46.4%), 35-54 (42.9%), >54 (10.7%) | <35 (51.6%), 35-54 (38.7%), >54 (9.7%) |
| | Education | higher (70.5%) | higher (78.4%) | higher (76.4%) | higher (62.9%) |
| | Professional status | administrative workers (44.6%) | administrative workers (42.7%) | administrative workers (52.8%) | administrative workers (40.3%) |
| | The size of the place of residence | city <100 tys. (36%), city > 500 tys. (34.3%) | city <100 tys. (36.9%), city > 500 tys. (33.3%) | city > 500 tys. (35.7%), village (32.1%) | city > 500 tys. (43.5%), city <100 tys. (32.3%) |
| | Country of residence (among respondents from Kasprowy Wierch) | Poland (89.5%) | Poland (96.2%) | Poland (95.5%) | Poland (97.1%) |
| | Country of residence (among respondents from Skalnate Pleso) | Slovakia (64.4%), Poland (17.2%), Czech Republic (9.2%), others (9.2%) | Slovakia (65.5%), Poland (24.1%), Czech Republic (8.6%), others (1.7%) | Slovakia (50%), Poland (20.6%), Czech Republic (26.5%), others (2.9%) | Slovakia (50%), Poland (32.1%), Czech Republic (17.9%), others (4.8%) |
| | Group size | small group 3-5 (38.7%) | two people (48.6%) | small group 3-5 (47.3%) | small group 3-5 (38.7%) |
| | Frequency of visits | several times (36.8%), first time (26.9%), once a year (19.3%) | several times (44.1%), first time (15.3%), once a year (22.5%) | several times (28.6%), first time (28.6%), once a year (21.4%) | several times (35.5%), first time (27.4%), once a year (24.2%) |
| | Length of the stay | 3-5 days (27.2%), 1 day (22.5%), 2 days (22.5%) | 3-5 days (33.6%), 1 day (20%) | 3-5 days (42.9%), 1 day (17.9%), 2 days (17.9%) | 3-5 days (37.1%), 2 days (22.6%) |

Conclusions and outlook

Understanding the motivations of alpine downhill skiers and snowboarders is essential for the management of the national parks. The occurrence of a sports factor in each group is understandable due to the character of the respondents. There is large group of visitors interested in physical activity, rather than in nature experience. However, almost 50% of visitors (visitor type 2 and type 4) appreciate contact with nature and mountain scenery. 14% of visitors are fun and entertainment oriented and perhaps could be attracted by other ski resorts.

In future, a comparison with summer tourists, visiting both cable car areas is planned.



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NATURE-BASED TOURISM PRODUCTS

Sustainable Coastal Tourism on Long Island – A Preliminary Study

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The economy of Long Island in the state of New York in the United States has grown from a set of farm and marine based communities into a diverse service based economy. Historically and culturally the marine based fishing industry has been an important part of the Long Island economy. However, as the economic viability of commercial fishing industry declines alternate strategies need to be developed to preserve Long Island's coastal heritage and support economic development.

A potential alternate strategy is the continued development of tourism which is an important industry for Long Island both due to the attractiveness of the many beaches on the Long Island coast and the proximity to New York City. Specifically, a tourism strategy related to the Long Island coast needs to examine the development of recreational fishing and the development of water based tourism related activities such as sport fishing. However, in order to preserve the coastal heritage of Long Island it is also important that strategies involving recreational fishing and water based tourism be sustainable.

This pilot study, part of a two year project funded by the New York Sea Grant identified two coastal cities on Long Island. Based on survey data the study examined the demographic characteristics of tourists and attempted to understand their motivation for visiting Long Island. The survey instrument consisted of twenty questions and the tourists to be surveyed were selected at random at the tourist site in the two cities. The questions measured many variables including the following; tourism attraction preferences, reasons for visiting, communication medium through which the tourist was exposed to the destination, family size and age, the preferences for different types of attractions and activities.

The two cities surveyed were Port Jefferson on the northern shore of Long Island along the bay and Long Beach a town along the Atlantic coast on the south shore of Long Island. Port Jefferson features a major ferry route, a Long Island Railroad terminus, multiple bus lines, and an extensive network of roads. The city of Long Beach is surrounded by Reynolds Channel to the north, east and west, and the Atlantic Ocean to the south. Long Beach has 7 recreation and parks, 5 landmarks and historic districts, and 2 museums and a community center. The very different nature of the two cities provided a strong contrast in terms of both the demographic characteristics of the visiting tourists as well as their motivations for visiting Port Jefferson and Long Beach.

Preliminary analysis indicates that on average tourists visiting Port Jefferson are younger, better educated, have higher levels of income, more likely to be visiting family and friends, more likely to enjoy outdoor recreational activities such as boat-

ing, fishing, bicycling, and hiking, and more likely to be visiting other coastal areas for their next vacation in comparison to tourists visiting Long Beach. The implications of the results for the development of sustainable water related tourism activities need to be examined. For example prior research (Vaughan and Ardoin 2014) shows that tourists and residents have differing perceptions on coastal resource management. Given that Long Beach has more resident tourism in comparison to Port Jefferson the nature of tourism preference is likely to be different between the tourists visiting the two cities.

In developing an appropriate tourism strategy there will be a need to assess tourism carrying capacity and develop an integrated coastal tourism strategy for the entire Long Island region adapting the strategy to variations in local conditions. Past research has suggested that localized intensive tourism may be more helpful to preserve larger natural areas that are not affected by development (Dragulanescu 2014). The identification of appropriate local cities on Long Island that can facilitate such a strategy may be a possible way to preserve the coastal heritage and promote economic development. The development of such an integrated strategy will however need a more detailed study that examines the political economy of different local areas including zoning policies, water quality, transportation, real estate, the role of marine culture, and the extent of coordination that is possible across different cities with varied social, economic, and demographic characteristics.



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Creating a transnational ecotourism offer: The MEET Experience

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Introduction

Despite the environmental and cultural importance of the Mediterranean, many immediate and long-term threats to biodiversity and local cultures persist, including the region's reliance on revenue from mass tourism. Ecotourism has been demonstrated to be a form of tourism that is respectful to nature and culture which engages local people and brings significant economic benefits to local communities without the disruptive effects that mass tourism brings in its wake.

The Mediterranean Experience of Ecotourism (MEET) is an EU-funded initiative, designed to harness the potential of ecotourism in the region. Having recently completed its three-year project life at the end of 2015, and involved 25 protected areas in 8 countries, MEET's goal is to continue integrating new protected areas to expand the conservation and economic benefits of sustainable, respectful and nature-oriented tourism across the Mediterranean Basin.

MEET Approach: creating a Mediterranean DMO

The Mediterranean Experience of Ecotourism (MEET) is a target-oriented network of people and organizations managing ecotourism products built around the natural and cultural attractions of protected areas. The network acts as a Destination Management Organization of the involved protected areas and has a support structure that facilitates the joint design, management, marketing and sales of these products, by incorporating them as a unique destination with strong branding and professional support.

The shared objective of the network is to strengthen the conservation of protected areas while respecting local culture and history and generating economic benefits for the communities that live in and around them. The MEET DMO is managed by the MEET Association, through its secretariat, which encompasses the MEET Network members and a Destination Management Company (DMC).

The MEET Network is now formalized in an Association and continues operating under the supervision of the MEET Secretariat.

Methods & Tools

The methodology followed by MEET project and applied to the 25 protected areas part of the initiative, followed the main principles detailed below.

1. Ensuring Local buy-in: the Local Ecotourism Clusters

The MEET Ecotourism model, inspired by the Europarc Federation's European Charter for Sustainable Tourism (ECST), set a leading example for public-private

partnerships working towards sustainable tourism in the Mediterranean region. To build on, implement and spread the MEET model across the Mediterranean at a local level, MEET supported the creation of a series of public-private 'local cluster' partnerships between protected area management authorities and local tour operators and service providers. In each protected area, the management authorities have taken a leadership role in the design, development and improvement of their own ecotourism packages ensuring that conservation of natural-cultural features of each site remains their primary objective.

2. Defining a common ecotourism product

The process for identifying the final features during the project spam consisted of the following steps:

1. Defining the methodology – the «MEET Ecotourism product selection criteria»
2. Testing (ecotourism experts) the first pilot ecotourism packages and customer satisfaction questionnaire;
3. Identifying improvement needs per each package;
4. Testing (ecotourism experts) the improved packages and customer satisfaction questionnaire;
5. Selecting the Approved packages for promotion;
6. Organization of Fam tour with OTOs;

3. Capacity building, partnership and continuous learning

MEET tests and familiarization tours have been an important part of the process for the continuous improvement of the packages together with the capacity building training workshops, organized in between each testing round, to address the most pressing needs for training were addressed (Fig. 1).

Since the inception of the MEET Network in 2014, the following capacity building workshops have taken place:

- Ecotourism Product Development Training
- Local cluster reinforcement (conducted per country in order to adapt to local contexts)
- Guiding & Interpretation for Conservation
- MEET Branding, Communication & Storytelling

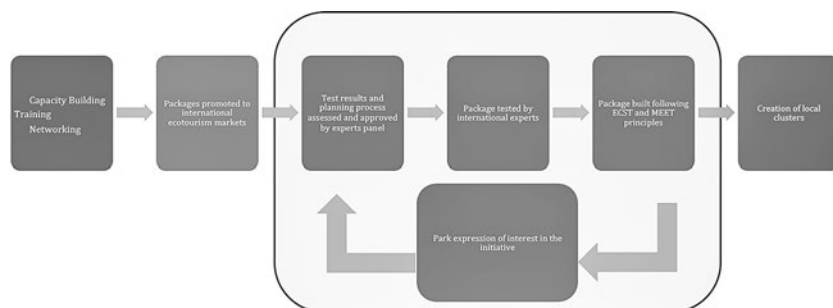


Figure 1. MEET Ecotourism packages Design & Improvement Process

Furthermore, various international coordination and networking events among the Network members (local clusters) took place during the project life, to strengthen the understanding and the buy-in of the initiative and share lessons.

A market-oriented approach

Specific market surveys were implemented, and about 50 Tour Operators from the target markets (USA, Canada and Australia, and UK) were contacted and took part in an educational to test and appreciate the product.

MEET project decided to develop its product towards a specific target, eco-tourists from long haul markets and with a common brand and marketing, coordinated by MEET DMO, and included in a common ecotourism catalogue to be promoted to outbound tour operators.

Financial contribution to conservation

As far as MEET packages are concerned, a minimum contribution (to conservation activities at park level) of 2-6% of the total package price has been set.

Lessons learnt

Cooperation is better than competition

Tourism providers in the surroundings of protected areas are often little organization with scarce experience and resources to dedicate to promotion. Having a single catalogue with the elements of the MEET brand facilitates the marketing of small, individual products located across a broad geographic region.

Eco-tourism is more than nature-based tourism

In the Mediterranean, eco-tourism is not just visiting a natural area, but “meeting a territory”, where the relationship between the Man and land has created particular features along the centuries.

Participatory planning improves capacity in tourism planning and management

The participative approach (local cluster) creates a stable platform that can generate consensus towards the Park management body's decisions, a place to solve any controversial, and a clear roadmap for reaching tangible results, positive both for the environment and for the local economy.

Adaptation to local needs and realities

Rather than imposing rigid schemes (i.e. for the financial contribution mechanisms) it is better to allow for adaptation to the different financial and regulatory realities of each protected area.

Training and capacity building is vital

Joint training and networking of protected areas and local service providers was a key component for the success of the initiative.

Nature-based tourism, protected areas and mining in Finnish Lapland

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Introduction

Tourism is growing industry and an important livelihood in northern Finland (Lapin matkailustrategia 2015 - 2018). Simultaneously, nature has an essential role in tourism. Many tourism resorts are located very close to protected areas and tourism in protected areas play an important role in the local economy (Huhtala 2007, Lapin matkailustrategia 2015 - 2018). While tourism has increased, the role of traditional livelihoods, like forestry and agriculture has decreased (Saarinen 2003, 2005). Simultaneously with tourism growth the metal mining industry and mineral exploration activities have increased notably in Finland (Kivinen et al. 2014). Although the growing mining industry has potential to bring positive socio-economic development in northern peripheral areas, the ungovernable growth of mining may adversely affect tourism and nature protection, and have raised some concerns among local people. As competing land use interests related to mining, tourism, forestry and environmental protection are likely to increase in the future, there is a need for tools for reconciling different land use needs. Our aim is to develop a new GIS-based approach that simultaneously considers ecological, social and economic values. Method can be used in classifying sites by their suitability for different land uses and locating areas with possibly conflicting land uses.

Methods

The study area is 14380 km² and located in Finnish Lapland. Study area covers three municipalities, which all have either operating mines or proposed mining projects in their area. Some of the proposed mining projects have raised concerns among local people. Tourism is important industry in the area and there are two popular ski resorts Levi and Ylläs. Other important livelihoods in the whole study area are forestry and reindeer herding.

To calculate the ecological value we compiled existing spatial ecological data from the study area. We assessed the ecological value based on the conservation value of the habitats and species in the area and identified biodiversity hotspots. For calculations we divided the study area to 1ha size cells. Secondly, to calculate the social value we collected spatial social data through internet-based Public participation GIS (PPGIS) –survey (e.g. Brown & Kytä 2014). In the survey respondents were asked to mark on the map places with different values e.g. recreation, gathering, hunting and fishing, beautiful landscape, biodiversity values. Respondents could also mark their development preferences regarding land uses (e.g. mining, tourism, forestry, nature conservation) in different sites of the study area. Thirdly, we assessed the economic value concerning timber production and mining industry. Geological Sur-

vey of Finland provides the in-situ monetary value of mineral resources. Data from the Finnish National Forest Inventory (NFI) and the multi-source Finnish National Forest Inventory (MS-NFI) were used to calculate the value of timber production in each cell (Tompson 2006). Finally, the spatial datasets compiled and collected are integrated in GIS to evaluate the location and possible overlap of valuable sites.

Expected results

Through spatial data analysis we can pinpoint areas that have high ecological, social and/or economic values. The simultaneous assessment of economic, ecological, and social values of target sites allows for their categorization into different classes according to their suitability for land uses such as mining, tourism and recreation, forestry and nature protection. The assessment further gives information on the location of sites with small or high risks of conflict between land-use alternatives and on the location of possible substitute sites.

Discussion

Sustainable land use planning should ensure conservation of biodiversity and the social acceptability of land management actions as well as the use of nature resources in an economically sustainable way. To be able to minimize the trade-offs between biodiversity losses and economic benefits, land use planners would benefit from a method that can be used for locating biodiversity and ecosystem service targets as well as socio-economically important areas in relation to each other. The developed new GIS-based approach considers simultaneously ecological, social and economic values of the landscape, and can thus promote sustainable land use planning in regional and local scale. The spatial overlay of different values can reveal potential synergies and conflicts between land uses, which is important information for the coordination and reconciliation of land uses.



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MTB Soča Outdoor (Slovenia) – A good case scenario

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The interest in extreme or adventurous sports has grown rapidly in the last decade. Activities such as skydiving, paragliding, zip lining, canyoning, swinging bungee etc. are experiencing a burst out in number of enthusiasts and challenge audacity. A huge progress has been made also in the corresponding technical equipment. Among mentioned adventurous sports, perhaps the most popular is mountain biking.

Since most of these activities happen outdoor, preferably in nature or even better in preserved and remote corners of nature, they inevitably have a significant impact on other users and inhabitants within these places; e.g. animals and their habitats, hikers, farmers, villagers, foresters, land owners, nature conservationists etc., who have been sharing the place more or less reconciled with each other since a long time. Now, this new presence has become an everyday reality and it brings a conflict between 'old and new users', which cannot be ignored. Therefore, these activities need to be properly integrated into the natural environment and into the legal system; which is easy to say, but much more demanding to accomplish.

The two major obstacles, which need to be taken into account are: (1) that these kind of activities evolve and spread much quicker than the legislation can handle and follow and (2) that the consequences of the impact of these activities on natural protected areas, species, their habitats and nature in general, will become evident and provable only after a certain amount of years, not immediately. Because of mentioned facts and issues, the legalisation and integration of extreme outdoor activities in the natural environment becomes a huge challenge. Furthermore, it becomes even more complex, when it comes to public events with 100, 200 or more people competing, e.g. racing on mountaineer paths, through the forests, etc.

In 2015 the Institute of the Republic of Slovenia for Nature Conservation (IRSNC), which is legally competent to decide regarding biking public events within nature protected areas, had to turn down a request for a planned mountain bike racing event – Soča MTB marathon as part of Soča Outdoor festival in Tolmin (Western Slovenia, Soča valley). The decision basically depended on the fact that part of the racing track was placed within the Triglav national park, where it is necessary to respect the existing protection regime. The impact of this decision on the corresponding public – organizers, participants, tourism workers, municipal council, and nevertheless on national public offices and ministries was huge. The IRSNC was severely pointed out in the media, pictured as an incompetent and unreliable entity and blamed for a possible loss of financial funds. Most importantly, the public awareness about urgent need of proper legal regulation regarding the issue on the national level has raised a lot.

After the waters calmed down a little, the IRSNC approached the main organizer of the rejected event with a suggestion to collaborate in finding together a good solu-

tion for the SočaMTB marathon event next year 2016. The representatives from both sides worked together and the invested effort paid off. For the 2016 event a new racing track was designed fulfilling adequately all the expectations and demands from those involved. Yet, there is still a lot to be done regarding the legislation and the proper integration of these activities in the natural environment, including agreements with land owners.

Visitor Management for Resource Conservation in Community-based Ecotourism, Thailand

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Introduction

Ecotourism has been developed as an encouraged approach to both preserving the natural environment and providing people in developing world with opportunities for community development. (Horwich, et al. 1993, p. 152). However, ecotourism can cause impact to natural and cultural resources as well as to visitor experiences if not well managed. If ecotourism is to be a tool for natural resource conservation, good management must be applied. The management strategies must aim at protecting resources while providing good visitor experiences (Manning, 2007). There are various visitor management strategies for tourism management that local communities can apply to fulfill the conservation goal. Their choice of strategies will depend on the capacity and efficiency of local communities as well as the resource implication. Eagles, et al, (2002) described four strategies approaches which can be used to manage tourism impacts of visitors on protected areas: managing the supply of tourism, managing the demand for visitation, managing the resource capabilities to handle use, and managing the impact of use.

Koh Pitakin Thailand is a small island located near Mu Koh Chomphon National park. Most are local fisheries. In 1992, marine resources were in crisis. The commercial fishing boats over-fished in the area close to Koh Pitak. The local people at Koh Pitak finally announced conservation measures to protect marine resources and introduced community-based ecotourism (CBET) to motivate community members in resource conservation. Ecotourism at Koh Pitak has become very popular that many visitors came to visit Koh Pitak, but limited resources and poor management has gradually created tourism impact. This paper aimed to examine how local community has applied visitor management as a tool for resource conservation and managing tourism impact.

Methods

The strategic management to link ecotourism to resource conservation was an essential success key. In this paper the process of finding visitor management strategies to encourage resource conservation and tourism impact reduction at community level was studied. PAR techniques such as mind map, focus group interviews on local leaders and village meetings to identify tourism impact issues and explore visitor management strategies was employed.

Results and Discussion

After CBET was introduced, the rehabilitation of marine resources by local villagers gradually started. By the village agreement, Koh Pitak allocated 2% of net income from CBET for marine conservation though most resources were in marine protect-

ed area jurisdiction. Local people realized to attract visitors, marine resources must be healthy. The other stronger connection of ecotourism to resource conservation was found from visitor management perspective through tourist activities designed to involve visitors in conservation such as coral reef planting and young crab release. The interpretation to build conservation awareness was used to communicate the value of marine conservation and local livelihood to visitors.

As Koh Pitak village had continued to receive high tourist visitation, the tourism impacts became more evidence. Profound problems were water scarcity, the expansion of houses to the sea to accommodate more visitors for homestay without proper waste management leading to sea water pollution, and loud noise from visitors partying at late nights disturbing other visitors. These impacts affected the local livelihood, the marine resources, and visitor experiences. The local committee on Koh Pitak CBET finally got help from researchers to build up a process to find strategies for tourism impact management.

The process involved all local people either they involved or not in tourism using the PAR technique so that local people had full participation, were able to identify the impacts and define the limits for tourism development with the guidance from the outsider researchers. The process employed mind map, focus group interview and village meetings to gather data and develop strategies. The impacts and visitor management strategies identified by the villagers was shown in Table 1. Villagers then conducted some visitor management strategies as an effort to cope with the impact. For improving water quality, use of microorganism (EM) was the preferable choice for local people and turned out to be an effective means. The resolution for fresh water scarcity was giving information to visitors so that they can help the villagers conserve the water. Additionally, the water recycling of household and visitor uses for farming turned to be an effective way to conserve water. The over capacity of the homestay was resolved by the local committee on Koh Pitak CBET that no one can expand houses to the sea without permission from the village administrative committee. The improvement of facility was done in some houses and pricing were increased accordingly. The committee on Koh Pitak tourism started to monitor tourism carrying capacity of Koh Pitak and survey of visitor satisfaction.

Conclusion

Negative changes of ecosystem as a result of human activities affected local socio-economic system and gave pressure to local communities to change their practices to improve situation. Koh Pitak used ecotourism for economic incentives as a strong motivation to conserve the marine resources. As ecotourism developed, visitor management strategies to cope with tourism impact were pursued. Koh Pitak chose to manage the demand/supply of ecotourism, the tourist behavior and the impact of use. Several strategies were carried out at community level. The effective strategies included using EM to improve water quality, designing of creative tourism activities, information distribution and interpretation program on resource conservation. This showed that the local community concerned to balance economic gained and the need for resource protection to provide good experience to tourists in their CBET management.

Table 1. Tourism impacts and visitor management strategies from local perspective

| Issues/problems | Choices of visitor management strategies | Effectiveness to solve the problem | Villagers' acceptance & ease to apply at community level |
|---|---|--|--|
| Sea water quality caused by direct discharge of human body waste to the sea | Information and education to local villagers | High | High |
| | Use Effective Microorganism (EM) to improve water quality | High | High |
| | Install waste water treatment | High | Low |
| | Monitor water quality | Moderate (need to apply with other strategy) | Low (difficult in some water quality parameters) |
| Fresh Water scarcity caused by increase demand of water usage by visitor | Information to visitors to conserve fresh water | High | High |
| | Water recycle from households to farm uses | High | Moderate |
| | Increase water storage tank | Moderate | Moderate |
| Loud noise, littering, and other nuisance activities | Information and education to visitors | Moderate | Moderate |
| | Regulations and enforcement | High | Low |
| Over capacity of the accommodation | Expand houses into the sea | Low | High |
| | Pricing management and improve facility | High | Moderate |
| | Monitor tourism carrying capacity | High | Moderate |
| Touching and standing on coral reef | Information and interpretation program | Moderate | Moderate |
| Low support from tourists in nature conservation | Tourism activities involving nature conservation | High | High |
| | Effective interpretation program | High | Moderate |



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Ecotourism in Balaton Uplands National Park

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Ecotourism takes place in natural areas, where visitors can enjoy all the benefits that only nature can give. A true ecotourist is willing to learn, has an understanding of the vulnerability and the diversity of habitats and species, appreciates local cultures, and attempts to have a low impact on the environment. Protected areas, national parks are often chosen as scenes of ecotourism, especially when visitors are offered a colorful, many-sided supply of activities and interesting sites to visit.

Balaton Uplands National Park

Balaton Uplands National Park, founded in 1997 on 57 000 hectares, is a diverse, mosaic-like array of habitats, consisting of 6 adjoining previous landscape protection areas. Due to the diversity of geological and geomorphological features and the local climate, wildlife and landscape are exceptionally appealing to tourists and researchers alike. The national park stretches along the north shore of Lake Balaton, which is the largest shallow-water lake in Central Europe, encompassed by hills, grasslands, lovely villages, vineyards. The once active, huge volcanic field of Balaton Uplands is a wonderland of unique geological heritage. The natural treasures of the Tihany Peninsula – part of the national park – were acknowledged by the European Diploma granted by the Council of Europe in 2003. Lake Balaton is the second most popular tourism destination in Hungary, with only the capital Budapest surpassing it. Regarding domestic tourism it is the most visited region in the country. The lake and the natural wonders of the national park enhance each other's attractiveness, thereby raising the touristic value of the region. The operational area of the Balaton Uplands National Park Directorate includes the national park and several other protected areas as well (3 landscape protection areas, 27 nature conservation areas and numerous ex lege protected objects, e.g. caves). The Bakony–Balaton Geopark – managed also by the Directorate – is member of the European and of the Global Geoparks Network, assisted by UNESCO. The key tasks of the national park directorate are to protect and interpret the natural values.

How to explore our national park?

There is a change in attitude of vacationers: there is a growing demand for venturing out of the hotel or campsite to explore the surroundings, walking in nature, gaining authentic experiences in gastronomy and culture. In accordance with the fundamental goals of nature conservation, the majority of our sites and nature trails lie in areas that are open to the public. However, some strictly protected areas may also be visited by our guided tours. We offer 14 exhibition sites and visitor centers, including 4 caves, one of which is Tapolca Lake Cave Visitor Center with the unique experience of underground boating. In Csodabogyós Cave, you can stretch your limits as

you explore the dripstones and the narrow passages in a caving overall. Salföld Manor is home to traditional Hungarian domestic animals, providing lots of fun for families and animal lovers. You can walk to the top of the spectacular remains of a basalt volcano and admire the view from above. Other sites include a fantastic observatory and digital planetarium, a traditional water mill, and the reserve of the largest buffalo herd in the country. Our most popular touristic event is Lavender Festival on Tihany Peninsula. It is an open lavender harvest, during which you can enter our own plantation to pick your own bunch. Nature lovers and avid birdwatchers can request guided tours to our wonderful, strictly protected wetlands, Kis-Balaton, an important Ramsar area and bird habitat, counting more than 260 bird species. Apart from these sites, there are many walking routes and educative nature paths for the ultimate exploration of all of the sections of our national park.

| <i>Registered visitors of exhibition sites and visitor centers, 2015</i> | <i>Column1</i> |
|--|---------------------------|
| Exhibition site / Visitor center | Number of visitors |
| Lóczy Cave | 16 281 |
| Lavender House Visitor Center | 33 111 |
| Szentgáli-kőlik Cave | 312 |
| Hegyestű Geological Exhibition Site | 42 015 |
| Salföld Manor | 24 389 |
| Tapolca Lake Cave Visitor Center | 147 156 |
| Csodabogyós Cave | 2 815 |
| Kotsy Water Mill | 2 660 |
| Diás Island | 7 459 |
| Folk House | 665 |
| Buffalo Reserve | 33 883 |
| Disused Sand Quarry | 218 |
| House of Forests | 5 198 |
| Pannon Observatory Visitor Center | 32 090 |
| Total | 348 252 |
| <i>Registered visitors of guided tours and events, 2015</i> | <i>Column1</i> |
| Guided tours | 17 563 |
| Events, open days | 29 125 |
| Open-air schools | 1 621 |
| Arts and crafts | 9 875 |
| Other | 7 469 |
| Total | 65 653 |
| Registered visitors altogether, 2015 | 413 905 |

Source of data: Yearly report of Balaton Uplands National Park Directorate, 2015

The wide selection of outdoor and indoor activities, places to visit, events, festivals, open days, open-air schools and educative programs for children can only reach the public by thorough communication, and a clear and purposeful marketing strategy. Cooperation with the governmental tourism bureau and other actors and organizations within the tourism industry, with NGO's and local people proves to be necessary and fruitful to reach our common goals.



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Potentials for Development of Rural Tourism in Blidinje Nature Park

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Protected areas represent the most significant destinations due to their beauty and original environment. Rural tourism, as a selective form of tourism, is in its very beginning in Bosnia and Herzegovina though the country is rich with potentials for development for this sort of tourism.

This paper investigates the possibilities of development of rural tourism in Blidinje Nature Park, as well as existing tourist offer. Significance of tourism reflects itself in the interaction of agricultural production, production of traditional products, presentation of tradition, gastronomy and touristic services – using existing resources of rural area as its constituent part. Thus, revitalisation of the existing traditional facilities, natural and cultural goods with new touristic purposes is very important. The aim of this research is to analyse the offer and to gain insight into the current condition of tourism potentials in the rural area of the park primarily with an aim of providing specific suggestions for development of existing resources, and of creating new products for improvement of touristic offer. The research methodology is based on the survey that was conducted in the period from September 2015 to April 2016. Survey was conducted on a sample of 200 visitors, and to explore whether we surveyed reliable and service providers in rural tourism.

We used the following methods for the research: field research, statistical data gathering and processing, research survey. With additional protection of natural and cultural values of the area and with promotional activities, Blidinje would certainly become an exceptional tourist attraction.

Educational and interpretative value of tourism offer as a prerequisite of sustainable tourism in protected areas in Vojvodina

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Introduction

Tourism occupies an important position within economic and development plans of both the government of the Republic of Serbia and the Autonomous Province of Vojvodina, which is reflected in numerous development strategies for this economic sector. Important segment of tourism offer refers to protected areas and ecotourism. There are 121 protected areas (national parks, special nature reserves, nature parks, landscape of outstanding features, nature monuments...) on the territory of Vojvodina. Protected areas cover 5.96% of the total area of Vojvodina. 25 protected areas out of the total of 121 have the potential of creating a tourism destination or an ecotourism site (Stojanović et al, 2011). The potential is represented through the variety of natural conditions in Vojvodina ranging from geological heritage, relief, to versatile flora and fauna. Tourism and ecotourism in protected areas are frequently discussed as an important topic with regard to their protection and total social and economic development.

In order to achieve mutual benefit from tourism development for the management in protected areas and tourism sector, it is necessary to apply sustainable tourism indicators. Numerous protected areas worldwide use the system of indicators that is linked to the condition of ecosystems and flora and fauna species, the reason for which the areas received protection status. However, it is of crucial importance that the set of indicators of sustainable tourism for a protected area, an ecologically sensitive area or an eco-destination does not refer only to ecology management, but also to tourism management. Educational and interpretative value secures a dominant position in the total tourism value of the protected areas. The paper explores the scope of its presence in protected areas in Vojvodina and its impact on the concept of sustainable tourism.

Background

Protected areas are becoming increasingly important as tourism venues, in part because the resources they contain are attractive to nature-based tourists and ecotourists particular. They also account for a growing proportion of the world's remaining relatively undisturbed natural habitats (Weaver, 2006). The 2014 UN List contains 209,429 protected areas covering a total area of 32,868,673 km². In total, 3.41% of the world's marine area and 14% of the world's terrestrial areas are currently protected. If Antarctica is excluded from the global statistics coverage, the percent-

age of the total terrestrial area protected is 15.4% (Deguignet et al, 2014). For some of these protected areas status tourism has direct relevance in terms of both benefiting from the protection of the environment from other forms of development and, if planned and managed appropriately, being able to make a positive economic contribution to environmental protection (Holden, 2000).

Management of protected natural values frequently has to cope with quite opposite tasks: (1) protection of natural values that are the main reason for establishing and regulating the protected areas; and (2) offering services to tourists who visit the protected areas. Protected areas are important tourism destinations, thus there is a sequence of indicators of sustainable tourism that aid planners and managers to organise the area according to the principles of sustainable tourism.

Methods

The paper basically aims at inventory and analysis of all tourism services that reflect the nature, history of nature and landscape, natural values, endangerment and preservation levels in protected areas in Vojvodina that are offered to tourists. Those include: visitor information centres, educational trails, thematic spots. Basically, they have educational character which furthermore assigns special role to understanding and respecting the nature, and nature protection issues. Educational and interpretative feature of tourism values frequently occurs as one of significant indicators of sustainable tourism according to World Tourism Organisation (Indicators of Sustainable Development for Tourism Destinations, 2004). In tourism destinations with natural landscapes and ecologically sensitive sites that are usually found in protected areas it is important to recognise the real educational value of the landscape and address to important topics – natural science and local tradition that may warrant greater attention. The value assessment includes the presence to the following segments: tour guides, printed material, information boards, thematic trails, visitor information centres, schools in nature, educational itineraries.

Preliminary analysis and discussion

The quality level of tourism presentation and interpretation of natural values is closely connected to the management model in the protected area and tradition of tourism development in the protected area. Best practice example is Special Nature Reserve Zasavica, managed by non-government organisation “Pokret gorana” (the oldest non-government ecology organisation in Serbia; their activities are linked to education and citizen participation in preservation of natural values; during only several years of management the programme of protection and development of various tourist activities has been created), which has become one of the leading tourism destinations among the protected areas in Serbia in a short period. Moreover, the increased interest in tourism development and introduction of new tourism services is noticeable (visitor information centres, educational trails, tourism and ecology information boards) in protected areas that exchange experience, establish some form of international cooperation or participate in cross-border projects. For instance, Special Nature Reserve Gornje Podunavlje received European Charter for sustainable tourism (Europark) in 2015, parallel to designing new tourism content (ed-

ucational trails), whereas Special Nature Reserve Ludaš lake included in its tourism offer a visitor information centre, funded and built by a cross-border project. Finally, by applying the high quality and professional approach to eco-destination management it is necessary to introduce new tourism services, attract higher numbers of tourists and achieve goals of sustainable tourism development. Otherwise, the early stages of sustainable tourism development in protected areas in Vojvodina would remain just an attempt.



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OUTDOOR EDUCATION AND INTERPRETATION

Environmental Interpretation and Forests: Perspectives of Managers and Agencies

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Beyond their ecological and commodity functions, forests are natural settings of scenic beauty, recreational activity and symbolic meaning. Peoples' attachments to forest settings and landscapes are fostered—discursively, and experientially—by resource management agencies, communities, non-profit organizations, business entrepreneurs, and others. Within these contexts, the services of environmental interpretation have been used to enhance personal and collective experiences of forest places.

Environmental interpretation is a term that refers to a variety of mediated and personal communicative services provided by resource managers to “reveal meanings and relationships of our natural and cultural heritage to various publics” (Tilden 1977). Agencies offer interpretation services and programs to educate and entertain visitors, accomplish management goals, and promote positive images. More than just information presentation or educational techniques, environmental interpretation personalizes meaning using stories, revelation, provocation, examples, imagery, and other linguistic and visual devices. Interpretive presentations are found in brochures, museum exhibits, guided and self-guided tours, on-site signage, and other personal and mediated communications.

Interpretive messages about forested landscapes are strategic, persuasive communication efforts intended to influence how people think about and value natural resource places. Though there has been considerable research about changes in visitors' perceptions, attitudes, and knowledge as a result of exposure to messages at natural resource places, much of the research on message *receptivity* has ignored issues about how and why certain types of messages are produced. The research presented here thus focuses on the *production* of interpretive messages, addressing questions about the interpretive goals and practices of agencies and organizations.

Three research questions guided this analysis: (1) how widespread are agency efforts to produce forest-related interpretive materials?; (2) what goals do managers seek in presenting and representing forests in their interpretive educational programming?; and (3) how are Vermont's forests and landscapes actually presented in the interpretive materials created by agencies?

Methods

The overall research project focused on how forested landscapes are portrayed in interpretive messages and media, and evaluated the intentions of agencies, organizations, and businesses in creating interpretive materials about forests. The study was conducted in northern and central Vermont, USA, an area that is about 75% forested, and which has numerous publicly- and privately-managed outdoor recreation and tourism sites oriented to and situated within forested landscapes (including the

Green Mountain National Forest, National and State parks and forests, and tourist sites emphasizing agricultural, forestry, and nature-based recreation).

The study was primarily qualitative, using multiple methods to collect and analyze data: discursive analysis of printed textual and visual educational and interpretive materials (websites, brochures, on-site signage); a mail survey of managers in regional agencies and organizations; and telephone interviews with several agency managers. The discursive analysis of textual and visual materials has previously been discussed (Derrien & Stokowski, forthcoming; Stokowski & Derrien, 2014); this presentation focuses specifically on results of the mail survey and telephone interviews. Questionnaires explored respondents' understandings of interpretation, the goals of interpretive programming, and managers' on-site interpretive practices. Interviews with a small sample of managers (n=6) solicited more lengthy explanations about the reasons for and practices of environmental interpretation. Interview data were recorded and transcribed; data were analyzed using content and thematic analyses.

Results

Discourse analysis of brochures and signage had suggested that many agencies and organizations were engaged in environmental interpretation work – thus, a comprehensive list of public, private and non-profit agencies and organizations in forest recreation and tourism was developed for the survey. But, only 36 of 87 questionnaires were returned (41.4%); about a quarter of these (n=10; primarily non-profit organizations and businesses) reported little involvement in or need for interpretive programming. Given the small sample size and the lack of a reasonable sampling frame, results are not generalizable. Rather, our intent is to observe patterns in the data and raise issues for future research.

The remaining 26 completed questionnaires represented primarily non-profit organizations (n=14) and federal or state agencies (n=10). Data revealed a wide disparity in definitions and meanings of environmental interpretation. In open-ended questions, respondents conflated environmental interpretation with environmental education, often describing top-down agency communicative practices (“conveying information”; “explaining to visitors”) as the function of their interpretation/education efforts. Only one respondent mentioned “inspiring” visitors, though several commented on increasing public “appreciation, consciousness and love of the natural environment.” Respondents used an array of traditional mass media sources to facilitate their communication with publics. Funding problems were cited as the key impediment to interpretive success. Few respondents could identify suitable measures for assessing interpretive effectiveness.

In telephone conversations, managers spoke eloquently about the use of environmental interpretation as a managerial practice, and expressed considerable support for this form of visitor engagement. Notably, though, they aggregated multiple forms of public outreach activities and communication methods and messages under this concept. Consequently, the unique qualities and contributions of environmental interpretation to resource agencies and organizations seemed under-developed, even when they stated considerable support for interpretive programming. The demands

of agency management practices seemed to favor, in many instances, more passive and philosophical support for environmental interpretation, rather than active investments in these activities.

Discussion

Public, private and non-profit groups concerned about forested landscapes communicate with citizens and visitors for purposes of education, promoting conservation understanding, and stimulating senses of place. Some goals are accomplished using practices of environmental interpretation – though the research findings presented here suggest that some opportunities may also be missed. This study suggests that environmental interpretation, while generally viewed positively by managers, has several potential concerns. The practice of interpretation sometimes over-emphasizes methods of communication; it may introduce tensions between education and entertainment; and it may present uncritically certain types of messages (i.e., activist). These characteristics call into question fundamental conceptualizations about environmental interpretation, and challenge managers and researchers to more carefully consider theoretical and practical aspects of public communications related to protected areas.



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Interpretative trails to enable an environmental education process in a Brazilian park

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Introduction

Environmental Education (EE) is the knowledge's construction process that has the capacity to encompass the socio-environmental interactions, recognizing the importance of stimulating the decision making, as well as the ethical and democratic foundations of life in society (Unesco, 1998).

In the Brazilian parks' institutional field, EE is an integrating axis of the public use, as it is a planned activity for all the categories established by the National System of Conservation Unities' law (SNUC), that regulate this kind of protected area in Brazil. Considering the process of parks' institutionalization and the consequent recognition of its importance for society, EE could enable a closer relationship among managers, adjacent communities and visitors (Pimentel and Magro, 2012). The Environmental Interpretation (EI) is based on practical experience of natural areas' visiting, to inform, to raise awareness, to educate and to encourage the ability of observation and reflection about the relations of people with nature (Tilden, 1977). This can provide a structure for carrying out educational activities and contribute to the promotion of social mobilization in support of environmental conservation. Thus, the EI is an enabling tool for Environmental Education, both generating positive impacts related to public use in parks (Cole, 2012). So, Interpretative Trails (IT) should stimulate new perceptions about nature based on a critical stance to allow this new environmental awareness. The objective of this paper is to present the development of two Interpretative Trails for Environmental Education in the Serra da Tiririca State Park (RJ – Brazil).

Development

The Serra da Tiririca State Park is located in Rio de Janeiro (Brazil). It was created in 1991 from a popular mobilization and protects Atlantic Rainforest biome. Two trails were chosen due to their intense visitation and proximity to the Itaipu's Archaeological Museum (MAI) and participant's schools. The Enseada do Bananal Trail (TEB) has 660 meters long. The Morro das Andorinhas Trail (TMA) has 2.6 kilometers long and has two belvederes that allows the landscape observation. The IT was developed for 833 meters of TMA (Fig. 1). The TEB and TMA were structured as ITs by selecting points with similar interpretive potential on track (Magro and Freixedas, 1998), as well as focusing on pedagogical objectives. To observe the perceptions of students from local public schools and check subjective responses about environmental interpretation points, guided tours were organized (Meireles et al., 2013).

The MAI collection shows the close relationship between the natural resources and local human history, from prehistoric times to the present day (Fernandes, Pimentel and Ferreira, 2011). Thus, to amplify its recognition by society, the Museum develops an EE process with local schools, consisting of ecosystems observation, guided tours to Park's trails, debates with local traditional community representatives, landscape reinterpretation and biodiversity identification.

The activities in TEB and TMA were based on the enhancement of environmental attributes that could rationalize to visitors, the region's institutionalization in a park. Thus, it was important to improve the knowledge of both micro and macro features, from Park's biodiversity to its geological formations. Nevertheless, socio-environmental characteristics had also been an inherent part of both ITs, as local history and designations, landscape transformation and the local humans' impacts.

Nine points of environmental interpretation were established for TEB basing discussions about biology, as species' scientific names and adaptations. Ecological information covered the landscape's features, the Atlantic Rainforest characteristics, as well the transition between marine and forest ecosystems. The presence of alien species and the need for environmental recovery stimulated environmental conservation debates. Information about the geological characteristics was also important. In view of the historical context, the Charles Darwin's visit on nineteenth century was highlighted. Considering the socio-environmental relations, the indigenous names were discussed as well as the past and present human occupations.

Six points of environmental interpretation were developed for TMA. It was also highlighted the biological information. But the human presence on the site and the possibility of landscape observation from the belvederes stimulated further discussion about local socio-environmental relations, as the landscape's historical development, the presence of residents in a park and issues concerning its limits and legal status. The TMA was tested with high school and elementary students, which generated two distinct models of guided and self-guided (folders) ITs. The first is ideal to work with schools and the second with visitors in general. Another practical result was the use of ITs as a complement to the school curriculum to facilitate the teaching and learning process, as indicated by the Brazilian National Curricula Parameters (PCNs). The educational structuration of the TEB's track was also important, so a textbook was produced to base all the work at schools, the Museum and the Park's ITs.

It should be noted that in both cases there were a previous educational process conducted with the local schools' support. Thus, it is considered important that the EI activities should be also related to these formal educational spaces. This ratifies the local institutions' relevance to enable the use of the non-formal learning space provided by the Park. The partnership among Park, Museum, Schools and University was fundamental to the project development.

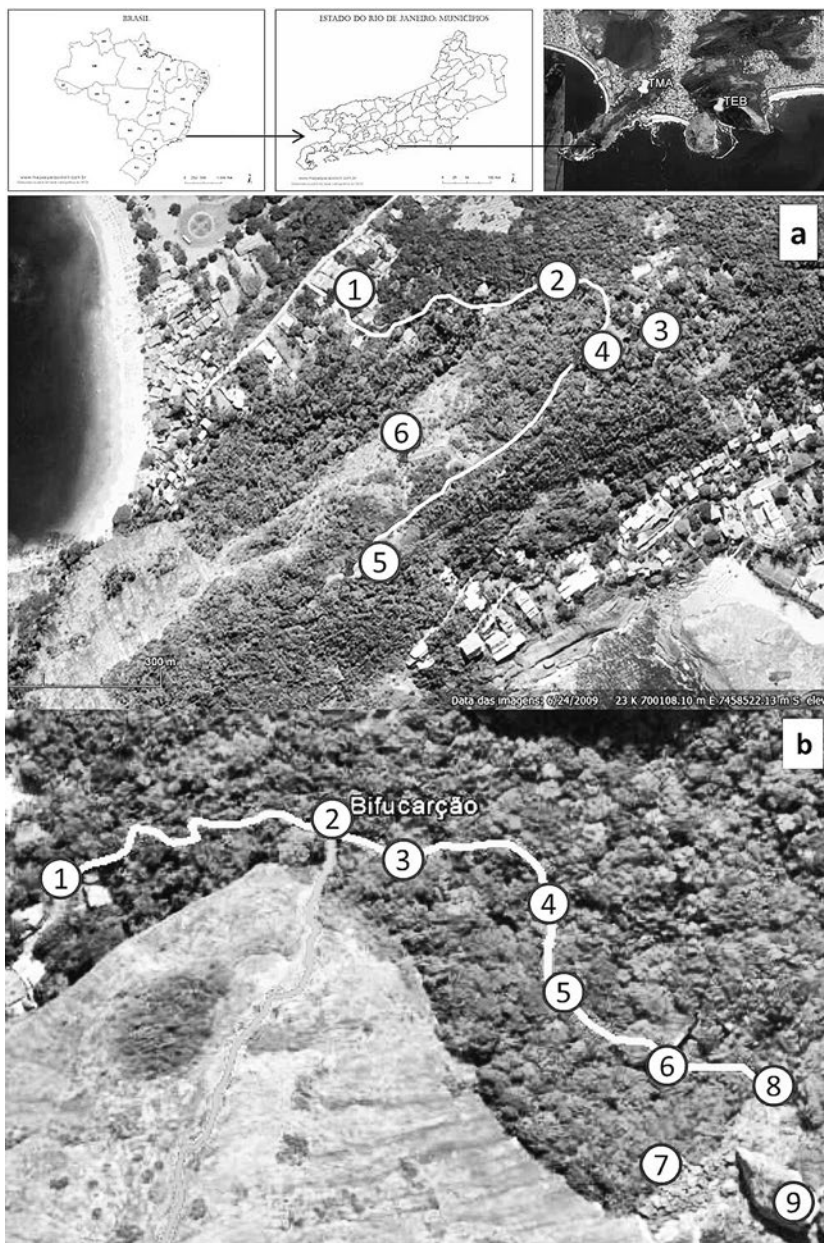


Figure 1. Brazil, the Rio de Janeiro State and Goggle Earth images pointing and detailing the two trails: (a) The Morro das Andorinhas Trail (TMA – Yellow and Red) with 6 Interpretations Points: 1) Wires everywhere; 2) Jerivá palm tree; 3) Traditional people place; 4) Jackfruit tree sight; 5) Itacoatiara belvedere; 6) Itaipu belvedere and (b) The Enseada do Bananal Trail (TEB – Yellow) with 9 Interpretations Points: 1) Starting point; 2) What goes up, must come down!; 3) Walking in the woods; 4) Forest giant; 5) Untouched nature?; 6) Climbing the walls; 7) Natural theater; 8) Invaders!; 9) Arrival. Reference: adapted from Meireles et al., (2013).

Conclusions

The ITs presented in this paper were developed from the formal space provided by schools but also involved other institutions as the Park and the Museum. All these interactions were enabled by different academic works, so the importance of this partnership increases due to lack of resources and personnel for management of environmental conservation and park's public use. Also, the activities necessarily addressed socio-environmental issues, such as history, politics and laws, ratifying the multidisciplinary basis of the process, which is in accordance with the environmental education's precepts. The production of educational materials was also considered important to potentiate a more qualified visit. However it is also achieved with trained trails' monitors. Both the Park and the Museum should continue to seek recognition of their importance to society and specifically from the local community. Therefore the developed ITs, based on EE key precepts of critical learning, is of enormous importance to empower local people for environmental management.



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Perception, interpretation and valuation of multifunctional landscapes of protected areas: a contribution to visitor management.

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The work presented was discussion of the thesis entitled “ Building indicators for the landscape of the State Park of Serra do Mar: Santa Virgínia.” The Park covers the northern portion of the Atlantic Forest of the State of São Paulo, Brazil, considered the owner of a valuable biological and cultural wealth. The conceptual bases used in the research were the Landscape Ecology and the phenomenological perspective of humanistic geography, basing the analysis of lived space and the lived world and the concept of multifunction Naveh landscape, taking into account the implicit values in the three areas of functions the landscape of this protected area: the bioecological; the socio-ecological- cultural and socioeconomic. It was established as main objective to create parameters for environmental valuation indicators in protected areas from the perceptions of those who experience it. Through literature review and interviews with representatives of user groups in this protected area, participants of its advisory council, sued the analysis and discussion of this multipurpose landscape for them. Characterized the experienced landscape protected area in three categories: the images that are brought in memory; the attitudes that give rise landscape features; the experience and knowledge built in the relationship with this landscape. The landscape features brought by the directors were included as parameters to measure biological diversity together with the cultural and ecological diversity as a common index of ecodiversidade the total landscape. The characterization of the landscape for these people, some of the perceptions of contact with the protected area, bringing the sensory memory, to define and characterize it. The concept of nature is implicit in this characterization: “ very lively nature; crystal clear (...); trees, trees, (...); mature forest.” This landscape is made up of the personal experiences of learning, imagination and memory and takes the subject to characterize it and idealize it, as this set of experiences, and are expressed not by their physical or sensory attributes, but by interpersonal relations that occur in it: it is the “place to bring the stronghold that has to be taken care of, the maintenance of biodiversity” drawing attention to the attitudes that must be to maintain the current features of this landscape. The landscape protects the man inserts in the world and portrays the scientific and objective attitude of man towards her, without giving a moral, aesthetic and spiritual vision. The “experience and knowledge built in the relationship with this landscape” is defined as the dynamics of life in this landscape, it is not a fixed line, but in motion, a link, a connection. A care-

ful reading of the landscape reveals the history of the place, its implications and bioecological relations, socioeconomic, and cultural and political. From the analysis of the characteristics, discussed with the board the multifunction this reported landscape as the expression of diverse interests and understandings of nature and its relationship with it - Uses, feelings, ways of acting, experiences and expectations as citizens of region. Regarding the bioecological field of multi-function this landscape of the protected area, the board pointed out as main functions: the preservation of natural resources of the Atlantic Forest, conservation and environmental interconnectedness, forming a mosaic of conservation of the Atlantic Forest with the other cores and emphasized the biodiversity maintenance functions of water protection and calling for the protection of the remaining forests in the region. Indicators that the directors elencaram for these functions are: biodiversity, protection of the protected area in conjunction with other agencies and community research for the protection of forests. In relation to the socioeconomic field, they brought a fundamental functions: to generate income for practical use of natural resources for conservation and occupation of ordination in the surroundings of ecotourism and environmental education practices as a product of both the municipalities and the Park, beyond the preservation of traditional practices and their communities. Indicators that the directors elencaram for these functions are: the development of rafting and other tourism and environmental education activities generating income, other activities that generate income for the surrounding communities, the areas of the park protecting water resources, trails with paid monitoring and local monitors for environmental education. Regarding socio-cultural areas, they understand that the Conservation Unit has the function: to be a beauty and bring peace (Eden / nirvana), pride and privilege that should be left for future generations as an educational function, cultural preservation and research. Indicators that the directors' elencaram for these functions are: the children themselves with thoughts have changed in relation to environmental issues, training and communication communities and surrounding municipalities, training schools. As to reflect a model that reflects the interactions between the listed functions and indicators bring as important point to greater effectiveness of the actions of the Council and the participation of all in the management of the Conservation Unit. We conclude that we need to order the territory not to, but everyone involved in this landscape taking into account the look of each of the actors of the protected area and the interaction of different scales of lived spaces, 'landscapes of scenery'. Regional spatial policies should integrate with the municipal space policies and more local scales of use and experience of the residents of the protected area and its surroundings. The spatial planning can only capture the realities and the most superficial relationships in the living room if you do not consider the views of the whole society involved in this landscape: they view their roles; I think in creating a healthy dynamic experience; how they perceive and act emotionally in this space, where it operates the protected area. The landscape identity of the protected area can take hold when we take into account the landscape identities of human experiences shared in space-time and the dynamics of the life experience of all, fostering the dialogue of people with the environment. The worldview that landscape takes place in the presence of this experience with the protected area.



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Outdoor education in protected areas from viewpoint of geographic education

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Emel (2015) said that outdoor education helps one to develop environmental awareness, attitude, knowledge, time management, social relationship, success motivation, emotion control of people etc. Fletcher (2015) further explored the role of ecotourism in the neoliberalisation of environmental education. Ewert & Sibthorp (2014) identified two branches of outdoor education: environmental education and adventure education. According to them, outdoor adventure education is a variety of teaching and learning activities and experiences that usually involve a close interaction with an outdoor natural setting and contain elements of real and perceived danger or risk in which the outcome, although uncertain, can be influenced by the action of participants and circumstances. Ting & Siew (2014) found that students develop better in their critical thinking skills and science process skills after undergoing an environment-based education. Probably, Gilbertson (2006) did the most complex study of outdoor education (Figure). Outdoor education is irreplaceable method in geographic explorations, but papers which deal with mentioned topic are rare. This research will try to put in focus outdoor education in protected areas from geographic point of view.

Planned and organized terrain observations in protected areas might be connected with outdoor education in geography. Observing the terrain based on written literature is the most effective way of learning. Also, terrain observations provide insight and information on recent changes in the geographic space, which may have a scientific and social importance. One can see changes in geological structure, relief, microclimate characteristics, the hydrological facilities, in soil or plant and animal world. One of the fastest process on the terrain is anthropogenically induced denudation, e.g. cutting forests, on the steep slope, in the time of rains. Earthquake, torrential flows, but also man, easily can break schist or loess rocks. Processes in nature are longer lasting than a visit of pupils, students and others. However, an analysis of the situation can point to their developmental stage. Dissolving the limestone often affects the modification of relief forms size. Relief transformations can be expected or caused by different tectonic and others phenomena triggered by endogenous and exogenous forces. During outdoor education potential landslides can be identified. People are rarely present in protected areas, therefore short stays of scientists and students are precious. Microclimate characteristics cannot be seen during a short stay. But, they can be identified by certain effects that are visible to the living world, primarily on vegetation. Consequences of drought, dominant wind, flood as

well as influence of lakes or seas are visible on terrain. They are one of the best lessons in geography outdoor education. Recording observations in outdoor education can be valuable in terms of control of bounty source, or the regime of watercourses, stagnant water monitoring. The study of plant and animal life is impossible without outdoor education. On this occasion, it is easy to identify ecological problems. Emel and al (2015) recognize that different approaches in environmental education bring about varied outputs such as increasing environmental knowledge level, having favorable environmental attitude, increasing environmental awareness, environmental behavior change, actively participate in solution of environmental problems etc. The experience gained during the outdoor education is more effective than the perception of ideas, which is acquired indoors during description of phenomena, processes, problems. Contemporary technique enabled aids, which are available even in the absence of AC power. Some of them are specially designed for use in geospatial explorations. This has opened up a number of options that can record observations and states. Outdoor education in protected areas has many advantages, but also disadvantages. Nature in protected areas is usually sparsely populated or uninhabited. The presence of population in the protected areas or near it, can be very useful. They represent the best experts, because they live in that territory. Protected areas practice minimum use of economic and non-economic activity or none at all. Settlements are almost non-existent. Therefore, the natural characteristics of the area are not disturbed and as such are excellent for research. Research can experience problems such as: relief barriers, adverse weather conditions, natural disasters etc. Also, money (for transport, equipment, etc.) is often seen as limiting factor for the organization of outdoor education.

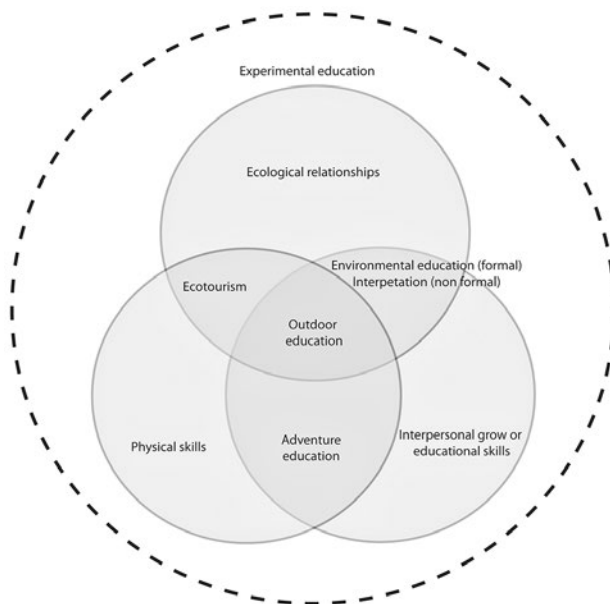


Figure 1. *Gilbertson's model of outdoor education*

Features of outdoor education in protected areas are: short retention, compliance with rules of conduct in order not non-deterioration. Visiting the area and observation phenomenon, process and shape are possible and are organized in larger groups. This way could be described as 'outdoor education for beginners' and it is very important in geographic education at all educational levels. Any research that requires a longer retention in the field should be organized in smaller research groups and it represents 'advanced outdoor education'. The results of such research can have scientific significance, which could prove useful for education in doctoral studies.

Considering outdoor education in geography, according to Gilbertson's model (2006), we can suggest the following conclusions. Term 'ecological relationship' refers to causal relationships in nature. It is base of geographical way of thinking. There is explanation for every phenomenon or process in the nature (Figure).

Development of 'physical skills' involves obvious activities and learning how to use equipment. Nowadays, for example, Global Positioning System (GPS) is necessary for outdoor education. GPS an accurate worldwide navigational and surveying facility based on the reception of signals from an array of orbiting satellites. 'Educational skills' mean knowledge how to find right facts in direct experience. Specialization of these skills has development character and it is directly conditioned by experience. The aim of 'Environmental education' is to acquire knowledge of prevention and salvation of environmental problems. Geographers are competent for environmental education, but they have not used it enough in society. Only 'adventure education' is for enthusiast, because they use perceived risk to enhance and influence learning. In geography, it is most often used in science explorations. Gilbertson's model can be used when checking whether all elements of outdoor education included in the plan.



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Special Nature Reserve Obedska Bara: Good Example of Organization of Teaching in the Field

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Development of science and technology created a need for a new approach to educational and pedagogical process in schools, especially in the field of natural sciences. There is a need for a modern, new approach that increasingly involves the implementation of active learning, practical knowledge and activating students as subjects of teaching. Vocational training of teaching staff is also necessary for implementation of innovation in teaching and education as well as relocation of classrooms into nature. In 1908, the first classroom in nature was made in the experimental garden of the famous Men's Teacher Training School in Jagodina.

One of the teaching forms in the field is the educational excursions. The task of this type of teaching is to move students from classrooms and the learning of natural phenomena and processes through the text in books. The highest quality knowledge is experiential one to which students come personally, palpable, experienced through the senses and emotions. Educational excursions allow children to experience the phenomena, processes, wildlife in their natural environment, directly, which is the essence of the natural sciences.

The advantage of teaching in the field is that it allows the adoption of educational content through observation, noticing and conclusions in nature. Educational excursions encourage the socialization of students, fostering friendly relations, comradeship, unity, work in a group. Students acquire knowledge about nature, cultural and historical heritage, they are educated to preserve nature and gain proper environmental attitudes. Staying in nature, through work, exercise and learning students are able to strengthen their health and physical fitness and develop work education and habits (Nikolić 1994).

The aim of this paper is to show how educational excursions can and should be implemented in education of primary school children. The paper shows detailed preparation of educational excursion for eighth grade, and also describes possible implementation of one-day excursion for fifth grade (Collection of plants for school herbarium) and sixth grade (Making school collection of insects). Special Nature Reserve (SNR) "Obedska bara" was used as a teaching facility.

Special Nature Reserve "Obedska bara" is located in the southern part of Srem, near the Sava River, at altitude between 71 and 82 m. The total area of the reserve with the highest level of protection is 9820.0 ha. Obedska bara is bounded by the



Figure 1. Location map of the SNR Obedska bara

Sava River in the south, while in the north it stretches across southern outskirts of rural areas of the villages of Grabovci, Obrež and Kupinovo. It is located in the municipality of Pećinci, 45 km away from Belgrade and 35 km from the international airport "Nikola Tesla". It is 20 km away from regional road Ruma - Šabac, 30 km from Šabac, while 70 km from Novi Sad. Special Nature Reserve in contrast to the narrower space of Obedska bara covers significantly greater area of 16,133.43 ha (Martinović-Vitanović 1996) (Figure 1).

The first administrative measures to protect Obedska bara date back to 1874, when it was protected as a hunting ground of the Austrian imperial family in the Habsburg monarchy while in 1919 it became a famous hunting area of the Karađorđević dynasty. Based on the Ramsar Convention (1977), this area has been put on the list of wetlands of international importance. Obedska bara is also on the list of areas of particular importance for European birds (Tomić et al. 2004).

Special Nature Reserve "Obedska bara" is recognizable by preserved natural values and their diversity. Mosaic shift of habitat conditions contributes to existence of diverse flora and fauna in small area and which as endangered are classified into rare, endangered and vulnerable species (Gajić & Karadžić 1991; Karapandža 1995). The future of Obedska bara is promotion and protection while preserving and ensuring ecologically sustainable and equitable use of natural resources (Besermenji 1999).

Students are trained in the field to actively and independently come to knowledge by observing, noticing, reasoning, connecting the existing knowledge, cooperating among group members and of course by collecting information during conversations with a guide and teacher in the SNR Obedska bara. After returning from educational excursions, students submit reports at school and in the form of presentations they communicate their findings to other students. In the filed, specific endangered plant and animal species are photographed, as well as the students

themselves during. These photos can serve to students for electronic versions of herbarium and insectarium, and photo board of field work in the school hall that would serve to other students as an educational and motivational tool. Of course, such panel has aesthetic significance and contributes to the quality of school.

Educational excursions can be applied in different parts of geographical and biological contents at different levels. The paper shows the application in fifth grade when creating biological herbarium, in sixth grade when creating insectarium, and in eighth grade for realization of exercise "Visit to a protected natural area". Particularly great possibilities of application of educational excursions are in teaching of eighth grade, where they can serve for teaching in the field and studying specific characteristics of different types of ecosystems, with emphasis on the degree of threat and protection capabilities. Educational excursions can be introduced also as a form of work in realization of contents planned in biological or environmental section.

Whatever the application of educational excursions is, it is certainly necessary and as frequently as possible. This is a special type of teaching that contributes to the overall high quality mode of development of students and should to replace the traditional form of teaching that is still deeply rooted in the school system of the Republic of Serbia. This way of work contributes to the development of environmental awareness, health, interpersonal relationships and of course the high quality of knowledge acquired in nature, with tangible examples. After educational excursions, students feel pleasure and desire for further research, which is the purpose of scientific research in the open space.

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GEODIVERSITY AND GEOHERITAGE

Re Cycling and Geotourism: an adventure approach to appreciating physical landscapes

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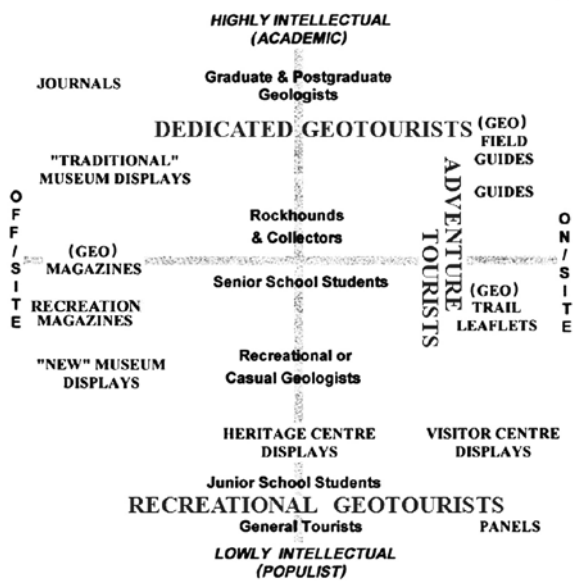
A Rich European Geoheritage

Europe's present-day rich legacy of geological material in museums, universities, archives and libraries – its cultural geoheritage – is a consequence of its citizens' 400 years of geological inquiry (Hose 2016a). Its recognised geosites and geomorphosites and their associated landforms, rocks, minerals and fossils (or geodiversity) – its natural geoheritage – populate both the historic and modern geological literature (Hose 2016b). The recognition that many of the literatures' geosites and geomorphosites, and from which the specimens in the collections had been gathered, were lost, degraded or were no longer accessible led, from the mid-20th century, to the development of geoconservation measures to protect what was left (Hose 2008). Further, the recognition geology in general and geoconservation in particular were poorly regarded and understood by the public geologists and others, from the late 20th century, developed geotourism provision (Hose 2011; 2012), latterly with an emphasis on geoparks; indeed, it has been recognised that 'In today's economically stretched climate, tourists are a valuable source of local income. The encouragement of the tourist industry to include geodiversity within its remit is therefore high...' (Burek 2012, 45). Whilst traditionally tourism provision has focussed on mass market provision there has been a growing interest in developing niche tourism (Novelli 2005) which can encompass geotourism (Hose 2005) and adventure tourism (Shephard & Evans 2005).

Adventure and Geo(Tourism)

Europe has witnessed in recent years a growing interest, perhaps resurgence when historical antecedents are noted, in physical activity - especially adventure - tourism. Between 2009 and 2013 it was estimated (Anon 2013) that its populations' involvement in adventure tourism increased from 25% to 47%. Geotourism provision, especially interpretative media, could most naturally encompass some adventure tourism provision – particularly when focussed along hiking and (road and mountain bike) cycling trails. 'Recreational' and 'casual' geotourists are primarily pleasure-seekers, focused on social interaction at (preferably) interpreted geosites. Their chief interest is informal educational experiences for themselves and for accompanying children (Hose 1997; 2000) and generally they are not adventure tourists. However, a minority are climbers, hikers and mountain bikers – individuals who, like true adventure tourists, choose to explore - often with an interest in the Nature of their surroundings – 'wild' areas. A minority of geotourists are 'dedicated' (Hose 2000) and a natural market for adventure tourism; they purposefully select and will explore 'wild' and remote areas to visit geosites and geomorphosites. In many of their characteristics adventure tourists cross over with, especially dedicated, geotourists. For example, of the former 37% are graduates (Anon 2013, 8) and of the latter just under

A TYPOLOGY of GEO/ADVENTURE TOURISTS and INTERPRETATIVE MEDIA



30% to 50% (Hose 1998) and generally around 40% (Hose 1996) are graduates. Likewise, as for modern and historic geotourists (Hose 2008), they '... ranked areas of natural beauty as the most important factor in choosing their last destination, followed by the activities available and the climate of the destination' (Anon 2013, 9).

Adventure tourism within aesthetic landscapes combines physical activity, cultural exchange or interaction, and engagement with Nature. It can require significant physical or mental effort and takes participants out of their 'comfort zone'. Five of its major activities are mountain, hill and trail walking, road biking and mountain biking. These are generally 'soft adventure' (Shephard & Evans 2005, 203) activities in that they provide experiences beyond those associated with mass tourism, are spiritually and intellectually rewarding, and are generally safe and without excessive physical demands. They appeal to a broad range of participants (in terms of age, fitness, and experience) and can readily be undertaken by beginners. They can accommodate a range of budgets and timeframes and can be integrated within interpretative provision such as geotourism. The recent, albeit USA based, report on adventure tourism (Anon 2013, 3) mentions archaeological expeditions, bird watching and safaris - but not geotourism - together with backpacking, hiking and cycling as forms of soft adventure tourism. The author's first geotourism writing was specifically aimed at hikers (Hose 1974) and it noted '... (in the interests of conservation) it is often best to take note, or photograph an exposure, than to literally hammer it into the ground. By conserving now we will leave geologists of the future something to observe and research upon.' Geoconservation permeates his approach to geotourism in the specific UK areas and geotrails herein examined.

Some UK Geotrails Considered

UK trails with a geotourism focus and primarily for cyclists, but also suitable at least in part for hikers, are examined and critiqued in terms of their accessibility, interpretative media and historical basis. Most of these cyclist focussed (geo)trails incorporate a holistic approach to interpretation with the inclusion of strictly non geological, especially historical, material as added interest for users. It is worth noting that such consideration are nothing new for it was noted at the close of the 19th century that ‘... if you can, combine with your strolling some such pleasant study as botany, geology, or some other branch of natural history. The best form of exercise by far and away is tricycling.’ (Stables 1889, 102). A particular feature of these (geo)trails is the use of multi-modal transport options, a much promoted modern approach to recreational cycling that has historic antecedents, ‘We frequently took long as well as short journeys by rail in addition to our bicycle riding ... By taking advantage of these facilities for travel, we saw a large portion of the country [England] not covered by our route on the bicycle.’ (Chandler & Sharp 1888, 77). Specific (geo)trails examined include those for: Milton Keynes to Newport Pagnell; Bristol to Bath; the Tissington Trail; and for the North Pennines Geopark. That examination incorporates a theoretical geotourism interpretative underpinning (see figure) based upon already published and some unpublished (Hose 2003) geotourism research is given. A historical perspective and overview is also provided as the basis for the development of future geo(trails). Finally, recommendations for the content and approach of (geo)trails for adventure tourists are also given.



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Protecting & Evaluating Geoheritage in Slovenia – Today's Issues & Challenges

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Abstract

Although Slovenia is a small country, it boasts with well-preserved diversity in natural and cultural resources. Many merits go to the first conscious and forward-looking individuals, which at the end of 19th century came up with the idea of protecting the worthiest parts of nature; one example is the proposition for protection of the Triglav lakes valley, handed by A. Belar in 1908 to Austro-Hungarian government.

Today, the worthiest parts of nature on the territory of Slovenia are protected under the Nature Conservation Act (NCA) and other accompanying regulations. NCA acknowledges two pillars of nature conservation: (1) natural valuable features protection preservation, and (2) biodiversity. Preservation of biodiversity is mostly provided through Natura 2000 network and analogous approaches, while protection of natural valuable features covers the entire natural heritage in Slovenia. In nature these represent: palaeontological sites, karstic and glacier phenomena, waterfalls, lakes, forests, botanic parks... By the NCA they are sorted in different categories: geological, geomorphological, hydrological, dendrological, zoological, botanical, ecosystemic, designed and valuable landscape, minerals and fossils.

Understandably, not all natural phenomena are protected as natural valuable features. To be recognized and protected as a natural valuable feature a natural phenomenon has to meet certain defined criteria; it has to be either: extraordinary, rare, typical, preserved, of scientific or other appointed importance. According to NCA is the Institute of the Republic of Slovenia for Nature Conservation (IRSNC) to carry out the process of recognition of natural valuable features - known as »evaluation«, and the Minister to designate them.

Currently, the IRSNC expert group is preparing an expert report about more detailed criteria for geomorphological natural phenomena. The challenge is to set the defined criteria in a way that they: (a) enable us to distinguish valuable natural phenomena from the ordinary ones, (b) ensure that all valuable natural phenomena are included, and (c) are in accordance with current laws and regulations.

Another, more complex issue the group has been dealing with is how to incorporate the concept of geodiversity into Slovenian nature conservation system. Currently, there are bigger geomorphological and geological natural valuable features determined, but in our opinion these should be evaluated also in terms of geodiversity preservation.

Geodiversity as a fundamental determinant in distinguishing geoparks in Southeast Europe

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The problem of defining geodiversity in the broader area of South-eastern Europe seems to result in the unwillingness of their getting proclaimed and nominated into the European network.

The question of evaluation and general research of geo-diversity and seclusion of Geoparks in SE Europe is burdened with many problems. Among the first is a problem of lack of recognition of the importance of the same. Although the question of Geoparks is "typical geographical" (as regards space as a subject of study in geography) it is just ignored by geographers. Some of the most important reasons for this situation in the field of research of geological diversity and seclusion of Geoparks are: different approaches to the concept of geo-diversity (narrower and a broader approach to defining), partly the failure to recognize the meaning of seclusion and protection of the most valuable parts of geological diversity (geoheritage) and political and administrative problems, which in some countries of South Eastern Europe are very pronounced, etc.

Geographical space has numerous elements in its content that give it a distinctive diversity. Summing the geospatial content, its features and functions, makes it possible, to understand that geodiversity is a unique system, distinct in its content and functionality, recognizable by its specific locality. It reflects the condition for the existence of the environment, as a location for living beings (humans notwithstanding) with all the peculiarities conditioned by the geospatial diversity. The existence of geo-diversity has been established and is not reduced to a plain physical-geographic system.

Geodiversity is often defined by diverse natural environment: geological, geomorphological, hydrological, etc.; while neglecting the fact that the geographical environment and therefore geodiversity includes all contents of anthropogenic origin, and here we present some of those definitions:

"The link between people, landscape and their culture: it is the variety of geological environments, phenomena and processes that make those landscapes, rocks, minerals, fossils and soils which provide the framework for life on Earth (Stanley, 2001). "The range and diversity of geological (rock), geomorphological (landform) and soil characteristics, units, systems and processes" (Australian Heritage Commission, 2002).

Geodiversity is defined as the natural range (diversity) of geological features (rocks, minerals, fossils, structures), geomorphological features (landforms and processes) and soil features that make up the landscape. It includes their assemblages, relationships, properties, interpretations and systems "(Gray, 2004).

The very concept of geodiversity was introduced at the beginning of the 1990s in the works of Australian and Tasmanian scientists, mainly geologists, hence the definition:

The value of this kind of diversity on our planet was recognized by UNESCO which has made its task to preserve it. The initiative “European Geopark” has been launched in the framework of the European Project Leader II, entitled “Development of geotourism in Europe” and is supported by Réserve naturelle géologique de Haute-Provence (France), Maestrazgo Cultural Park (Spain), Natural History Museum of the Lesvos Petrified Forest (Greece) and Geopark Vulcaneifel (Germany), where a network of European Geoparks “European Geoparks network” was established in 2000, in order to develop and promote geo-heritage and tourism (geotourism); the network was recognized by UNESCO in 2001.

SE Europe region has just one Geopark – Papuk in the Republic of Croatia. Bosnia and Herzegovina haven’t got any registered Geoparks as yet, though many sites there deserve it: Mount Vranica, Blidinje Nature Park, Konjic. Macedonia has noted down a whole list of significant geomorphological sites: Markovi Kuli in Prilep, Kratovo-Zletovo, the canyon of the Radika, Mariovo region, Demir Kapija canyon and many others. Montenegro has listed numerous proposals, but so far has not acted upon them: Morača River (Zlatica, Raslovići, Milunovići, Andrijevo), Komarnica, the Mrtvica Canyon, the Lim River and its tributaries, Krnovo, and Lake Skadar.

If we analyse that a geopark is defined as “the territory containing geological heritage of particular importance, rarity or aesthetic appeal, with the aim to preserve other values, by supporting projects of sustainable development of the local community, particularly through programmes of education and popularization in order to win support for the protection of the local population,” it is clear that the role which geographers, primarily physical, have in the valuation of a nominated area can be clearly identified. By the structure of their content Geoparks give impetus to the development of geotourism, as a modern fast-growing type of tourism in the world. (<http://www.eko.minpolj.gov.rs/geoparkovi/>).

The aforementioned reflects the diversity of the geospace and the potential that geography, as a complex synthetic science, can use for the promotion of geodiversity, geoparks and geotourism based on geocites.

The Geoparks Network basic development guidelines are based on three points: conservation, education and geotourism, i.e. geodiversity is the basis for singling out Geoparks, while the Institute can best be used to organize geotourism.

Geotourism includes natural and tourist resources (Dowling and Newsome, 2006, Dowling, 2011): 1) natural resources include forms (landforms, landscape, sediments, rocks, fossils, soil, minerals) and processes (tectonics, volcanism, wearing down, erosion, accumulation); 2) tourist resources include attractions, accommodations, tours/trips (panoramic flights, organized tours with transportation, independent tours), activities (visitor centre, virtual tours), interpretation (visitor centre, trails), and planning and management (geoconservation, visitors, promotional materials). Dowling (2011) distinguishes five key principles essential for geotourism: 1) geotourism based on geo-heritage, 2) geotourism is viable (economically viable, contributing to the local community and encourages geoconservation) 3) geotourism is

educational (through geointerpretation) 4) geotourism contributes to the local community 5) geotourism provides visitors with satisfaction.

The first three characteristics are deemed essential for a product to be considered geotouristic, while the last two are considered desirable for all forms of tourism. From an economic point of view, geo-heritage and geosites are considered fundamental for the development of tourism (Reynard, 2008), i.e. geotourism in the interpretation by Newsom and Dowling (2006 and 2010) where geotourism can be considered a type of tourism that focuses on geosites. Geosites contribute to the primary and secondary tourist resources (Reynard et al, 2003; Pralong, 2005.).



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Papuk Geopark and the tourism activity

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Papuk Geopark can be described as an area with distinct natural and socio-economic features giving it its unique characteristics. Its vertical stratification is composed of parts of the lithosphere, hydrosphere, atmosphere, pedosphere and definitely social sphere. Consequently, geographical space differs from the biosphere since biosphere is only its integral part and the features created by human activity are incorporated within it. Taking in regard geospatial characteristics, both its features and functions one may conclude geological diversity is a unique system, distinct in its content and functionality, recognizable as a definite location. It reflects the state of the environment as the location where all living beings reside and are conditioned by the geospatial diversity. Geodiversity does not relate only to geographic physical features.

Nature Park Papuk is the first Geopark in Croatia

In 1998 UNESCO introduced the concept of Geoparks with the aim of protecting geodiversity, preserving geoheritage and developing geotourism and local communities. European Geoparks Network, established in 2000, now has 69 parks in 23 European countries. Within the concept of Geoparkit are not only geological features that are important but also sites of archaeological, cultural, historical, etc. values. All the mentioned characteristics together are crucial for the creation of thematic parks and can be found in the Nature Park Papuk. In 2007, due to its exceptional geological diversity Nature Park Papuk became the first Geopark in Croatia. Simultaneously it joined the Association of European Geoparks as well as World Geoparks.

One of the most important natural features of the Nature Park Papuk is its geological diversity.

It is the only place in the Republic of Croatia where geological formations from all Earth's geological periods can be found on such a small territory. The most common geological formations in the Nature Park Papuk are dated from Palaeozoic, around 600 million years ago, while there are also rocks dated from Mesozoic, Tertiary and Quaternary. Geomorphological features specific for this area are karst landforms, abysses, sinkholes and caves on the crest of Papuk.

Papuk has distinct hydrological features, with abundant flora and fauna, and numerous cultural-historical monuments and sites. Forests cover 96% of the area of the Park and are represented by 13 species including sessile oak, downy oak, Austrian oak, beech and fir trees up to the altitudes of around 700 meters. The Karst parts of Papuk, particularly underground and caves are habitat for more than 80 different animal species, including 11 species of bats. The oldest archaeological traces date back to the period of Sopot and Starčevo cultures and continue as Urnfield culture, i.e. the Hallstatt culture. In Roman times, it was a transit region to the Sava and Dra-

va rivers. The remains of the medieval towns Ružica, Klak, Kamengrad, and Velički are located within the boundaries of Park.

The Nature Park Papuk – Geopark Papuk is one of the most significant tourist destinations of the continental part of Croatia.

For tourists who seek adventures, which prefer rural areas, mountains, sports or recreation, for those searching cultural and historical sites, or those interested in hunting and fishing expeditions this area offers a diversity of opportunities. In this region numerous types of selective tourism such as for example ecotourism, geotourism, cycling tourism, etc., can be developed.

The value and importance of the Nature Park, i.e. Geopark Papuk, are still unknown to the public. Within park boundaries, six educational tracks are built and half-day and full-day excursions are organized. Research shows that travel agencies forget to mention the fact that the Nature Park Papuk is the only Croatian Geopark. It was declared Geopark under the UNESCO protection at the plenary session of the 38th General Assembly on 17th November 2015 in Paris.

Table 1. Number of visitors in the Park Nature Park in the period 2004-2014

| year | Number of sold tickets |
|------|------------------------|
| 2004 | 1050 |
| 2005 | 1600 |
| 2006 | 4224 |
| 2007 | 5760 |
| 2008 | 7166 |
| 2009 | 6615 |
| 2010 | 6244 |
| 2011 | 5627 |
| 2012 | 6508 |
| 2013 | 5216 |

Source: Public Institution Nature Park Papuk, 2015

According to the official statistics, the number of visitors is relatively small but it is supposed that the majority of visitors stay in the Park without buying the ticket and therefore they are not registered. According to the Nature Park officials, there seem to be more than 140 000 of such visitors, which pose a significant problem for protection of the Park.

The international promotion of the Geopark is also inadequate. Only 2.57% of visitors are foreign residents (Public Institution Nature Park Papuk, 2015). Majority of persons visiting Geopark are elementary school pupils. In Croatia, public awareness regarding the importance of natural and cultural heritage still is not developed enough.

Methods used for this research were field research and survey. Survey has been done among elementary and secondary school geography teachers and employees in tourist agencies. Gathered data reflect current situation regarding recognition and valorisation of Geopark Papuk. Characteristics of the Park were presented using GIS.



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Landscape Diversity of the National Park Paklenica as Paradigm of Tourism Development

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Paklenica National Park was established in 1949. The Park territory forms a part of Dinaric karst, one of the most impressive karst units in the world, marked by distinctive geological, geomorphological and hydrological features. The tourist offer of the National Park is extraordinarily interesting to foreign visitors, the number of whom is, according to the research included in this final paper, 77%. The types of tourism such as adventure ecotourism, wildlife tourism and nature based tourism are well implemented in the Park. For that reason, this paper dealt with the visitors'/tourists' perceptions on valorisation of the landscape particularities as the paradigms of the development of specific types of tourism.

Landscape particularities of the Park

The Park abounds in numerous types of karst reliefs such as karrens, sinkholes, cliffs, groves, rocky areas, karst wells and icicles, and in speleological structures it contains caves and pits. The Park area dominates in carbonate rocks limestones and dolomites. The majority of the Park territory, including its peaks, is built from the Jurassic carbonate sediments, while the lower southwest slopes are made of Cretaceous and Paleogene carbonate deposits. Clastic sediments pride themselves in impermeability and thus enable the existence of several permanent or occasional torrent-flows and numerous permanent springs. The most powerful spring of Velika Paklenica is CrnoVrlo at 780 m.a.s.l., followed by Kontinovovrilo at 870 m.a.s.l., Jukićavril at 600 m.a.s.l. and Ivine vodice at an altitude of around 1200 m. In the Park area there are several types of soils such as brown soil on limestone, red clay soil and rockery. In hydrological terms, the stream Velika Paklenica stands out because, during the rain season, it flows into the sea in its full length. Another significant watercourse is situated in the Mala Paklenica canyon.

The aim of the research and the methodology

The aim of this research is to explore the extent to which landscape diversity influences the Park's attendance and the development of the specific types of tourism in the Park's area. In order to test the influence of landscape diversity as the paradigm of the tourism development, it is necessary to analyse all the Paklenica NP landscape factors and explore the visitors' views and the way in which the landscape diversity of the Park influences the development of different forms of tourism. In doing so, a survey was used as a primary form of the empirical research of this paper. A survey research has been conducted by using a structured survey questionnaire on

a sample of 359 respondents (N=359). Based on the structured questionnaire which included set of closed and openended questions, face-to-face interview was used as the method of data collection. The survey consists of a total of 31 questions. The first 11 questions are close-ended and relate to socio-demographic characteristics of the respondents. The second part of the survey questionnaire concerns the park's landscape diversity. It consists of 20 claims followed by a 7-item Likert scale according to which the respondents express their level of agreement or disagreement with a certain claim. A 7-item scale was used to obtain more possibility of the response differentiation.

Survey on the landscape diversity of the Park

The survey contains 20 claims regarding the Park's landscape diversity, and the answers range from 1 (Strongly agree) to 7 (Strongly disagree). The answers are expressed in percentages (Table 1.). In this survey, 28% of respondents strongly agree, 31% agree, and 23% somewhat agree with the claim that the Park boasts with the exceptional landscape diversity. The majority of respondents strongly agree with the claim that the landscape diversity of the Park represents the foundation of the biological variety and should be protected, preserved and improved, which pinpoints to a high level of visitors' knowledge concerning the ecological problems. Around one-fifth of the survey respondents absolutely agree regarding the following questions: *"Geomorphology is the main motive of my visit to the park (according to some authors Velebit mountain has about 8,000 geomorphological phenomena). It is necessary to further develop and promote the landscape tours. It is necessary to bring the tourists closer to specific habitats for individual plant or animal species."* Considering these questions, one must assume that the problem should be confronted in a simpler, more convenient and comprehensive way. Furthermore, it is interesting that only a few of the respondents strongly agree with perceiving the Adventure Tourism and the Nature Based Tourism as the future of the Park. A rather small percentage of the respondents consider speleological structures of the Park represent an extremely valuable hydrological asset. Taking into consideration that the park, as a part of the Velebit mountain, abounds in water springs (over 4000 different springs) and geomorphological phenomena (around 8000), that and these claims confirm the hypothesis: *"The landscape diversity of Paklenica National Park has not been adequately validated as a paradigm of the alternative tourism development."* The tasks that impose themselves include a systematic enhancement of the promotion of these natural assets as a prerequisite for the development of those specific forms of tourism that are based on these assets/attractions.



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Protected natural areas and geoheritage of Homolje – an overview

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Homolje is one of the most outstanding geomorphological areas of Eastern Serbia, surrounded by Beljanica Mountain on the South, Homoljske Mountains on the North, Black summit on the East and Gornjačke Mountains on the West. According to Spatial plan of the Republic of Serbia, Homolje represents an area of protected natural values with specific geo and biodiversity of national importance. The Central Registry of protected natural assets of Homolje encompasses the following natural assets: The Spring of Žagubica (The Mlava Spring), Homolje intermittent (rhythmic) spring, The Krupaj Spring, Uvala Busovata, The Osanička River Gorge and The Samar Karst Bridge.

The Mlava spring is located in the southeast part of Žagubica valley, in the lower part of the northeastern side of Beljanica Mountain. It is situated on the southern peripheral part of Žagubica, 1 km from its center. It looks like a smaller lake with a diameter of 25-29 m and the volume of 93 m, and it protrudes from the surface from the submerged sinkhole with a depth of 70 m. The total surface of The Mlava spring is about 655 m², with an approximate volume of 2480 m³ water (Dukić, 1975). It belongs to the group of siphon karst springs with a maximum bounty of more than 6 m³/sec. It is protected in 1979, as a hydrological natural monument of the first category.

Homolje intermittent (rhythmic) spring is the only active intermittent spring in Eastern Serbia and one of the rarest in this part of Europe. It is located on southwestern slopes of Homoljske Mountains. It is located 12 km from Žagubica. It represents real natural and hydrographic rarity, but also important religious and cultural place for the local community. Due to its extra ordinal natural value, this intermittent spring is protected in 1961, as a natural monument, but after revision of this

asset in 1995, it became a hydrological monument of the I category (Miljković and Mirković, 2006).

The Krupaj Spring is located below western limestone section of Beljanica Mountain, at 220 m altitude. It is placed in a southeastern part of Krepoljinsko-krupajska valley. It is located 10.5 km southern from Krepoljin, the nearest bigger town. This spring has been going out from the cave hole gravitationally until 1946, but after it was blocked by a concrete dam about 40 m downstream, it obtained the appearance of a small lake whose longer axis are 40 m long and the shorter axis is 17 m long. The spring is of siphon type. According to the latest measurements in the entrance area of the cave hole, which were conducted in 2009, the maximum depth of Krupaj Spring is 123 m. At about 40 m from the spring, there is a thermal spring which temperature is around 26 °C. Krupaj spring is the true representative of the hydrological heritage of Homolje, but also of Serbia, which was protected in 1979 as a hydrological natural monument of I category (Miljković et al., 2015).

Uvala Busovata is located in the central part of Beljanica Mountain, about 3 km eastern from Uvala Rečke. It is 1000 m long and 500 m wide. It has East-West direction, on the altitude of 1000 m. The bottom of uvala is made of the Paleozoic schists filled with a thick layer of sediment consisting of decaying rocks with the waterproof base, over 10 m thickness. It is protected in 1975.

Osanička River Gorge is a minor fluvial-karst form, located on the northern outskirts of the village Osanica. It was built by Osanička River, between Veliko brdo i Veliko Šetaće with a length of about 1.5 km. In some places it has a canyon-like appearance with vertical sides about 250 m high. In the middle section, where the gorge narrows to the width of the riverbed, there is Osanička Karst Bridge, a very interesting geomorphological form, created by cliffs collapse of a large hill. The length of the karst bridge is 18 m, and height from the water to the vault ranges from 0.9 to 2.8 m, width is from 3 to 4.5 m, and thickness of up to 5 m. It belongs to the III category of protection, with the total area of 30.44 ha (Marković, 1964). It is protected in 1979 as a nature reserve.

Samar Karst Bridge is located in the southeastern part of the Žagubička valley, in the eastern part of Beljanica Mountain, on the river Prerast which flows into the Mala Tisnica near Kraku Pešt. The span of the hole of this gigantic natural stone bridge is 15 m, its height is 14 m, the height of the arch is 24 m, and its thickness is 5-10 m. Unlike karst bridge of Vratna, in which the poles coalesced with the surrounding walls, polls of Samar karst bridge are quite isolated with a thickness of 18 m (left) to 20 m (right poll) and thus they reminiscent of the arcades (Marković, 1964). The site was protected in 1979 as a geomorphological natural monument.

Institute for Natural Protection suggests also protection of Tisnica and Crna reka Gorge, due to its rich plant and animal diversity. Moreover, it recommends protection of Gornjak Gorge with characteristic geoheritage and the highest parts of Beljanica Mountain, which represent the area of special natural values and important natural resource in terms of protection and usage of forests and water protection.

According to the classification of geosites of National council for geoheritage of Serbia, on the territory of Homolje, there are sites of extraordinary importance: sites of geomorphological heritage (uvala: Rečke and grass earth hummocks and Busova-

ta, the gorge and Samar karst bridge, Suvi Do Gorge, Buk tufa, tufa on the Perast, a headwater of the Tisnica); Structural geoheritage sites (the Krupaj Spring, Homolje intermittent spring, Geomorphologic geopark of karst topography

Kučaj-Beljanica, Ribarska Gorge of the Mlava, The Tisnica Gorge and superimposition and Gornjačka Gorge); Speleological geoheritage sites (Pogana peć cave and Ivkov sinkhole), Hydrogeological heritage sites (The Mlava spring).

The principal aim of the paper is a detailed overview of protected natural monuments and geoheritage of the Homolje area.



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Exploring the potential for geotourism development in the Danube region of Serbia

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Introduction

The Danube region in Serbia is home to numerous geological and geomorphological features as well as paleontological remains of mammoths and other animals that testify to the long and vivid history of this area. Parts of the Middle and Lower Danube in Serbia contain most of the rich natural and cultural (mainly archaeological) heritage dating back to prehistoric times as well as the remains from the Roman and Medieval period. Throughout history, it has been a place where different cultures and civilizations have flourished over a long period of time. All of these paleontological and prehistoric remains of mammoths and early man as well as numerous later civilizations and their achievements are simply woven in this space which has been continuously inhabited for nearly a million years.

Moreover, from a geological point of view, this river is considered to be a significant factor influencing the formation of the entire region through which it passed, in nearly every geological period. During this entire time, the Danube River area was a true oasis of life, even during the Ice Age when living conditions in certain areas of Europe were harsh and difficult. Thanks to its power and influence on the surroundings, the Danube has significantly participated in the creation of a very rich geological diversity along the whole of its course (Vasiljević et al., in press).

This rich and diverse natural and cultural heritage along the banks of the Danube with numerous geological, geomorphological, paleontological, archaeological and cultural attractions makes this area one of the best natural and cultural tourist destinations in Europe and the entire world.

Methods and data

The aim of this paper is to create a geosite inventory of the Danube River area in Serbia and determine the current state and potential for geotourism development by applying the modified geosite assessment model (M-GAM). An official inventory of geosites in the Danube area in Serbia still does not exist. However, numerous geosites that are included in the official geosite inventory of Serbia are located in this area. Still, not every geosite is suitable for geotourism development. This is the reason why we proposed an inventory of geosites which are the most attractive for geotourism development and have the largest potential to attract the attention of a larger number of tourists. Apart from these, there are many other geosites which can be included in the geotourism offer. However, in the initial phase of geotourism development, more attention should be focused towards geosites that not only possess a high degree of attractiveness or aesthetic value, but are also easily accessible and have at least some of the necessary infrastructure for geotourism development. The proposed inventory includes fifteen geosites throughout the Danube River area.

Afterwards, these geosites were assessed by using the M-GAM model for geosite assessment. This method provides us with less subjective results and gives us more precise results because it includes the opinion of both experts and visitors whose needs and interests have a crucial impact on determining the value and potential of geosites. If the evaluation is only done by experts, the final result will heavily reflect their opinion while other parts of the tourism market that do not belong to this segment (but are usually much larger) will be neglected (Tomić and Božić, 2014).

Results and discussion

The results indicate that the Danube region in Serbia can be divided in seven (geo) tourist zones which should be the main focus of future geotourism development in the area. According to the proposed inventory, these zones include 15 of the most representative and attractive geosites in the Danube area with Djerdap, Fruška Gora and Viminacium being the top three zones with the most attractive geosites. The results also indicate that the major problems for further geotourism development are mainly related to a lack of promotional activities, good quality tour guide service and poor infrastructure at geosites. More interpretive panels are necessary in order to provide visitors with basic geosite information as well as interpretive or visitor centers which would offer more detailed information presented in a unique and interesting manner. A good location for these centers would be Djerdap and the Fruška gora mountain. The results show us that these are the key elements which affect the quality of visit and highly contribute to the visitor experience. Thus, these services and facilities should be the primary focus of future geotourism development in this region.

Conclusion

As it was mentioned before, the Danube area in Serbia possesses valuable geoheritage as well as archaeological heritage. These two types of attractions often share the same location or are near to one another which offers the possibility for the formation of a unique geo-archaeological route. This kind of route would encompass both geological and archaeological values into a unique tourism product and would be a useful tool for the promotion of both geological and archaeological heritage which would attract the attention of a larger number of tourists and more diverse tourist profiles.

One more thing that would also contribute to the promotion of geoheritage and geotourism development is the formation of the first ever Geopark in Serbia. In the last couple of years there has been some limited effort to achieve this, with Fruška gora and Djerdap being the main candidates for joining the European geopark network. However, due to a lack of expertise and initiative this process is going extremely slowly and it still remains a mystery if it will ever be completed.



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Degradation of in situ geosites caused by anthropogenic factors – analysis of tourists' attitudes

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Geological diversity values are extremely vast, but are also most reasons for its degradation. Only at the beginning of the XXI century, with the popularization of science, the role of geological heritage started to be accepted and the need for its protection recognized in developing countries, such as Serbia. However, the papers available are mainly engaged with the essence of geoconservation and its basic steps: geosites inventory, examining their values and threats and suggesting the best solution or geoconservation method, etc. The authors returned to revise the part that concerns the study of the very threatening factors. Threatening factors can be divided into those arising from natural processes and those arising from anthropogenic activities - more numerous, but weaker.

Natural processes that could cause degradation are extremely rare, but when they happen – they cause disasters (such as: erosion on Canossa geosite, earthquakes, river floods, etc). On the other hand, main types of anthropogenic threats to geodiversity are: extraction of mineral resources, urban development, deforestation, intensive agriculture, tourism activities, removal of geological specimens, forest fires, military activity, and lack of education (neglecting natural values). However, this division cannot be taken for granted, given that the erosion is usually caused by human activity.

The factor that is very important to mention is tourism. Although geological formations are less sensitive to anthropogenic impacts than biological formations, they deserve an adequate care through a variety of protection measures. Tourism activities can be the engine of development of economic activities and exploitation of the cultural and aesthetic values of the landscape. However, tourism could immensely degrade the environment. A large number of visitors can be destructive for geological formations and this can be a cause of disappearance of various landforms.

The central aim of this research is to examine tourists' attitudes towards anthropogenic degradation of geosites. For this purpose, the survey was conducted on a sample of 309 respondents in Serbia. The respondents' attitudes examined are divided into four groups: Attitudes towards the environment (Mean= 3.58), Attitudes towards geosites' aesthetic components (Mean= 4.19), Attitudes towards the role of the human factor in degradation (Mean= 3.13) and Attitudes towards geosites' state and protection (Mean= 3.59).

The results showed that respondents have the most positive attitudes towards aesthetic component of the environment, but are also at least in favor with the role of human factor towards the degradation.

Table 1. Respondents attitudes towards environment

| Attitudes towards: | N | Minimum | Maximum | Mean | Std. Deviation |
|---|-----|---------|---------|--------|----------------|
| Environment | 309 | 2.00 | 4.57 | 3.5853 | .47750 |
| Aesthetic component | 309 | 1.80 | 5.00 | 4.1916 | .75356 |
| Anthropogenic factor in degradation | 309 | 1.60 | 4.20 | 3.1333 | .47045 |
| Condition and protection of environment | 309 | 2.38 | 5.00 | 3.5907 | .54519 |
| Valid N (listwise) | 309 | | | | |

The results also indicate that respondents generally have a positive attitude towards the environmental protection, but are not yet ready to change their own behavior in order to protect the nature. All the attitudes where analyzed separately, with comparisons between the categories. The aim was also to explore if the level of education, income, place of residence or type of work affects the respondents perception of their own influence (as a visitor) to geosite. Based on the results obtained, it is concluded that people of different professional qualification and income differ in their attitudes towards geosite degradation. People of different gender and age, however, do not show significantly different attitudes.

FINANCIAL PLANNING AND INVESTMENTS IN PROTECTED AREAS

Optimal pricing of recreation in the Czech protected areas

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With growing number of visitors in wilderness areas, the burden on touristic infrastructure increases together with the nature protection expenses. The management of protected areas is not able to fully cover these costs and their economy is partially or completely dependent on state subsidies. The pricing of recreation is one of the options how to manage the number of visitors entering the protected area, and how to enhance the budgetary self-sufficiency of the protected areas.

The contribution presents the model of the optimal entrance fees and potential revenues for the system of landscape protected areas and national parks in the Czech Republic. The model was transformed into a parametrized software tool available to the managements of Czech protected areas.

The optimization software tool

The economic model enables to set the optimal fee for three different forms of pricing, two direct forms of pricing (charging the fee for the entrance to small protected areas - e.g. natural monuments, nature reserves; and large protected areas - national parks and landscape protected areas) and one indirect form (parking fees). The pilot area for the model is the Šumava National Park, but the model was designed and is utilizable also for other Czech protected areas.

Methodology of the software tool

Optimal prices are derived by maximizing the objective social welfare function, which represents social benefits of visitors from the consumption of recreational services in a particular protected area. The optimization problem is set as a maximization of the sum of recreational benefits, revenues collected from entrance fees, positive spillover effect from tourism on local economy, while deducting variable costs and investments to tourist infrastructure and negative ecological impacts associated with tourism.

The optimization is based on the Lagrangean method (Alpízar, 2006). The objective function of the optimization exercise is given as follows (Ibid.):

$$\max f(p)$$

$$f(p) = \int_p^{\infty} x(v) dv + px(p) - C(x) - I - g(x) + T(x)$$

given the following constraints:

$$i: px(p) - C(x) - I - R \geq 0$$

$$ii: x > 0$$

where:

- $f(p)$ – is the function of benefits to the society
- p – is the price (entrance fee)
- $x(p)$ – is the recreation demand for the natural area
- $C(x)$ – is the variable cost to maintain the tourist infrastructure
- I – is the fixed cost to build the tourist infrastructure
- R – is the minimal revenue from pricing needed by the management of the natural area
- $g(x)$ – is the external cost associated with the visitation in the natural area (negative effect on the ecosystems)
- $T(x)$ – is the spillover effect of the visitation in the natural area

The optimization exercise consists of maximalization of the sum of recreation benefits that accrue to the visitors of the natural area, collected fees, spillover effect, after deduction of the variable and fixed costs associated with the tourist infrastructure and the management of the area, and external costs. The first part of the objective function above represents the consumer surplus of the visitors to the area, whose entrance is subject to a fee; the consumer surplus calculation is derived from recreation demand $x = x(p)$. Second part of the function is the producer surplus, i. e. the amount of revenue from the fee. Third part of the function is variable costs (marginal variable costs are assumed to be constant, $C(x) = c \cdot x$). Fourth part of the function is fixed costs, and the last two parts are the functions of external costs and spillover effect (both are assumed to be linear). The first constraint allows to generate an exogeneously specified revenue to the management of the protected area, the second constraint assumes that the recreation demand is positive.

The underlying recreation demand model in the optimization is the single-site model for the pilot site - the Šumava National Park, which is based on the results of the project Rec-Optim (Kaprová, 2015). The demand is available for the whole national park, and for smaller areas within the park (Jezerní moor, Tříjezerní moor and Prášily lake). The parameters for other Czech recreational areas originate in a random utility travel cost model for the Czech Republic (Kaprová and Melichar, 2016).

The information on the demand side are supplemented by the supply side data on the potential of recreation in the natural area. Example values for the parametrization are available for the pilot site in the application; the data on other natural areas have to be supplemented by the user of the application. The user also specifies the present visitation of the area - the estimation of the specific number may be inspired by the default values from the pilot site, or should follow the guidelines in Braun Kohlová et al. (2016) that will be soon available to the managements of protected areas in the Czech Republic.

The optimization using the tool results in the quantification of the effects of different scenarios of pricing and hopefully represents a valuable input into the discussion of the pricing in protected areas and its effects in the Czech Republic.

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Accounting the value4money of Marine Protected Areas

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Introduction

Protected Areas (PAs) both terrestrial and marine are financed by public funds. Since the last 2014 the Italian Ministry of the Environment is asking Marine Protected Areas (MPAs) to report the public resource management and especially to assess the worth produced by MPAs at the local level. For this purpose, starting from the economic accounting, environmental benefits and costs have been valued and integrated building the Protected Area environmental accounting model. The model approach complies with the EU Biodiversity Strategy to 2020 (EU, 2011) and the Mapping and Assessment of Ecosystem Services Initiative (EU, 2014) carried out at European level aiming to promote the integration of environmental benefits into accounting and reporting systems at EU and national level.

The research on which this paper reports illustrates the model highlighting what and how much value the MPAs are able to create from the money allocated by government and funding bodies. In the Methodology section, the method is outlined and the environmental accounting model is given. In the following section the results are described. The last section provides an analysis of the results and draws the conclusions.

Methodology

PAs have been considered as organisations. Organisations usually have an internal accounting system known as financial statement taking into account the stock and flow of resources. Stock refers to the value of an asset at a balance date, while flow refers to the total value of transactions during an accounting period. Stocks and flows are related because the stock of resources available is usually increased by the flow of new investment and depleted by the flow of depreciation.

This accounting approach was adopted and adapted to PAs while developing a tailor-made environmental accounting model (Marangon et al., 2008). The model is based on two main accounts: the natural stock account and the natural flow account. As is the case for organisations, the aim of the environmental accounting system is to take into account resources in the PA, both consumed and produced. The model aimed to supplement monetary accounting (based on expenses and revenues) with environmental accounting which reflects not only environmental costs but also “environmental revenues”, *i.e.* environmental benefits. In line with the cost-benefit approach, the difference between economic and environmental costs and benefits represents the net benefit and the value produced or consumed by the PA.

Table 1 shows the environmental accounting framework, and includes the natural capital dimension (natural stock account) and the flow dimension (natural flow account).

Table 1. Environmental accounting model of Protected Areas

| Environmental accounting model of Protected Areas | | |
|---|--|------------------------|
| Natural stock account | Natural flow account | |
| Natural stock: | Costs/expenses: | Benefits/revenues: |
| Qualitative analysis (e.g. diversity) | PA expenses | PA revenues |
| Quantitative analysis (e.g. visual census) | Environmental costs | Environmental benefits |
| | Σ = PA net benefits produced/consumed | |

Results

Natural stock account

Natural stock accounts is set up based on a long time series. Data referred to natural resource quality, *i.e.* diversity based on the biological classification used to group and categorize organisms into groups such as genus or species, and quantity, *i.e.* density assessed through the visual census.

Natural flow account

The natural flow account is based on the monetization of the environmental costs and benefits. As regards costs, the Organisational Life Cycle Assessment (O-LCA) is adopted in order to assess costs related to the institutional activities; Carbon footprint and Water footprint to assess impacts related to services provisioning and good production inside the MPA. As regards benefits, ecosystem services are mapped and assessed. The Common International Classification of Ecosystem Services is adopted and the following ecosystem services assessed: wild animals and their outputs, mass stabilization and control of erosion rates, experiential use of plants, animals and land/sea-scapes in different environmental settings, physical use of land/sea-scapes in different environmental settings, scientific and educational.

Discussion

PAs provide a series of fundamental services for the constituents of human well-being. Expressing the value of ecosystem services in monetary units is an important tool for policy-makers helping them assess the financial value for money and make effective decisions on resource allocation between competing uses.

With reference to the methodology, the environment is considered in the economic accounting system by analysing natural resources and their ecosystem services and by assessing the impact of activities carried out inside the PA through the LCA.

From an analytical perspective, the PA natural flow account is compared to the contribution allocated by the Ministry of Environment. The calculation of the public funding /total benefits ratio shows that one euro spent for protection returns a value in terms of environmental, social and economic benefits.

From a policy perspective, the model developed provides a framework for managing both economic and environmental information, through which the contribution of the environment to the economy and the impact of the economy on the environment can be analysed. This is intended to meet policy-makers' needs, by providing them with indicators and statistics to monitor interactions between the economy and the environment, and to be a tool for strategic planning and policy analysis so as to identify more sustainable development paths.



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Estimating preferences for pricing policies in Japanese national parks using best-worst scaling

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Introduction

The purpose of this study is to understand preferences of the general Japanese public for pricing policies in the national park system applying the best-worst scaling (BWS) approach. One remarkable feature of Japanese national parks is that the most of costs for park services have traditionally financed not by visitors but by general taxpayers. Recently, however, the Japanese government has faced a serious financial shortage; each national park faces revenue shortfalls. In the near future, we need some fundamental changes in Japanese parks system on pricing policies. We have to know general Japanese citizens' preferences for them.

Many countries introduce some kind of pricing policies other than taxes in national parks, wildlife reserves and other protected areas. Laarman and Gregersen (1996) divided pricing policies in terms of nature-based tourism in these areas into seven categories: general entrance fee, fees for use, concession fees, royalties and profit shares, licenses and permits, voluntary donations and taxes. This study attempts to quantify the Japanese citizens' preferences for the above seven alternative pricing policies by BWS approach.

BWS is a method developed by Finn and Louviere (1992). It requires the respondent to choose one alternative that she or he prefers the most and one alternative that she or he prefers the least from a series of choice sets that contain different combinations of alternatives. Previous studies have shown that most of the Japanese people agree with introducing cost burden for services in national parks. If we ask Japanese people about preferences for seven alternative pricing policies in a straightforward fashion (e.g. 5-point Likert scale from "strong agree" to "strong disagree"), most of them seem to reply "strong agree" or "agree". Thus, we may not distinguish differences among preferences for these policies. BWS is sensitive to quantitatively distinguish preferences in these situations.

Method

Questionnaire design

The experimental design is needed to construct a series of BWS choice sets. Balanced incomplete block designs (BIBDs) are useful to ensure that each alternative appears equal number of times and is equally paired with each of the other alternatives across all choice sets (Auger, Devinney and Louviere, 2007; Lee, Soutar and Louviere, 2007). In our survey, each pricing policy appears three times across the series of choice sets and each pair of pricing policy appears once.

Counting analysis

In this study, we employed counting analysis to analyze data obtained by a series of tasks. In counting analysis, we count the number of “total best (aggregated number of the best)” and “total worst (aggregated number of worst)”, respectively. Then, we calculate “B-W score (“total best” – “total worst”)” of each alternative. A higher B-W score indicates that an alternative is evaluated relatively higher on an underlying latent scale. Please see Marley and Louviere (2005) on details of theoretical foundations.

Results

A web survey was conducted to obtain BWS data during the period from 9 to 13 January, 2015. Invitations to complete the survey were sent to 24, 102 Japanese citizens through a research company, and 2,351 people responded. Although this response rate is the low (9.8%), it is similar response rate to mailed survey in Japan (e.g. Yamaura et al., 2016).

The results of counting analysis are summarized in Table 1. Table 1 also shows an index estimated by dividing B-W score by frequency of appearance in aggregated choice sets ($2,351 \times 3 = 7,052$). The most frequently chosen pricing policy in the “total best” category was general entrance fee (chosen 4,764 times), followed by fee for use (chosen 3,640 times). The most frequently chosen pricing policy in the “total worst” category was royalties and profit shares (chosen 4,110 times), followed by taxes (chosen 3,617 times). The pricing policy with the highest B-W score was general entrance fee, followed by fee for use. The results show that general entrance fee and fee for use are relatively preferred to other pricing policies. In addition, the current pricing policy based on taxes is not relatively preferred.

Table 1. Total best, total worst and B-W scores

| alternatives | total best | total worst | B-W score | B-W score divided by frequency of appearance | ranking |
|-----------------------------|------------|-------------|-----------|--|---------|
| general entrance fee | 4,764 | 787 | 3,977 | 0.564 | 1 |
| fees for use | 3,640 | 815 | 2,825 | 0.401 | 2 |
| concession fees | 1,539 | 3,436 | -1,897 | -0.269 | 6 |
| royalties and profit shares | 804 | 4,110 | -3,306 | -0.469 | 7 |
| licenses and permits | 2,232 | 1,412 | 820 | 0.116 | 3 |
| voluntary donations | 1,748 | 2,280 | -532 | -0.075 | 4 |
| taxes | 1,730 | 3,617 | -1,887 | -0.268 | 5 |

Discussion

Japanese citizens tend to prefer direct pricing policies (general entrance fee, fees for use and licenses and permits), which are collected in exchange for the direct provision of visitor services. In contrast, they are relatively reluctant to pay for indirect method (concession fees, royalties and profit shares, voluntary donations and taxes) that their relationship between services and payment is not sufficiently clear. However, there remains a technical problem regarding the effectiveness of the direct pricing policies in Japan. Japanese national parks are no more than a layer of multiple land uses; therefore, park managers cannot easily place gates for fee collection and control all of visitors.



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Assessing economic impact of national park visitation in Nepal

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Introduction

International Union for Conservation of Nature (IUCN) has categorized Protected Areas into six categories depending on management objectives. National park (IUCN category II) is the large natural or near-natural areas protecting large-scale ecological processes with characteristic species and ecosystems, which also have environmentally and culturally compatible spiritual, scientific, educational, recreational and visitor opportunities (Dudley, 2008). Thus, national park provides opportunities for recreation and tourism besides conservation of biodiversity and ecological processes. . Tourism and Recreation which forms part of the cultural ecosystem services provide benefits to local, regional and international community in the form of nature visit, wilderness experience and economic contribution.

Ecotourism industry provides extra income to local people residing in and around the park, supporting for poverty reduction and conservation (Odell, 1998). Benefits accrued from ecotourism businesses are an important element for positive attitudes towards natural areas (Lindberg et al., 1996 in Lindberg, 2003) which otherwise would have been detrimental to both tourism and conservation (Lindberg, 2003).

Langtang National Park (LNP), the third most visited mountain Park in Nepal provides opportunity to experience both nature and culture. International category of protected areas, Ramsar Site (Gosaikunda) also lies within the park and attracts thousands of Hindus and Buddhist pilgrims. Therefore, it is important to understand the economy impact of ecotourism in the park and to justify the need for more investment to secure various ecosystem services, including tourism.

Methodology

Survey among foreign visitors (N= 289) visiting LNP was carried out in 2014 (autumn) to explore the economic value of the park tourism and its local and regional economic impact. Survey was carried out in Kyangjin Gompa in Langtang National Park (3850 masl) by the author himself and few tourists who returned from trekking trip were also surveyed in SyafuBensi. Convenient sampling method was employed and tourist were approached during their free time in hotel. Rate of rejection to participate in the survey among tourists themselves was almost null however, guides of some tourists were reluctant and had fear that if the survey was for different purpose . Only the international tourists were surveyed during the study period ignoring Nepalese and South Asian Association for Regional Cooperation countries (SAARC) tourist because of the lack of visitor data for Nepalese tourist and negligible number of SAARC tourist in the region. The economic impact of tourism in LNP region was calculated based on Money Generation Model version 2 (MGM2 model) (Stynes et al., 2000).

Result and Discussion

The highest age of the visitor (respondent) was 74 years old. In average, tourists spend 10.43 days in LNP which is bit more in comparison to previous year of 9.73 days (Thapa and Getzner, 2014). Two different group of international tourists visit LNP, one is group traveler or those who buy tour package (package tourists) and the other is Free and Independent Tourists (FITs). Group/package tourist represented 47% and FITs represented 53%.

Tourists travelling without guide have to pay USD 20 for Trekkers' Information Management System (TIMS) card fee, otherwise pay USD 10 in addition to park entrance fee. 38% of the tourist visit park without trekking guide.

Average expenditure for FITs is found to be USD 35.44/day (n=142) and average package tour cost for the whole trip is USD 1156 (n=126). Due to difficulty to calculate the daily average expenditure figure by package tourists, Thapa (2016) used the conservative estimate of national average expenditure of tourist visiting Nepal (USD 46.4/day) (The Himalayan Times, 2015). This may be underestimated than the actual expenditure because the package tourist are high spending tourist. Group tourist yielded the highest economic impact followed by FITs, entrance fee, TIMS card (for FITs) and TIMS card (group). Economic impact due to the existence of park is estimated to be USD 13,008,223 (detail calculation in Table 1).

Table 1. Analysis of money flow and economic impact in Langtang National Park

| Category | Average stay days | Average expenditure per day (USD) | Number of tourists | Total money flow (USD) |
|--|-------------------|-----------------------------------|--------------------|------------------------|
| FITs | 10.43 | 35.44 | 7489 | 2,768,228 |
| Group Tourist | 10.43 | 46.4 | 6645 | 3,215,861 |
| Expenditure | | | | |
| TIMS (FITs) | 20 | 5371 | 107,420 | |
| TIMS (Group) | 10 | 8763 | 87,630 | |
| Entrance fee | 30 | 14134 | 424,020 | |
| Total Monetary Value (USD) | | | 6,603,159 | |
| Economic Impact (Total Monetary Value X Multiplier) = USD 13,008,223 | | | | |

Although the tourism provides heavy sum of money for the small economy country like Nepal, the major constraints is the tourism income leakage. As high as 70% of the income leaks out of Nepal (Lindberg, 2003).

Conclusion

Existence of park in the Langtang region provided various opportunities to locals and outsiders, most notably income generation to local and economic contribution to local, regional and national economy. An average visitor day in the region is increased than previous year and so economic impact. Attention should be given to increase the production base in the region so that leakage will be less to maximize local benefits. However, return from tourism benefit in comparison to the investment made to secure park resources is very high.



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ENVIRONMENTAL AWARENESS

Mountain biking and wildlife – disturbance experiments with roe deer (*Capreolus capreolus*) in Switzerland

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Introduction

In addition to being the main habitat of European roe deer (*Capreolus capreolus*), forests provide diverse and outstanding settings for recreational activities such as hiking, horse riding and mountain biking (Jacsman, 1990). The effects of new patterns of recreational use such as night rides with bright floodlights are hotly discussed topics associated with the management of recreational forests. Animal ecology so far has mainly focused on spatio-temporal behaviour of individuals in undisturbed remote areas, while research on human behaviour mainly focused on visitor conflicts in highly frequented recreational forests (Arnberger, 2006). Therefore, our knowledge about the effects of new recreational activities on wildlife is currently insufficient. We studied the effects of mountain biking events on the immediate spatio-temporal reaction and subsequent habitat use of roe deer. Furthermore, we compared the effect of on-trail mountain bike events with other disturbance events that occurred off-trail such as hunting, orienteering and on site observations.

Methodology

Study area and context

Our study was conducted at the the Wildnispark Zurich and its surrounding forests, about 7 km south of the city of Zurich, Switzerland. The study area contains the typical fauna and flora of a Swiss midland mixed forest. The Wildnispark Zurich consists of a protected core area and a surrounding area with high recreational use due to its proximity to the city of Zurich.

Our experiments were part of an interdisciplinary research project that investigates the impact of recreational activities on wildlife. Between 2013 and 2015, 15 roe deer were fitted with GPS collars (Model GPS Plus, VECTRONIC Aerospace GmbH, Berlin, Germany). GPS collars were programmed to a general fix rate of 3 h, optimizing for a long battery life. For disturbance experiments, the fix rate was temporally adapted to 5 min.

Methodological approach

The research design consisted of systematic bike rides through the habitats of collared roe deer, in each instance by pairs of bikers with concurrent tracking over two weeks in summer and winter. Deer adapt their behaviour according to the time of the day and are most active during twilight hours in the morning and in the evening (Reimoser, 2012). The experiments were therefore carried out at dawn (within 1 hour after sunset) and at night (between 12pm and 1am).

GPS data of both bikers and roe deer allowed us to identify the exact disturbance time and location, and observe the immediate reaction of the roe deer. The animals usually fled and moved to sites with good cover (Sigrist et al., 2015). Flight initiation distances and the quality of cover sought following the disturbance event were compared between on-trail and off-trail activities.

Results

A total of 51 disturbance events were carried out. The statistical comparison states that flight distances (distance covered during a flight event) due to off-trail disturbances are significantly ($p=0.0365$) higher than due to on-trail disturbances (see below). After the experiment, completed distances return to normal. At night, distances are generally longer than at dawn. Reactions to mountain biking events could be

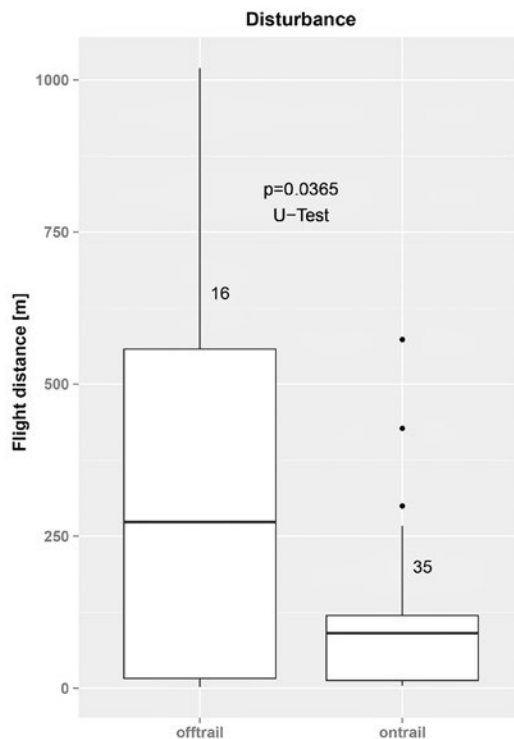


Figure 1. Flight distance (distance covered during a flight event) of roe deer due to off-trail (hunting, orienteering, on-site observations) and on-trail (mountain biking) activities (n=46)

observed with more than 50 % of the animals fleeing more than 50 m and one deer over 500 m. In comparison with mountain biking, off-trail activities (hunting, orienteering and on site observations) generally caused significantly longer flight distances ($p=0.0365$; Fig. 1). Due to off-trail events, 50 % of the animals fled over 250 m and maximum distances up to over 1 km were completed.

Discussion

New developments in outdoor recreation cause challenges for the management of recreational forests. Mountain biking at night is one example of this and its effects on the environment and wildlife are currently being discussed. The results of this study give a first insight into an important topic concerning the management of recreational forests and may provide some support for landscape management when questions of wildlife refuges or wildlife protection are discussed. This study used only position data of roe deer and mountainbikers. Statements on the animal welfare cannot be made. Nevertheless, significant reactions to the disturbance experiments can be measured, both in terms of an interruption of the previous behaviour and a flight over varying distances. Flight distance due to off-trail disturbance is generally longer than due to on-trail disturbances. The habituation of roe deer to existing pathways could be a reason for this, besides other factors that can be taken into account when looking at the disturbance response of animals (Beale, 2007). According to Reimoser (2012), the intensity of the disturbance effect depends on various factors and is increased at night, when the animals are active. This observation is partly confirmed by the outcomes of our experiments. However, research from the nearby Uetliberg has shown that mountain biking activities take place mostly in the evenings (Wytttenbach, 2012).

Conclusion

The experiments showed a significant reaction of roe deer to mountain biking at dusk and during the night. As mountain biking during the night seems to be an increasing human activity, it causes a further limitation of the habitat use by roe deer and other animals. How much disturbance can be sustained by a natural system? This research represents one of the first puzzle pieces to answer this question. For the management of recreational forests, it would be crucial to have more information on use patterns of mountain biking activities and the respective impact on wildlife. Looking ahead, the ongoing project will produce more data and hence more reliable sources and sample sizes.

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Monitoring visitor use and awareness in Sanriku Reconstruction National Park: Towards eco-based disaster risk reduction

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Introduction

On Friday at 2:46 pm Japan standard time, a magnitude 9.0 earthquake occurred at the level of the Japan Trench, approximately 130 km east of Sendai. The sea floor was lifted up, causing a major tsunami that inundated 516 km² of the eastern coastline of Japan. Together, the earthquake and tsunami resulted in around 16,000 deaths and approximately 2,600 missing people (Renaud and Murti (eds.) 2013, Japan National Police Agency 2016). In order to support the revitalization of the Sanriku area, the Sanriku Reconstruction National Park was created after the 2011 Great East Japan Earthquake. However, large construction projects provoked adverse reactions in the tsunami-hit areas. For example, a giant conveyor belt is bringing mud to raise the ground level in Rikuzentakata City and some researchers have pointed out resulting negative effects on the ecosystem. In the case of Sri Lanka, dumping of debris from the cleanup into waterways and wetlands created pollution and drainage problems that hampered long-term recovery after the Indian Ocean tsunami (Sudmeier-Rieux and Ash 2009). These kinds of negative impacts have occurred in the aftermath of disasters and it is very important to pay close attention to the post-disaster recovery period and also to address how to strengthen the function of protected areas in eco-based disaster risk reduction. In addition to this viewpoint, this research focuses on visitor use, including visitor consciousness that can offer information on the value of a national park. Not only visitor use but also the consciousness of visitors, such as interest in disaster risk reduction and expected countermeasures, are thought to change gradually after a disaster but very little research has focused on such types of changes in psychological states.

Twin research objectives were thus formulated, to investigate 1) visitor use of Sanriku Reconstruction National Park and 2) visitor awareness on the role of a national park four years after the disaster.

Methods

Sanriku Reconstruction National Park was selected as a tsunami disaster case study area. It is located in an eastern district of Japan and runs 220 km north–south along the Sanriku Coast, stretching from Hachinohe in Aomori Prefecture through Iwate Prefecture to Kesenuma in Miyagi Prefecture. The designated parkland area is 14,635 ha (Japan Natural Parks Foundation 2016). A section of the Michinoku sea breeze trail was also established in 2013 and offers opportunities for hiking in the area.

The monitoring survey employed a questionnaire for domestic visitors to the park that included hikers in 2015, focusing on the following aspects: (1) visitor at-

tributes (e.g. age, gender), (2) characteristics of visit (e.g. number of visits, group size, objective of the trip), (3) awareness of national parks and disaster risk reduction (e.g. degree of interest and importance, preparedness and countermeasures expected for disaster risk reduction), (4) satisfaction and intention to revisit. Self-administered questionnaire sheets were distributed at Tanesashi Kaigan (coast) Information Center, Jodogahama Visitor Center and Goishi Kaigan (coast) Information Center on August 22–23. The three centres are located in order of north in areas hit by the 2011 tsunami in the Sanriku coast district and many of the seriously affected areas can be found from Jodogahama southwards. The data were collected from a sample of 18- to 82-year-olds from the Japanese visitors to the park. In total, 431 respondents participated in the survey, representing a response rate of 68%.

Results

Results indicated that the largest proportion of respondents was aged 20–40 (62%) and that the total number was almost equally divided between the two genders (male: 52%, female: 48%).

The most frequent size for groups of park visitors was two people (41%) and groups consisted of friends (33%) and family (26%). Some 69% of visitors used private cars since the public transportation system is not developed in the Sanriku coast area. The most common trip type was day-trips (41%) and first-time visitors (26%) were not common. The most commonly mentioned trip objective was sightseeing (70%) and natural landscape (60%) was regarded as the most important factor when visitors decided on the place to visit.

Visitors' degree of interest in reconstruction after the disaster was high (very interested: 50%, interested: 45%) and the role of the national park in the tsunami-affected area was regarded as important (very important: 47%, important: 33%). The most common answer for preparedness and countermeasures to protect against a future disaster was maintaining an evacuation passage, while learning about disaster risk reduction and ensuring self-help efforts were selected as the top-ranking

Table 1. Visitors' awareness at three centers in Sanriku Reconstruction National Park (N=431)

| | Tanesashi IC (N ₁ =200) | Jodogahama VC (N ₂ =192) | Goishi IC (N ₃ =39) |
|---|--|---|--------------------------------------|
| Interest in Reconstruction after the Disaster | 2.394 ^a | 2.550 ^b | 2.605 ^b |
| Importance of the Roles Played by the NP | 2.595 ^a | 2.508 ^a | 2.351 ^a |
| Importance of Learning about the Fury of Natural Hazard | 2.745 ^a | 2.787 ^a | 2.789 ^a |
| Importance of eco-based Disaster Risk Reduction | 2.736 ^a | 2.773 ^a | 2.757 ^a |

N.B. 1) The degree of interest and importance was measured using four levels Likert scale method (3: much interest, much importance - 0: no interest, no importance). 2) Tukey's honestly significant difference test was used to find out the difference among the averages of group (The same letter attached to numbers in the same line means "not significant, $p > .05$ ").

actions. Comparing the degree of awareness on national parks and disaster risk reduction among three study sites, the average score of degree of interest was significantly lower at Tanesashi ($P < .05$) but otherwise no significant difference was found (Table-1).

The average degree of satisfaction was measured at 7.98 out of 10 and the intention to revisit was very positive.

Implications and Conclusions

The implementation of this monitoring could demonstrate the role of national parks expected by visitors. As a matter of course, safety should be given priority in the aftermath of a disaster because the zoning system is employed and many people live in parks in Japan. However, visitors' consciousness is thought to be changing for a long period of time and further research is urgently needed on this topic. These results are expected to provide the management planning of the park with basic and important information. Moreover, I hope that the unique history and culture of this national park will provide a valuable insight into post-disaster reconstruction.

Acknowledgements

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Tranquility mapping: A tool for the equitable allocation of soundscapes in protected areas

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Introduction

It is well recognised that advanced industrialised societies have become progressively 'noisy' over time. This has led to the health and wellbeing benefits of tranquil spaces becoming increasingly recognised - and valued - around the world. Indeed, the search for tranquil environments is often the chief reason people give for escaping urban settings for 'natural' environments.

Tranquillity in natural environments is a combination of both 'natural' landscapes - *and* 'natural' soundscapes. The preservation and conservation of natural environments therefore requires the management of not just natural landscapes and ecosystems, but also their associated soundscapes. Natural soundscapes are finite: at any place and time the soundscape is 100% 'natural' unless affected by 'unnatural' human-caused sounds. Therefore, the primary challenge to preserving and conserving natural soundscapes in protected areas is the management of unwanted human-caused sound - or 'anthropogenic noise'.

The predominant source of anthropogenic noise in New Zealand's protected areas derives from the use of motorised transport, most notably the commercial operation of aircraft and jet-boats for conservation management and tourism purposes. Because these movements of aircraft and jet-boats necessarily involve transiting across protected areas to access particular places of interest, the impact on natural soundscapes from this activity can be temporally and spatially extensive.

Current noise management practice in New Zealand's protected areas

The New Zealand Department of Conservation (DOC) develops statutory management plans that establish the nature, extent and scale of human activity permitted in protected areas. With respect to anthropogenic noise, to date these plans only address noise derived from aircraft activity. The sole management intervention to mitigate the impacts from noise is through the imposition of zones that control both the number of locations that may be accessed by aircraft, and the number and frequency of movements to those locations.

The effectiveness of this intervention is determined through ground-level monitoring at key sites using DOC's Standard Aircraft Monitor (SAM) (Booth, Jones & Devlin, 1999), based on 1994 work by the US National Parks Service (NPS). SAM focusses on subjective 'annoyance' level as the primary measure of social impact, with the 'acceptable' level of ground-based visitor annoyance arbitrarily capped at 25%.

Limitations of current practice

Annoyance is currently the only metric used by DOC to inform soundscape management, the purpose of SAM being to help identify those areas where aircraft noise may be compromising the quality of visitor experiences; however, the relationship

between visitors' annoyance with aircraft, and the effects of those aircraft on visitors' overall visit enjoyment has yet to be consistently demonstrated.

Furthermore, the level of reported annoyance is a function of visitors' expectations with respect to the presence and nature of tranquillity in protected areas – and results from SAM indicate these expectations are declining in parallel with the aforementioned increasing noisiness of the modern world. With annoyance the deciding measure, the management response to this trend has been to allow commensurate increases in aircraft activity.

In addition, SAM's sole focus on the subjective responses of ground-based visitors to aircraft over-flights imposes significant methodological, logistical and practical challenges that essentially constrain its use to sites where there are large numbers of ground-based visitors and high levels of aircraft movements. These sites tend to be the most accessible 'front-country' locations in protected areas – whereas, anthropogenic noise impacts are typically far more wide spread.

Finally, DOC statutory management plans and SAM do not explicitly address the impacts of anthropogenic noise with respect to cultural and historic heritage values and spiritual values at sites of particular significance.

A new approach

It can be concluded from the above that natural soundscapes are a resource deserving of management for their own sake - quite separate from the visitor experience. This important distinction reveals the essential challenge of the management task: the preservation and conservation of tranquil natural environments for the long-term benefits of the public; *and* the sustainable and equitable allocation of the same finite natural soundscapes between different stakeholders. Developing a robust, evidence-based management model and tools is therefore critical to meeting this challenge.

DOC is addressing this requirement through a combination of two threads of research. The first draws on work by Dumyahn and Pijanowski (2011) that conceives of soundscapes as Common Pool Resources (CPR) bound by time and space. This conception recognises that some visitors consume natural soundscapes in a manner that subtracts from the total soundscape available to others, with the management focus therefore on the equitable and sustainable allocation of the resource according to an agreed set of principles and objectives.

Dumyahn and Pijanowski observed such agreement necessarily involves incorporating the aspirations, preferences and obligations of a range of stakeholders in the development of a management regime based on a shared understanding of both the resource itself, and the mechanism by which it is to be allocated. For management purposes, such a mechanism would need to be able to represent the qualitative and quantitative allocation of the resource, both spatially and temporally.

The second research thread provides this mechanism: the Tranquillity Rating Prediction Tool (TRAPT) developed by Watts and Pheasant (2013, 2015). TRAPT enables the predictive site-specific mapping of tranquillity levels based on a formula of subjective and objective factors, and incorporates a qualitative scale of tranquillity levels to report the results. TRAPT is being calibrated for the New Zealand context,

including the historic, cultural and spiritual imperatives of DOC's statutory management plans. Input from stakeholder groups often seen as 'competing' for use of natural soundscapes is central to this work.

When deployed, TRAPT will facilitate engagement of all stakeholders in soundscape allocation based on a common frame of reference and shared responsibility. Incorporating GPS data from aircraft and jet-boat operations, TRAPT will be able to model alternative scenarios to achieve specified qualitative and quantitative levels of tranquillity at any given site. Use of TRAPT will therefore shift the focus of management from interventions intended to constrain annoyance levels, to interventions that preserve and conserve natural soundscapes - thereby ensuring all visitors can access locations where the wellbeing benefits from high levels of tranquillity may be enjoyed.



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Do Canadian's Leave No Trace? A study examining the pro-environmental behaviours of front-country and back-country overnight park visitors

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Introduction

Inherent in the term outdoor recreation is the interaction between humans and the natural environment. However, this interaction creates inevitable impacts on the natural environment, such as soil compaction and habitat fragmentation (Hammitt, Cole, & Monz, 2015). Some research has been done to investigate how back-country (BC) overnight visitors mitigate these negative impacts through low-impact camping practices, however little has been done on the millions of front-country (FC) overnight visitors. The purpose of this study was to understand the level of engagement in pro-environmental behaviours of Canadian provincial parks users and compare those practices of FC and BC overnight visitors. Park visitors' knowledge of, intent to engage in and actual practice of Leave No Trace (LNT) practices were measured. Guided by value beliefs norm theory and the theory of planned behavior, additional factors that influence these visitors' engagement in pro-environmental practice were also measured (Ajzen, 1991; Stern, Dietz, Abel, Guagnano, & Kalof, 1999).

Background

Canadian provincial parks policies have a dual mandate of protecting provincially significant natural and cultural heritage resources while simultaneously providing sustainable recreation services to current and future generations (OMNR, 2011). Currently visitation to provincial parks in both Ontario and Alberta is over 8 million visitors annually. Of those visitors, over 2 million will stay overnight for a minimum of one night. With such high visitation numbers it is not surprising that provincial parks in Canada are experiencing resource degradation, habitat loss, and lasting environmental impacts (OMNR, 2011). In order to mitigate environmental impacts caused by outdoor recreation, park managers must employ multiple strategies, including both direct (e.g., rules and regulations) and indirect methods (e.g., education and interpretation programs) (Hammitt et al., 2015).

Education is viewed as an indirect management strategy for park and protected area managers. The goal of environmental education is to change visitor's behaviours to be more environmentally sustainable. LNT is a widely accepted educational program that aims to reduce environmentally depreciable behaviours and promote responsible outdoor recreation through low-impact camping practices (Marion & Reid, 2001). While the principles taught by LNT were initially developed for the BC, the concepts can and are being applied to FC camping areas (areas accessible by car).

Methods

Study Site

The two parks examined were Algonquin Provincial Park (APP) in Ontario and Peter Lougheed Provincial Park (PLPP) in Alberta. These parks are culturally comparable, have high visitation numbers, offer similar BC and FC camping opportunities, and provide a broad representation of visitors to provincial parks in Canada. Within PLPP, there are 546 regular FC or auto access camp-grounds, two group campsites, twenty day-use areas, and 83 BC campsites. APP hosts over 2000 km of BC canoe routes and hiking trails, includes over 1900 campsites total in both the FC and BC. In addition, APP has an established formal relationship with LNT Canada and offers educational programming related to LNT, thereby enabling rich opportunities to compare impacts of information campaigns surrounding LNT. On the other hand, PLPP does not employ formal LNT materials or content, instead using in-house messaging to promote low-impact camping.

Methodology

A controlled comparison case study method was followed, as the goal was to compare the similarities and difference between both the two parks and user groups. Data was collected using a survey questionnaire administered on Android tablets and on paper. Surveys were collected at trail heads, campsites, permit offices, and visitor information centres. The scales included measurements of environmental values, attitudes, LNT understanding and knowledge, intention to practice LNT, ecological world views, and other factors relating to TPB and VBN Theory. Data was collected using convenience-based sampling and resulted in a sample of $n=459$, 230 visitors in Alberta and 229 in Ontario. Additionally, a follow up survey was emailed to participants intending to measure actual practice of LNT as a measure of behaviours, this survey resulted in a sample size of $n=91$. T-tests were run to determine if there were statistical differences between both user groups and parks with regard to self-reported LNT knowledge, actual LNT knowledge, and environmental world views. The p-value for statistical significance was set at .05. One-way analyses of variance (ANOVAs) were conducted with Tukey tests to examine the relationship between TPB and VBN variables on park visitors intentions to engage in pro-environmental behaviours such as LNT. In addition, to determine if demographic variables, gender, income, and education play a role in the relationship between parks and user groups on the DVs: ecological world view and knowledge of LNT, ANCOVAs were conducted.

Results and Discussion

Results indicated a significant difference between FC and BC park visitors in terms of both self-reported knowledge of LNT (FC $M=3.86$; BC $M=4.34$, $p=.001$, $d=.319$) and actual LNT knowledge (FC $M=4.07$; BC $M=3.93$, $p=.002$, $d=.302$). It is important to note that while these findings are in line with previous research, suggesting BC users might have a higher level of self-reported knowledge, there is also a contradiction of this in the results of actual LNT knowledge. FC users scored higher levels of

actual knowledge when asked direct questions about LNT practices. Additionally, a significant difference was found in self-reported knowledge of LNT between the two parks (AB $M=4.38$; ON $M=3.67$; $p<.000$, $d=.479$). Analysis of the TPB and VBN theory factors indicated that PEB intentions were best predicted by environmental values ($\beta=.281$), perceived behavioural control ($\beta=.208$), personal norms ($\beta=.192$), attitudes ($\beta=.168$), and awareness of consequences ($\beta=.102$) see table 1.

Table 1 Predicting pro-environmental behavioral intentions

| Factor predicting PEB Intentions | β | Lower bound | Upper bound |
|----------------------------------|---------|-------------|-------------|
| Environmental values | .281 | .203 | .393 |
| Perceived behavioural control | .208 | .119 | .262 |
| Personal norms and beliefs | .192 | .080 | .243 |
| Attitudes | .168 | .085 | .238 |
| Awareness of consequences | .102 | .023 | .163 |

Based on the findings of this study park visitors in Alberta have a higher knowledge of LNT practices than those who typically camp in Ontario. These results can be explained by a multitude of factors such as demographics, previous and current low-impact camping education/campaigns, and geographically location. The study participants in Alberta had a higher percentage of bachelor level and post graduate level degrees, as well as on average a higher household income. Stern et al.(1999) suggested that those with higher levels of education and income tend to have a more pro-environmental world view. These results also suggest that perhaps LNT as a brand is not as important or useful as previously believed. Algonquin Provincial Park has been implementing a LNT education campaign and using official logos and wording since 2012, whereas Alberta Parks uses generic low-impact camping information. Furthermore, it is interesting to note that it was the FC users who scored higher on the actual LNT awareness scale. LNT has widely been used for educating back-country users and has only recently been used in front-country areas. A better understanding of the environmental behaviours of FC overnight visitors will allow park managers to improve the efficiency and effectiveness of communication/education strategies targeting this group. Furthermore, understanding the factors which are most important in motivating engagement in PEB, can further develop park programs that enhance visitors' knowledge of LNT and their commitment to engage in these practices.



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Does Natura 2000 Always Mean Ecotourism Potential? Application of PP GIS to the Perception Study of the Tourist Stakeholders' Values at the Local Scale of Natura 2000 Municipalities

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Natura 2000 has been established as the world largest network of protected areas to halt biodiversity loss in Europe, mainly by promoting sustainable use of semi-natural ecosystems. However, in many cases, the implementation of sustainability goals has been limited to its environmental dimension. This is evident especially in Central and Eastern Europe where residents reported significant social and economic costs of Natura 2000 (ref. Grodzińska-Jurczak, Cent 2011). Nature conservation authorities and some NGOs often propose ecotourism to respond to the residents' concerns about negative local-scale economic impact of the Natura 2000 program. However, it can be misleading since an ecotourism potential is not solely created by environmental assets concentrated in Natura 2000 sites. Thus, in this study, we focus more closely on social aspects of ecotourism and provide insight into 1) community values towards nature, 2) stakeholders' attitudes towards ecotourist path of development and 3) local environmental knowledge of the stakeholders. We argue that only after learning these aspects and gaining an active support of wide array of stakeholders' towards the ecotourist initiatives, the process can truly address local-scale social and economic needs while contributing to nature conservation (ref. Western, Wright 1994).

Interpretative character of the studied aspects impelled to adopting a qualitative approach. We restricted our analyses to three municipalities in Małopolska Region (Poland), all partially covered by Natura 2000 network. While we controlled for inter-regional factors that could affect an ecotourism potential, we kept case study areas diverse in terms of both 1) main subjects of Natura 2000 protection and 2) socio-economic characteristics. Since none of the municipalities have long tradition of well-established nature-based tourism, we identified most of the key-informant stakeholders who perform tourism-related activities among the selected communities. We concurrently used two methods of data collection: 1) in-depth interviews with the stakeholders supplemented with 2) a participatory mapping task. A total of 28 respondents were interviewed between July and October of 2013.

The interviews consisted of series of 27 questions, organized in six categories: 1) perception of local natural resources, 2) views of ecotourism development, 3) community participation in nature conservation, 4) community views of Natura 2000, 5) social, economic and environment tourism impacts and 6) connectedness to local

nature. The interviews were transcribed, coded and interpreted, following the formulated research questions.

We included mapping task to enrich the collected results with spatial information. This enabled us to interpret associations between subjective, self-reported attitudes of the respondents and objective, spatially-defined environmental assets and Natura 2000 sites borders. To ensure maximum comprehensiveness of the task to the community respondents, we adopted a pen-and-pencil mapping technique (ref. Pocewicz et al. 2012). We got insight into local environmental knowledge of the respondents by defining separate mapping attributes for each of the environmental components (rocks, air, water, soils, plants and animals) and by asking the stakeholders to map all subjectively valued features of the local-scale landscape, following the proposed categories. To deepen the value-side of the analysis, we divided all the categories into two further subgroups: one connected to the natural values of the landscape and second to the economic ones. For example, respondents were asked to mark a) areas valued for their clear air as well as b) those areas they regarded as attractive for placing wind turbines. Finally, we asked respondents to map: 2) areas subjectively viewed as attractive for a specific (listed) form of ecotourism, 3) areas to be excluded from tourist activities, 4) areas with both existing and preferred elements of ecotourism infrastructure. After digitalizing all the responses using ArcMap 10.2.2 software, we performed hotspot analyses and calculated a collection of spatial indications to enrich qualitative analyses of the maps, following Klain& Chan's (2012) approach.

We observed substantial coherence of the results gained with the use of the two independent methods. We learned that the closest dependence of the residents to provisioning values of the environment, the more limited willingness to diversify local economy through ecotourism development. Spatial analyses allowed for identifying potential areas of conflicts between contradictory directions of use of the same ecosystems. Importantly, the areas were designated based on stakeholders' responses only, thus they are expected to be potentially more easily managed based on bottom-up approaches. Surface area analyses helped to interpret the capability of the area to provide site-specific ecotourism assets: the more uniformly perceived landscape by the stakeholders, the smaller potential to attract well-prepared ecotourists, dedicated to experience a specifically-defined environmental value.

Also, the way the stakeholders' understand an ecotourism itself can influence internal potential of its development. While most of the respondents recognized core components of the ecotourism correctly (they associated it with (1) experience of nature, (2) ecological education and learning about local ecosystems or (3) minimizing pressure on those ecosystems), we found examples of significant misunderstanding in that respect (e.g. ski resort proposal in the core zone of a Natura 2000 site or associating local ecotourism assets with a town's economic zone or dinosaur theme park).

Finally, Natura 2000 sites may not be perceived as the most environmentally attractive areas in the municipality and therefore they aren't considered core ecotourism assets. We found this perception is linked to the size of the site and its distance from the main municipality settlements (fig. 1.). However, the results of mapping ex-

ercise revealed shortages in internal (community-addressed) promotion of the protected values. This was evident as some of the stakeholders were unaware of the potentially attractive resources of Natura 2000 sites in their vicinity.

The study demonstrates potential of a successful application of public participation GIS (PPGIS) to ecotourism-planning processes. PPGIS, defined as a variety of GIS tools to engage public in decision-making (ref. Sieber 2006), is already widely used for optimising urban planning, protected area management or land-use conflict facilitation, however it has been still unpopular in the ecotourism contexts, so far. We believe our results provide a step forward establishing closer connections between multidisciplinary science, nature conservation agencies, tourism industry and local communities in Poland to better inform unavoidable social and economic processes which affect all of these groups of interests.

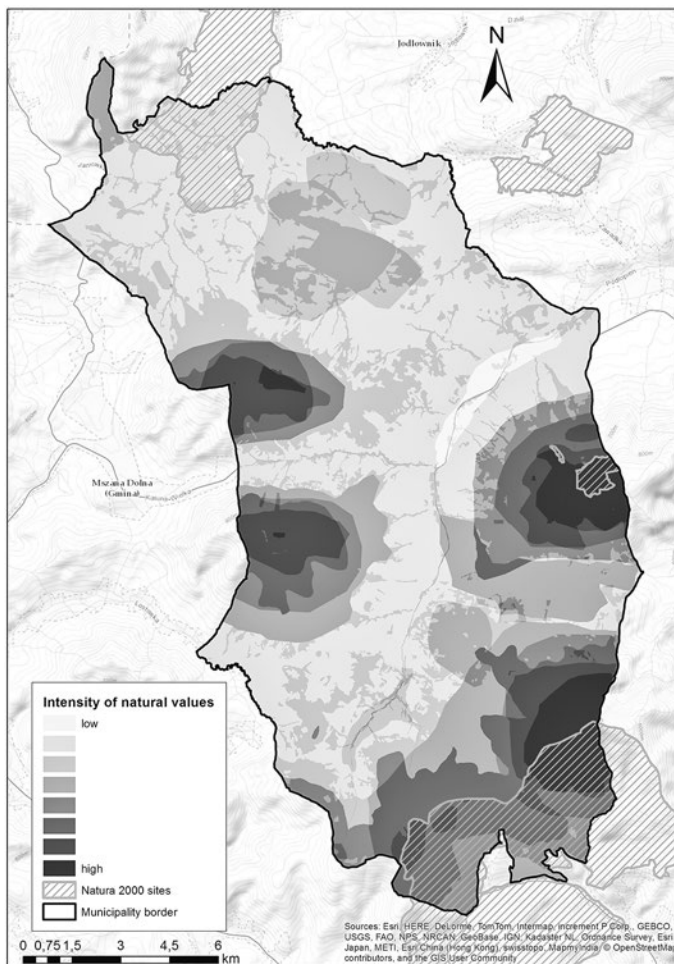


Fig. 1. An example of limited spatial colocation of subjectively valued natural features and borders of Natura 2000 sites in Dobra municipality (Małopolska Region, Poland)



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Estimating benefits of nature conservation: ecosystem service valuation in Krka National Park (Croatia)

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Introduction

Protected areas (PAs) are cornerstones of all national and international conservation strategies to preserve species diversity and ecosystem function and, therefore, ensure continuation of ecosystem services (ES). The protection includes additional regulation and control of human activities. The restrictions are mostly placed on provisional services (agriculture, farming, logging, hunting, mining, etc.). Due to these restrictions, locals may perceive income loss and oppose the PA. Revenues and non-monetary benefits from cultural ES - such as nature-based tourism - may be greater than the value of provisional services, but the local population will feel compensated only if aware of the revenues. Increasing awareness of ES-based benefits of PAs can, therefore, help PA managers foster good will towards the PA among the local populations. In addition to monetary benefits resulting from ES that are of primary interest to the local and regional population, PAs offer non-monetary values of cultural ES that are of primary interest to tourists. The interests of tourists are important because only their satisfaction guarantees positive advertising and, therefore, continuation of the tourism revenues.

In this study, we estimate the benefits of ES in Krka National Park (Croatia) - to the local population and to the Park visitors. We develop new methodology to estimate indirect monetary benefits of nature-based tourism to local population (i.e. local economy), and non-monetary benefits of nature-based tourism to Park visitors. Additionally, using existing approaches (CICES), we estimate monetary benefits of provisional and regulating ecosystem services (ES), and direct monetary benefits of nature-based tourism (cultural ES).

Methods

Provisional and regulating ES were classified by CICES and valued by direct or indirect market evaluation method (market price, secondary production value, value of avoided damage and/or replacement cost, conditional value, and conditional choice). Direct monetary benefit of nature-based tourism (cultural ES) was also calculated following CICES classification as net income attained by visitor's payment of administrative fees (such as tickets) and other services in the Park.

Indirect monetary benefit of nature-based tourism was estimated as revenue based on the length of stay of Park visitors in the region and average visitor expenditure. Visitors were asked for the role (importance) of the Park in the decision to vis-

it the region. The importance of the Park was then used as a scaling factor for the length of stay and, consequently, total expenditure in the region.

Non-monetary benefits of nature-based tourism were established by investigating personal benefit attainment (PBA) experienced by visitors through interactions with nature on physical, intellectual or spiritual level. Research was conducted by designing and administering a questionnaire to a random sample of visitors at exit.

Results and discussion

Total monetary benefits of provisional and regulating ES has been evaluated as 15.97 million euros/year. However only 14 out of 20 services have been evaluated. Since maintaining nursery populations and habitats (class P15) have not been evaluated, but have a potentially extremely high value, the actual monetary value of provisional and regulating services is certainly much higher.

Direct monetary value of nature-based tourism (cultural ES) has been estimated at 9.83 million euros/year, yielding the total sum of ES classified by CICES of 25.8 million euros/year. Services related closely to the protection (filtration of water, filtration of air, erosion control, genetic materials, nature-based tourism) account for 43% of the value, even though the potentially largest class (P15) could not be calculated. Economic activities (cultivated crops, reared animals, honey production, water based energy) account for 30% of the total value.

Total indirect monetary benefits of nature-based tourism in the Park are nearly 164.96 million euros/year. The visitors who are staying in Sibenik-Knin County rate the role of the Park significantly higher compared to visitors staying in more distant counties, while the visitors staying in the bigger cities evaluate the role of the Park significantly higher than visitors from small coastal towns. However, the visi-

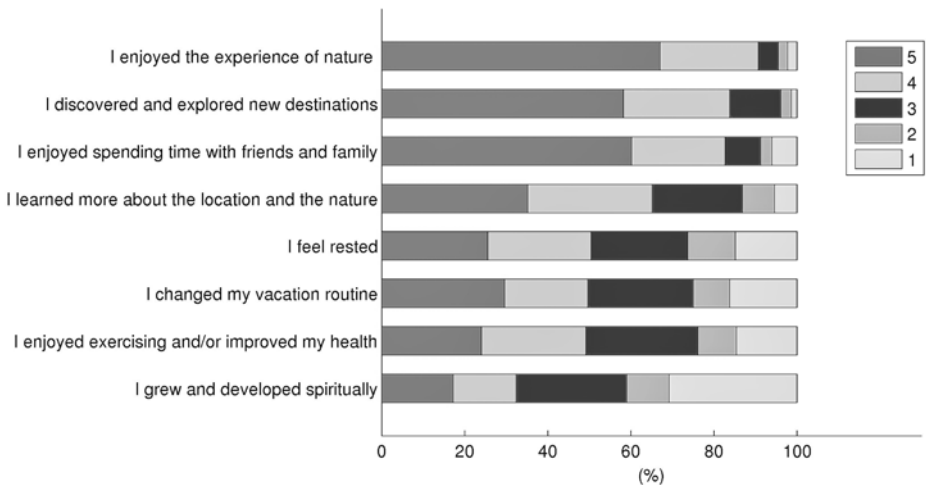


Figure 1. Personal benefit attainment (PBA) was assessed via 8 categories. Visitors graded the agreement with the statements connected to the 8 categories on a five point Likert scale: 1- completely disagree, 2-somewhat disagree, 3-neutral, 4-somewhat agree, 5-completely agree

tors who evaluate the role of the Park with higher grades stay in the region for shorter period of time.

Non-monetary benefits of nature-based tourism to Park visitors excel in sensory stimulation by beauty of nature (grade: 4.51 on a 1-5 scale), closely followed by new experience, and social engagement (Figure 1). Averaged grades of PBA categories are in the range 2.78-4.51. Visitors seldom attain spiritual and meditative experience in the Park, probably due to high number of other visitors (very crowded area).

Conclusion

Estimated direct and indirect monetary benefits of nature-based tourism (cultural ES) are considerable (sum: 174.79 million euros/year), ensuring substantial incomes to local population due to the existence of PA.

Non-monetary benefits of nature-based tourism to Park visitors add to importance of cultural ES as well - at least 82% of the visitors had grades greater than 4 in three categories of PBA they rated the highest. These findings give great leverage to PA managers when negotiating with local stakeholders. Further research is needed to i) verify the findings independently, ii) test the methodology on other types of PA, particularly marine PA, and iii) to expand methods to incorporate seasonal variability such as daily expenditure per tourist, and duration of stay.

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Quantifying effects of tourist activities on the environment, tourists, and park services in nature protected areas

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Nature protected areas (NPAs) are cornerstones of all national and international environmental conservation strategies. While activities in NPAs are limited, tourism and the related tourist activities are often encouraged, sometimes as a means of funding environmental protection programs in the NPAs. However, the tourist activities can damage the environment and, therefore, threaten protection goals of NPAs. Since number of tourists in NPAs is increasing globally (Balmford et al., 2009), the threat is increasing. Additionally, the increase in the number of tourists and, therefore, intensity and variety of tourist activities, can adversely affect park services and tourist satisfaction. Only a balance between the competing goals and activities can guarantee long-term coexistence between nature protection and tourism uses of NPAs.

NPA management achieves this balance by providing NPA services such as crowd management, mitigation of negative impacts, and ecological restoration. To provide an optimal set of the services, the management first needs to relate the effects of tourist activities on all entities of the NPA (including the environment). In practice, park managers use adaptive management approaches such as VERP, TOMM, ROS, LAC and VIM. In these approaches, feasible monitoring systems and simple indicators are used in conjunction with adaptive approaches and quick in-house responses to keep the indicators in the acceptable range. The responses include infrastructural improvements, crowd management, partial closures, etc. Despite its efficiency, the adaptive response method has several disadvantages: (i) its responsive rather than preventive nature can cause delays in reactions, (ii) the simple indicators cannot capture complex causalities between activity types, intensities, and their (potentially delayed) effects on the environment and, consequently, (iii) the simple indicators with a fairly narrow focus are not always able to detect when changes become irreversible. High tourist densities cause more damage at a greater rate, thus exacerbating the disadvantages. Assuaging those disadvantages requires the ability to predict effects of possible activities on the environment, i.e. quantitatively analyze interdependencies of relevant processes. This, in turn requires an analytical framework that relates types and intensities of tourist activities to complex processes in ecosystems.

Here we present such a framework based on the DPSIR (Driving forces-Pressures-State-Impact-Response) causal framework. DPSIR has been used to assess environmental impact of human activities by the European Environment Agency (EEA

1999; EEA 2014), United Nation Environment Programme (UNEP 1997; UNEP 2012), and - more recently - to environmental impact of visitors in PAs (Navarro et al. 2012; Salerno 2013). However, the focus of DPSIR is on the state of the environment and impact on humans, while other important factors such as impact on the visitor satisfaction, and park services, are not included in the analysis.

Our framework treats tourist activities as the driving forces, and connects the causal chain of Activities – Pressures – State – Impact – Response and Services (APSIRS, Figure). Unlike prior frameworks, we interpret the state as the state of all entities in the NPA, not just the environment. The entities are composed of four types of objects: people, cultural heritage, NPA services, and the environment. The state of the objects is quantified by indicators compatible with EU regulations and conducive to valuation of ecosystem services (ES), and can be evaluated subjectively (e.g. through opinion polls) or objectively (e.g. through sensors).

The framework serves as a platform for integrating models into a decision support system for NPA management, and is not meant to replace, but enhance current adaptive NPA management frameworks. The main goal is to complement the understanding of causal relationships impacting nature preservation and visitor satisfaction as a part of the decision-making process. Therefore, in contrast to other frameworks that include all stakeholders and surrounding areas, we exclusively address visitors and other entities within the NPA. APSIRS can be especially useful for NPAs with high tourist densities when costs of nature protection are funded by tourists.

APSIRS augments the applicability of the DPSIR framework to:

1. focus on tourist activities as driving forces
2. encompass all entities of the protected area (natural and cultural heritage, people, and NPA services)
3. recognize experiential and physical in addition to environmental pressures
4. separate effects of internal factors controlled by the NPA management from external factors outside of the control
5. utilize the carrying capacity for tourists as an indicator in a dynamic way
6. include NPA mandate as a determination of management goals
7. assert NPA services as a way of affecting tourist activities, pressures, and state
8. provide a basis for comprehensive valuation of ES

We use an example of PP Telašćica to show how models connect objects and can be used to quantify interactions between elements of the framework to determine impacts and the carrying capacity of an area for tourists. APSIRS can increase management efficiency by enabling rapid testing of effects of alternative managerial decisions in-silico, reducing the need for field testing that could harm the environment, increase management costs, and/or slow the implementation. Therefore, APSIRS represents a holistic decision support tool meant to inform decision-making and help stakeholder negotiation in any of the existing frameworks, thus improving allocation of resources and, therefore, visitor experience as well as environmental conservation.

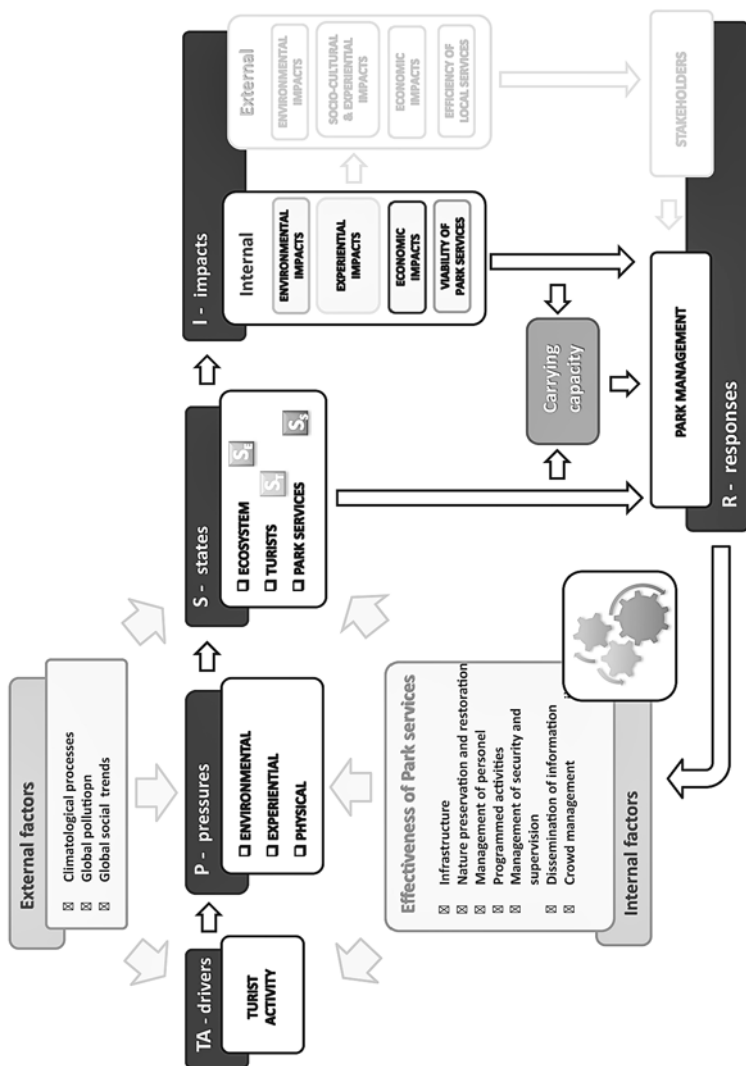


Figure 1. APSIRS analytical framework. Tourist activities (drivers) cause pressures on the environment as well as other objects in the NPA: other tourists (experiential pressures), and the physical infrastructure (park services). The pressures modify states, from which impacts of the tourist activities can be calculated. The states and impacts determine and limit the carrying capacity (which here is a dynamic quantity emerging from the analysis), and serve to inform management response. The response then affects effectiveness of park services and, therefore, the impact of tourist activities on the objects of the NPA. External factors (e.g. demographic trends, climate change etc) also affect the elements of APSIRS, and can be accounted for in the framework



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Impact factors on protected areas and management policies on a global scale

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Introduction

The issue of sustainability of protected areas has been, up to twenty years ago, on the margins of scientific research due to common perception that the protected natural areas are sustainable by their very existence. Tourism in general, including tourism in protected areas, which often has a prefix eco, inevitably changes and disturbs state of the environment by its existence in a certain area. The main impact of tourism is created by attracting tourists and their concentration on specific particularly attractive area, which brings consequences that signify the usual environmental pressures, such as: waste, wastewater, traffic and others (Growcock, Pickering, 2011). Infrastructure required for tourist activity irreversibly alters the natural, and social environments. Contact with tourism affects the way of life of the local population, socio-cultural identity and brings new structure of the local economy, which substituted the traditional activities. Accordingly, the question arises is tourism in the protected areas possibility or a challenge, at a time when modern trends of world tourism indicate growing interest in protected areas, which not only favours the development of a relatively undeveloped areas, but also generate considerable economic benefits (Dowling et al., 2013). Therefore, this paper examines the issues of sustainable development and management policies on the example of selected natural areas in the world.

Literature review

Sustainability of natural protected areas is largely dependent on the management which can be, if successfully directed and implemented, main method for conservation of the underlying phenomenon (Alexander, 2008). Negative impact factors are specific for each area, and thus a model of sustainable management of natural protected area must be specific for each area (Blackstock et al., 2006, Hobbs et al., 2009). Furthermore, management must be based on geographic particularities of space which is managed and associated with regional planning. Sustainability as a complex issue cannot be easily solved by focusing only on one of its dimensions (Dudley et al., 1999). Only integrative approach can solve the issues derived out of different impact factors. Therefore it is essential to recognize impact factors and prevent them if possible to minimize their effects (Hobbs et al., 2009).

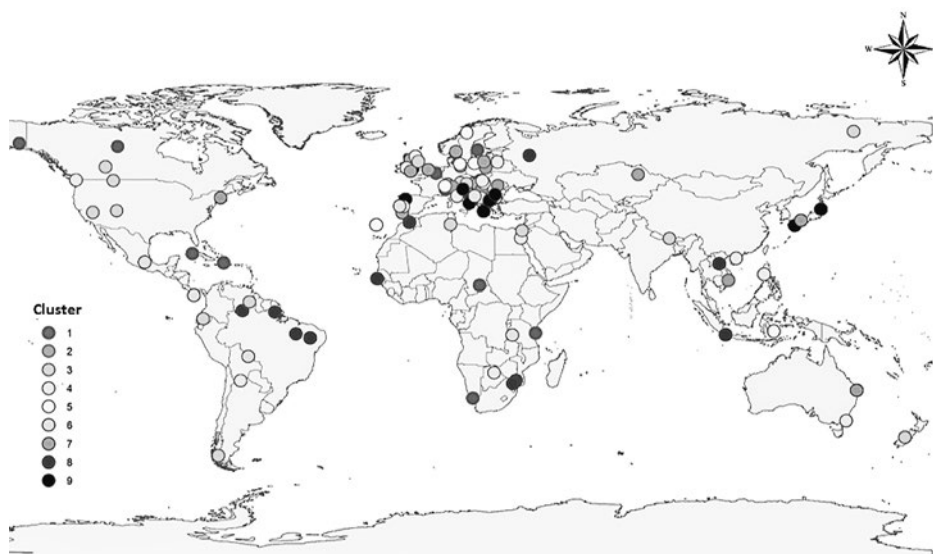
Impact factor determination

Within this framework of this research 114 protected natural areas were explored, out of which five strict nature reserves, four wilderness areas, 71 national parks, one natural monument, five habitat/species management areas, 19 protected land-

scapes, six areas with sustainable use of resources and six protected areas without the IUCN categorization. The focus of the research in selected areas were the factors (global, regional and local) effecting the sustainability, their geographic distribution, management models of protected areas and their effectiveness. Each of the analysed protected areas filled in the questionnaire in which they needed to evaluate 23 elements of endangerment and their impacts on the area at the likert scale of 7 points. By using multivariate factor analysis five fundamental factors threatening the protected natural areas were extracted: 1. the impact on natural resources and water by anthropogenic pressures; 2. the impact on space and environmental by urban development and agriculture; 3. the impact on space and environmental by tourism development; 4. exposure to natural risks and demographic and socio-cultural changes; and 5. Exposure to extractive activities and risks due to hydro-technical interventions and consequences of war.

These factors were also analysed considering the links between certain factors and the frequency of their combination, which can be inferred from the differences that exist between clusters and the specifics of each cluster. Nine different clusters were determined, while their distribution on a worldwide basis and names are visible in the picture 1.

In particular were considered the most common types of management in the world (according to the IUCN): management by government, partnership management,



Picture 1. Protected areas with regard to the clusters of impact, 1 - areas without major external influence, 2 - areas with expressed hydrological changes and resource exploitation, 3 - areas pronounced impact of the population, climate change and tourism, 4 - areas affected by population, climate change, urbanization and reduction of biodiversity, 5 - areas affected by tourism, waste and poor management of resources, 6 - areas of poor management of natural resources and waste management, 7 - areas with pronounced impact of tourism and urbanization, 8 - areas affected by urbanization, population, climatic and geological changes, 9 - areas without pronounced negative impact of all factors.

private management, management by the local community and regional management. Analysis showed that an important role in the current modes of management has tradition of management. Newer models of governance, such as a partnership or private management for now are largely linked to the management of the lower category of protection (IUCN III, IV, V category) or for projects of association of existing protected areas. Through the analysis the most successful management (or rather the greatest success in the prevention of negative impacts) was demonstrated in areas managed by the local communities and private companies (although this does not apply for all analysed areas). The least efficient and insufficiently specific form of management proved to be regional management, which primarily lacks clear jurisdiction and control systems.

Conclusion

In conclusion, the two basic assumptions were verified: first, that the protected natural areas in the contemporary period are increasingly faced with the problem of anthropogenic impacts and consequent problems of sustainable development, and that the expansive development of tourism and related activities, above the carrying capacity is one the basic element of jeopardizing protected areas. There are different contemporary models worldwide for managing protected natural objects which are to a large degree based on specificities of these areas. Without specific use of tools of sustainable development, such as impact factors and indicators, fundamental problem issues of protected areas cannot be recognized, and therefore neither they can be quality and sustainably managed. Initiatives to establish indicators on global, national and local levels indicate that it is a necessary precondition for sustainable development, to materialize, measure and evaluate components of the environment as a concept of sustainable development does not remain just a general guideline.



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Potential of dispersal seeds by endozoochory of *Urochloa decumbens* seed and *Melinis minutiflora* by riding animals

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The use of horse riding in natural areas has caused great concern due to social and environmental impacts. One of the problems that has been investigated in some countries is the relationship between the use of riding animals and the presence of exotic plants. This kind of study is very important, once invasive species are the second cause of biological diversity loss. Herbivores are able to disperse a wide variety of species through their feces (JANZEN 1984; Vellend et al 2003). However little is known whether these seeds will be able to grow and settle in places. It is estimated that only a small portion of seeds present in the feces of horses will be established. Therefore, this study aims to verify if seeds of *Urochloa decumbens* and *Melinis minutiflora*, after being eaten and defecated by horses, have the ability to germinate, grow and bear fruit in ideal conditions.

Background and objectives

Protected Areas that use horses for recreational purposes have been causing polemic amongst managers, planners and developers of equestrian tourism. In Brazil the document - Guidelines for Visitation in Protected Areas - provides such practices with the goal of fostering the local economy through the possibility of hiring animals for riding and transportation of equipment into remote areas.

Authors like Newsome, Cole and Marion (2004) take the position that the use of horses in areas with a high biological value should be prohibited due to the potential risks for conservation of biodiversity. According to Pickering and Hill (2007) damages caused by horses are similar to damages caused by off-road vehicles, beyond conflicts created with other users.

Andrade (2009) studied the use of recreational riding with animals in the Serra do Cipó National Park (Brazilian savanna area). The author took samples of animal feces at two tracks. Across the *in situ* and laboratory experiment, she studied germination of collected material. The findings were inconclusive, with seeds germination occurring only at the laboratory conditions. With *in situ* tests no germination was observed. Amongst other species, the survey identified high incidence of two species of invasive grasses: *Brachiaria* (*Urochloa decumbens*) and molasses grass (*Melinis minutiflora*).

We believe that the absence of an adequate germinating protocol has led to inconclusive results on that research. Therefore the outcome could not provide effective and practical suggestions to the Park Managers. That observation has led us to carry out the current study which aimed to check whether *Brachiaria* seeds (*Urochloa decumbens*) and molasses grass (*Melinis minutiflora*) have the capacity to germinate, grow and bear fruit in uncontrolled conditions after having been ingested and defecated by horses.

Methods

For the experiment we acquired seeds of *Urochloa decumbens* and *Melinis minutiflora*, seeds obtained from commercial dealers. Three horses were used in experiment. 24 hours before feeding the horses feces already on the floor in their horse houses were collected and discarded.

In the morning, horse number 1 was fed with approximately 2 liters of ration only (T₁). Horse number 2 was given approximately 2 liters of ration and 300 grams of *Urochloa decumbens* (T₂). Horse number 3 was also offered the same amount ration with 300g of *Melinis minutiflora* (T₃).

After the animals were fed, they were separated during the whole day and night. In the morning, the feces were collected separately in plastic bags and taken to laboratory for a screening. During the collecting we avoided to catch those feces which had contact with the ground. In the following two weeks the experiment was repeated until all the horses received all treatments.

For each repetition of the experiment were separated 10 samples containing 500 ml, totaling 100 samples. Each sample was placed in aluminum trays of 20 x 12 x 3.5 cm containing 100 ml of vermiculite as substrate and placed in a green house. The experiment was designed in randomized blocks.

Results

After a period of two months 529 plants germinated plants where 113 were *Melinis minutiflora*, 174 *Urochloa decumbens* and 246 plants of other species (table 1). In the T₃ treatment there was a higher germination rate of *Melinis minutiflora* and treatment T₂ the highest germination rate was *Urochloa decumbens*. In the treatment T₁ the highest germination rate was other species. Tukey tests confirmed these statistical differences.

Table 1. Amount of plants that germinated

| | T1 | T2 | T3 | Total |
|----------------------------|-----|-----|-----|-------|
| <i>Urochloa decumbens</i> | 2 | 172 | 0 | 174 |
| <i>Melinis minutiflora</i> | 0 | 0 | 113 | 113 |
| other species | 137 | 52 | 53 | 242 |

As expected there was more grass germination rate of *Melinis minutiflora* in the T₃ treatment and *Urochloa decumbens* in T₂ treatment, since it was offered a great amount seeds of these species. As the seed density was higher than the species, the germination rate was higher.

In spite of the horse decrease the rate of germination of these seeds, based on these data we can observe that if they are present in the stool, viable seeds of *Urochloa decumbens* and *Melinis minutiflora* have the capacity to germinate, grow, flowering and fruiting. In order that these species are introduced and forms a viable population is necessary to have an enabling environment, but once in place they can change the original characteristics of the vegetation.

Another relevant factor is the competitiveness of these species. The *Urochloa decumbens* is extremely aggressive, and *Melinis minutiflora* in open environments can become a threat to local species (Pivello; Shida; Meirelles, 1999).

According to a study by Ansong and Pickering (2013), a wide variety of species can germinate from stool horses, native or invasive. It can be observed in the study of Wells and Lauenroth (2007) that most of the seeds that germinated are small seeds, mostly herbaceous grasses because large seeds are more susceptible to damage by chewing (SIMÃO NETO, JONES; RATCLIFFE, 1987). All species that germinated in this study were grass or herbaceous. Although some studies indicate that some species germinated from the feces of animals, some failed to reach maturity. The species of this study demonstrated that characteristic indicating that it is possible that the feces of riding animals can introduce these species.

More research has to be done *in situ*, including different conditions of soil and vegetation. The results obtained may be used as subsidies for taking decisions about the use of riding animals in protected areas, since we will know for sure if the seeds contained in the horse feces really possess the capacity to establish on-site forming a capable population colonizing new areas and not just a causal species.



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Trade-offs between the forest ecosystem services biodiversity and recreation: Perception and assessment of deadwood by outdoor recreationists and the general public in Bavaria (SE Germany)

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Project background and research goals

Forests are of major importance to human society worldwide, contributing to ecosystem services fundamental. In this context, biodiversity is regarded as a key factor. In recent years, numerous studies identified deadwood as a crucial precondition for forest biodiversity (e.g. Müller et al. 2008; Müller & Job 2009). Deadwood encompasses non-living tree biomass including standing or lying woody debris or pile wood volumes and is created by tree mortality, which can be caused by several (natural) factors such as fire, storms, droughts, insects or pathogens.

Previous studies have improved the understanding of habitat relations for many species associated with deadwood, emphasizing the remarkable importance of deadwood for different supporting, provisioning and regulating ecosystem services (e.g. Gamfeldt et al. 2013). However, existing studies also indicate that neither forest visitors nor the public welcome higher shares of deadwood due to several reasons. This shows that considerable trade-offs exist between different ecosystem services (for instance between profit maximizing harvest and high deadwood amounts). These trade-offs are subject of a large research project called BioHolz (supported by the German Federal Ministry of Education and Research BMBF and the Federal Agency for Nature Conservation BfN, funded by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety BMUB) which evaluates ecosystem services and biodiversity in a multidisciplinary perspective focusing on deadwood.

The present study is part of this project and analyzes the influence of deadwood on cultural ecosystem services and their trade-offs like tourism and outdoor recreation, but also on spiritual and emotional relations of respondents to forests as part of their place attachment and personal identity. Despite some progress in recent years this nexus has not been explored in detail and not with a multiple method research design combining quantitative and qualitative approaches. Thus, this study analyzes the impact of different amounts and arrangements of deadwood in specific forest sites on the visual preference of forest recreationists and tourists according to previous studies in that field (Edwards et al. 2012). Main goal of the research project is

the assessment of the perception and valuation of forest ecosystem services by visitors, the public and other stakeholders that are related to forest management. Based on the results we seek to recommend location specific forest development options.

Methodological approaches

The methodological approaches can be differentiated in several ways:

1. Stakeholder groups
2. Geographical scope
3. Quantitative vs. qualitative methods

Ad (1): Our project focusses on three major stakeholder groups: Forest visitors, non-forest visitors (general public) and decision makers related to forests like forest owners, foresters, hunters, administration and politics. The leading hypothesis here is the question if all groups are expected to have different attitudes towards ecosystem services

Ad (2): The geographical scope of our study is twofold: on one hand, we conduct in situ surveys with forest visitors in the Bavarian Forest, a densely wooded mountain region and national park in southeast Germany situated along the Czech border. In this survey area, we also show experimental plots of man-made deadwood accumulation to selected respondents in order to assess their perceptions and valuations of these differing experiment areas. The idea behind these experiments is the following: In order to maximize ecosystem services forest owners and managers have to be convinced to allow higher deadwood levels in their forests compared to the present situation. To achieve short to mid-term improvements of biodiversity levels, the project seeks possibilities to include more deadwood in regularly managed forests, for instance by leaving parts of the timber harvest at place. The experiments simulate this situation.

On the other hand, a representative online survey among the population of the German federal state of Bavaria allows the analysis of non-forest visitors' perceptions towards differing deadwood amounts and arrangements as well as their willingness to pay for hypothetical changes in forest management leading to higher deadwood amounts and thus most likely higher biodiversity. In addition, pictures of the deadwood experiment plots could be included in this online survey in order to compare the public opinion with the onsite experiences.

Ad (3): Adapted to the stakeholder groups, the geographical scope and the specific research question we use a broad mix of methods. The most suitable approach to include both forest preferences and trade-offs with other ecosystem services is by far a discrete choice model (Ben-Akiva&Lerman 1985; Hensher et al. 2005). This allows in a direct comparison an estimation of the utility preferences and marginal willingness to pay for distinct forest situations. Based on random utility theory (Hensher et al. 2005) the choice experiment (CE) is a common approach to assess respondents' preferences for several options. The most important challenge is to provide the best-fitting set of alternatives and corresponding attributes that will allow assessments of people's preferences for several forest scenarios. This holds especially true for the complex task of taking pictures representing ideally several forest and deadwood scenarios and amounts.

The CE will be both applied in the onsite survey in the Bavarian Forest and the representative online survey. Using the same survey instrument for both samples allows to test for the role of onsite experience and the geographical location of the respondents (urban vs. rural context). However, we will use two different versions of the CE: First, we will evaluate general forest scenarios ranging from near natural to intensively used. Second, we will specifically assess the effects of the deadwood accumulation experiments on scenic beauty and its perception and valuation by visitors and non-visitors.

In contrast, the study on the decision makers' perceptions and attitudes concerning ecosystem services, their relationships and trade-offs follows a qualitative research approach using semi-structured personal interviews as well as discourse analysis methods based on press and media outlets. However, in order to assure comparability, the CE will also be undertaken with the decision makers but requires most likely a different statistical design as the number of respondents is limited. This means that every respondent has to answer a higher number of choice tasks than the respondents in the visitor and public surveys.



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Rainfall erosivity as an indicator of potential threat to erosion vulnerability in protected areas of Vojvodina (North Serbia)

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Introduction

Soil erosion is one of the main environmental problems in Southeastern Europe. The major climatic variable affecting water erosion is precipitation. In order to illustrate the role of rainfall erosivity, it is necessary to examine the changes in the amount of precipitation over a certain period of time. Recent studies indicate that climate variability on global basis will affect the changes in precipitation in Southeastern Europe. Since climate change is an inevitable natural process, it is necessary to make certain predictions based on analysis of all available rainfall data in order to protect potentially endangered ecosystems and important areas of distinct natural values. Erosion and precipitation distribution are important elements concerning the implications of climate variability in the Pannonian basin. Vojvodina (North Serbia) is a region located in its eastern part. It is widely known as an important region which consists of a great number of protected bio and geo-diversity areas. Therefore, it is very important to draw attention to the above mentioned areas vulnerable to pluvial erosion in order to create and implement adequate preventive and mitigation measures (Lukić et al., 2016).

Data and methods

A database of the Republic Hydrometeorological Service of Serbia for the period of 1948 - 2014 for the 12 meteorological stations was used to present the amount and seasonal distribution of precipitation in the Vojvodina region (Meteorological Yearbook of Serbia, 1948-2014). Three indices are used for investigation of aggressiveness of erosion caused by rainfall regime: Precipitation Concentration Index (*PCI*), Fournier Index (*FI*) and Modified Fournier Index (*MFI*). *PCI* is used as an indicator of rainfall concentration and its annual distribution, while Fournier indices are

implicating rainfall aggressiveness (Oliver, 1980; Arnoldus, 1980). Using the data obtained from the analysis of relationship between the *PCI* and *FI/MFI*, it is possible to describe the evolution of rainfall aggressivity during 1948 - 2014 in erosion-vulnerable protected areas of Vojvodina.

Results and discussion

Before presenting the results, it is necessary to point out some essential information's concerning the investigated meteorological stations. The number of stations for each part of Vojvodina (Bačka, Banat and Srem) are not evenly distributed because of data shortage. Also, some possible anomalies in the obtained results are explained by the different altitudes of the stations. *PCI* indicates that the precipitation throughout Vojvodina is mostly moderately concentrated (values vary from 11.5-11.9). The multiannual average values of the *FI* is ranging from 21.04 (Palić) to 26.91 (Vršac). The *MFI* shows more accurate data, and is therefore used for cartographic representation (Figure 1-A). The highest and lowest values correspond to *FI* (64.72 Palić – 77.84 Vršac), and according to these values of both indices, territory of Vojvodina is classified as low value erosive class. Linear trend indicates a positive movement of both indexes in 11 out of 12 stations. During the period of 68 years, only Sremska Mitrovica has a decline in the average annual amount of precipitation, and therefore all three indexes shows negative trends. Since the increase of rainfall erosivity indices (*FI/MFI*) is evident, it is necessary to point out the potentially endangered areas of the Vojvodina region. Over 60% of the territory of Vojvodina is covered with eolian sediments (loess and loess like sediments), some of which are a significant element of geodiversity and geoheritage (Vasiljević et al., 2011). The most significant loess profile is the “Čot” in Stari Slankamen village, but numerous profiles of the Titel, Srem and Tamiš loess plateau have high geoheritage values as well. Furthermore, a great number of protected areas are located in the vicinity of stations with relatively high values. Probably the most vulnerable protected areas are Special Nature Reserve “Deliblatska peščara” and areas of exceptional natural beauty “Vršackibreg”.

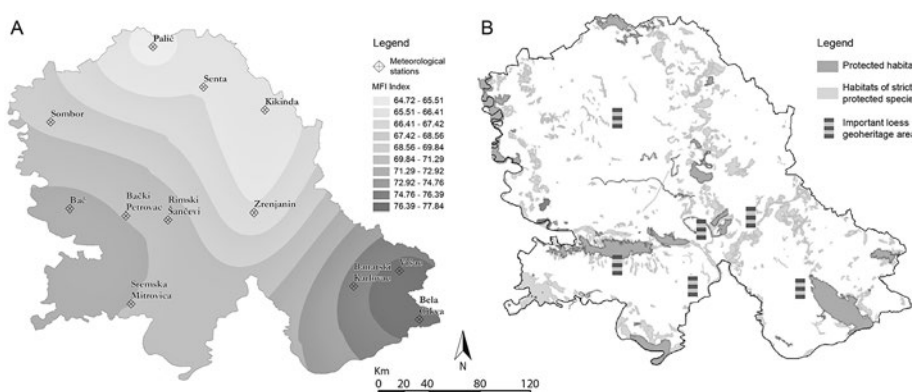


Figure 1. A) Values of Modified Fournier Index in the Vojvodina region; B) Location of the natural wealth of Vojvodina. Source adapted from Tomić et al., 2004

They are located in the southeastern part of Vojvodina, where the values for meteorological stations Vršac, Bela Crkva and Banatski Karlovac are the highest. Moreover, in the vicinity of Rimski Šančevi, Bački Petrovac and Bač is National Park "Fruška gora", Special Nature Reserve "Koviljsko-petrovaradinski rit", Nature park "Tikvara" etc. These stations have relatively high values and display a further increase of rainfall erosivity. Also, it is important to point out that even the numerous protected areas in the northern parts of Vojvodina are endangered, even though indices display lowest values and regular spatial distribution (Figure 1).

Conclusion

The observed trends in rainfall aggressivity (*FI/MFI*) exhibit a positive relationship with the precipitation concentration (*PCI*). Results presented in this study may contribute to improved understanding of the regional dynamics of the main climatological agent of erosion in Vojvodina. Furthermore, it could aid in creating suitable mitigation and protection strategies to reduce the impacts of erosion not only in the investigated area, but in the surrounding regions (with similar geo and bio diversity) as well.



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The environmental impact of mountaineering in the Mt. Everest region

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Introduction

Sixty years have passed since the Mount Everest was first conquered. The popularity of its scaling and the rapidly growing tourism in the Nepal Himalayas after 1970 are noticeably affecting natural, social, and cultural environments in the vicinity. This in turn, is creating serious environmental problems at the Everest Base Camp (5,300 m above mean sea level), the entry point for climbing the Mt. Everest. In this study, our research objective was to elucidate the relationship between mountaineering activities and associated environmental changes by applying GIS and remote sensing, so that further degradation of present environmental conditions could be stopped.

Method

The geographical area covered in this study is the Everest Base Camp in the Sagarmatha National Park, Solo Khumbu region which is located in northeast Nepal. In order to elucidate the actual usage of the Everest Base Camp, field survey was carried out four times in May, October 2003, May 2004 and May 2005 at and around the Everest Base Camp. We conducted the following investigations at the Everest Base Camp; survey of the Base Camp, questionnaires to all the mountaineering parties at the Base Camp, survey of the water quality at the Everest Base Camp. We monitored the actual usage of the Everest Base Camp in order to clarify the number of tents and their locations by photointerpretation using high resolution satellite images on two separate occasions (2003 and 2013).

Results

Survey of the Base Camp

A topographical survey of the Base Camp was conducted to pinpoint the location of each tent and to grasp the topographical features of the area. The Base Camp in the pre-monsoon season is shown separately in the EVEREST BASE CAMP TOPOGRAPHIC MAP 2003 MAY. We were probably the first in the world to create a topographical map of the Everest Base Camp that shows detailed positioning of each tent. There were 35 parties consisting of 665 tents in the pre-monsoon season. On the other hand, there were 44 tents of 4 parties in the post-monsoon season. As shown in

the photographs and the maps, there is a sizable difference in the usage of the Base Camp between the pre and post monsoon seasons. Notice the congestion occurring at the camp during the pre-monsoon season.

Questionnaires to all the mountaineering parties at the Base Camp

Inquiries were made to every party staying at the Base Camp. The questionnaires enquired about the following information:

Number of members in each party; amount of belongings brought in and out; number of yaks used to carry equipment; and environmental considerations taken by each party.

Results of the questionnaire show that during the pre-monsoon season, an astounding 115 tons of equipment was brought into the Base Camp.

Furthermore, over 2,300 yaks were used for transportation during the pre-monsoon season. The enormous amount of excrement produced by these yaks is one of the main sources of resource contamination.

Many of the parties brought solar panels to the camp, which we believe, provided them with the power necessary for internet communication via satellites.

Survey of water quality at the Everest Base Camp

Water quality research was conducted at 3 locations of the Base Camp: water collection points; filtering drainage; and inflow points of contaminated water. COD at the collection points showed 10ppm, which indicated that the water was badly contaminated. There was improvement in the quality of the filtered water and desired results were obtained to a certain degree. However, at the last point, COD was a very high 100ppm, which indicates a very serious contamination level.

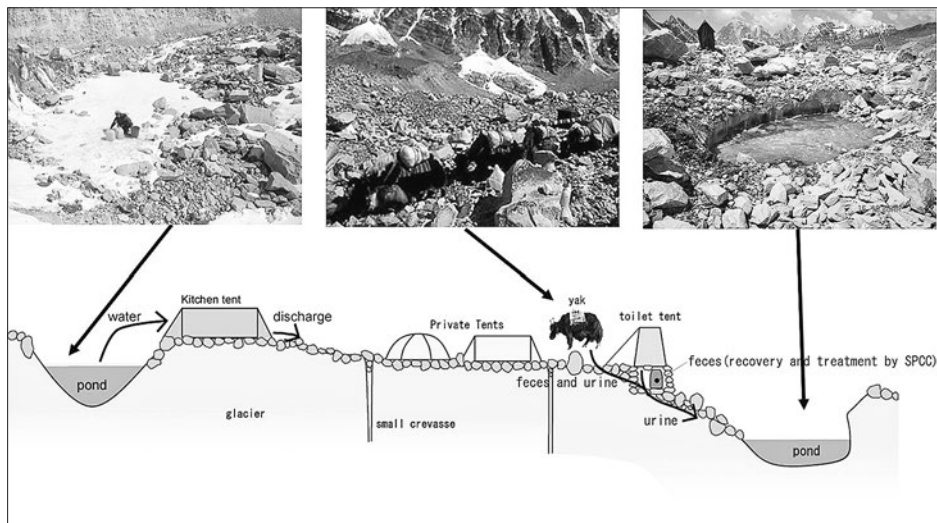


Figure 1. Cross section of the Everest Base Camp on the Khumbu Glacier

Drinking or cooking water is usually sterilized by boiling. However, it was revealed from the research this time that the headspring itself was contaminated. We can conclude that the sources of contamination were not only from the toilets used by people, but also from the enormous amount of waste generated by the yaks, and waste water from the kitchens, showers, and laundry areas of each party.

Conclusion

A few of the findings of this study after surveying thrice in May, October 2003, May 2004 and May 2005 at and around the Everest Base Camp are as follows. (1) A topographical map of Base Camp was prepared pinpointing the location of each and every tent of the area. We are probably the first in the world to prepare such topographical map of the Everest Base Camp. (2) Inquiries were conducted with each group staying at the Base Camp regarding the number of members in each party, quantity of goods brought in and out, and number of yaks used for transportation. The results of the questionnaires show that during the pre-monsoon period in 2003 an astounding 115 tons of goods were brought into the Base Camp. Furthermore, over 2300 yaks were used for transportation. (3) Water quality research was also conducted at water collection points of the Base Camp. The water was found to be badly contaminated because of urine and excrement of Yaks that were found scattered over the Base Camp.

EXPERIENTIAL AND HEALTH VALUES OF OUTDOOR RECREATION

Contribution of nature areas to residents' health in urban and suburban areas in Helsinki, Finland

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Background

Urban and suburban greenspaces are increasingly acknowledged to provide an essential resource for residents' mental and physical well-being and can be influential during both leisure time and commuting. In many cities, however, land-use pressures leading to intensifying land use and compact city structure fail in taking into account the potential of nature areas to enhancing health and well-being of residents. Although Finnish cities are still fairly green compared to the European average, heavy pressures are placed on the green spaces of the largest growth centers, in particular in the Helsinki Metropolitan Area. Key information serving urban planning in this context include what kind of green infrastructure within and around cities supports health and wellbeing of different types of residents and how the use of these areas can be promoted among various user groups.

Although the association of green exposure and health has been increasingly studied, including mediation of health benefits through physical, social or relaxation actions within the green environment (e.g. Hartig et al. 2014, Korpela et al 2010, Pietilä et al. 2015, Maas et al. 2008), there is still a lack of consistent scientific knowledge of the associations between green exposure, physical activity and experienced health benefits, and how the perceived quality of the physical environment influence health-related behaviors. The main aim of this study was to investigate the underlying linkages of perceived health, use of neighborhood green areas, and green infrastructure in residence living environment in respect of accessibility and quality of green areas.

Data and Methods

A survey data from Helsinki, were collected by using a mail questionnaire. A random sample of 15-75 years old residents were drawn from the census. A total of 872 residents (41.2 %) responded to the survey. Information of respondents' health was obtained by asking: "How would you describe your present health status?" reflecting an individual assessment of his or her health with a Likert-type of scale from one to five. Respondents were divided into two groups according to their living district and postal code number. They were categorized either urban (/city center) (n=229) or suburban residents (n=636). Some differences were found between these two areas in respect to residents' socio-economic factors, how permanently they had stayed in the housing area, use of the green areas, both supply of green areas and the how well the area will fulfill the residents' expectations.

The survey data were supplemented with precise, GIS-derived data of each respondent's quality of the living environments to describe the amount and quality of

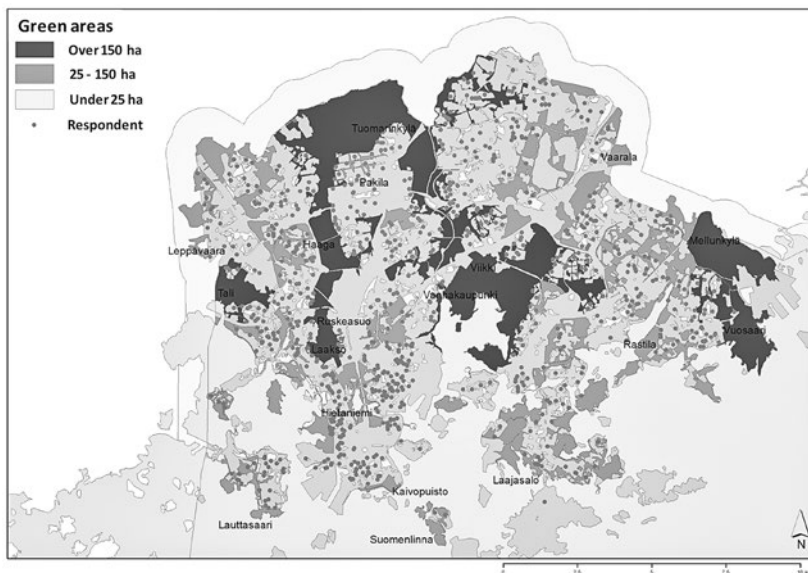


Figure 1. Map of green areas in Helsinki and the location of respondents

green areas in the living environment. Moreover the data included respondent reported information of the environment regarding the amount and accessibility of green space in residents' neighborhood area. The respondents' home location provided a link to the GIS-dataset. This study utilized several spatial measures, such as the *distance to the closest* green area or water element, and distances to three green area classes (small, middle-sized and large green areas (over 150 hectare)) as well as percentage of green and water areas within a one-kilometer radius from the informants' home.

Pearson Chi-Square and T-test were used to analyze the difference between urban and suburban areas and Spearman correlation to test the linkages between studied factors. Path analysis was utilized to study the associations between the greenness of (or blueness of) the residents' neighborhood environment, visits to nature, and they relation to the health. The analysis started with Helsinki suburban residents followed by the similar model structure but with residents living in the most urban parts of the Helsinki.

Results and Discussion

The results show that the good supply of and easy access to green spaces contributes to improved perceived health through increased physical activity in the suburbs. Good accessibility to green areas (distance) with residents' satisfaction to green areas in regard to nature experiences, a place for promoting social interaction and outdoor activities correlated positively with the usage of neighbourhood green areas and consequently had a positive indirect association with better health status. Thus, in order to promote health to suburban residents, access to close-to-home greenspaces suitable for recreation should be secured. In more urban residential areas,

greenspaces were connected to more frequent visits, but the association between health and more frequent use were not statistically proven.

This study demonstrated the difficulty to describe the quality of living environment for residents' point of view. The objectively measured GIS-variables functioned less well as an explanatory variable than residents' own subjective assessment of the accessibility of the green areas in the statistical models.

The research results contribute to understanding the role and importance of close-to-home recreational opportunities in urban green spaces. Easy accessibility to greenspaces should be an important objective in the management and planning of urban and suburban forests and other greenspaces. In contrast, large scale land-use intensification and taking nature areas for construction in suburbs may lead to decreased physical exercise and consequently to increased health related lifestyle diseases.



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Enhancing vitality of young students by integrated experience-based outdoor education methods.

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Introduction

In the past decades the overall vitality of the society is decreasing despite continuous campaigns on healthy and physically active lifestyle, recommendations to change recreation patterns, development of facilities and infrastructure. The attitude towards lifestyle that includes regular physical activities among youth is very alarming. The long term consequences for society include health problems, decreased economic productivity, social and cultural input. These are strong arguments to concern about a vital society that has physical and mental energy, experience sense of enthusiasm, liveness, which is essential for sustainability (Ryan et al., 2010).

The critical period representing the most decline associated with changes in physical activity is the transition from late adolescence to early adulthood (Kwan et al., 2012). The main identified barriers for physical activity in young adolescents are intrapersonal, interpersonal, institutional barriers, community, and physical environment. Intrapersonal and institutional barriers are predominating in this age group (Gyurscik et al, 2006). The natural environment has specific added value, physical activity in nature can significantly reduce aggression, stress and violence (Ryan et al. 2010).

In the present study the particular case of Vidzeme University of Applied Sciences Tourism and Leisure studies (founded in 1996, Valmiera, Latvia) will be used to present the experience of integration of outdoor physical activities in the study program with a focus on development of skills knowledge and reduction of institutional barriers for physical activities.

Despite the fact that a good physical condition is not only a personal issue, but also a professional precondition in case of tourism, the research of Grinberga (2016) reveals that 70% of students identify their lifestyle as sedentary and inactive (11% with 0 activity), 45% of respondents said that they do some outdoor activities because of the added value of natural surroundings. The most common problems related to physical inactivity that students mentioned is back pain, decrease of physical fitness, (difficulty to move, muscle weakness etc.), also weight gain, poor immunity and sickness, pain in the neck, apathy. In their comments about the reasons for inactivity students mention lack of time due to the intensive lecture schedule which could be interpreted as an organizational barrier.

Approach used in tourism studies in Vidzeme University of Applied Sciences

Since 2012 we have been implementing more experience-based education. Experience-based education (experiential learning) is understood as facilitated continuous holistic process with high level engagement (integrated functioning of the whole person – thinking, feeling, perceiving and behaving) of participants. Learning results acquired from synergetic new experience-based transactions between the person and the environment (Colb, Colb, 2009).

Besides changes in methods in particular courses, two specific courses were created as an essential part of the program. Both consist of planning, implementation and evaluation. Students are responsible for the choice of destination (usually territories with specific nature protection status) and co-creation of the program.

To evaluate the role of courses, the students' opinion was collected from: individual written reports of Outdoor Practice in 2015 (n=25) and individual diaries filled during Integrated Regional Practice 2013 – 2015 (n=57). The qualitative content analysis was used with a focus on comments about physical condition, health, skills and knowledge, role of natural environment and personality growth. The feedback in both courses is very similar (see the results in Table nr. 1)

Table 1. Description of Courses and Students' feedback

| Title | Outdoor Practice | Integrated Regional Practice |
|---------------------|---|--|
| ECTS | 3 | 6 |
| Study year | 1st year | 2nd year |
| Aim | To develop skills for outdoor life, active tourism, stimulate personal development, develop communication, decision making, critical thinking, leadership, foster understanding of the importance of the natural resources. | To develop skills in event management, leisure and tourism management. Focusing on useful, practical input in regional tourism development. |
| Implementation | Not less than 3 days | 10 days |
| Feedback | Group and individual. Written report. | Group and individual. Individual diaries. |
| Venue | Wild environment, different types of trails. Completely outdoors. | The base is located in remote rural municipalities. Partly outdoors. |
| Physical activities | Hiking, trekking (~ 20 km/day)* | Cycling (~300 km), hiking (~30 km)* |
| Other comments | Socially meaningful job (e.g. cleaning river). | Students during the course stay in the base and hike or cycle to explore surroundings. Specific tasks include: creating and testing tourist trails, ethnographical expeditions, development of infrastructure management of Museum Night events. |

| Title | Outdoor Practice | Integrated Regional Practice |
|---------------------------|--|------------------------------|
| Feedback | | |
| Physical condition/health | Being tired, exhausted, some felt muscle pain, headache, were afraid about their physical condition, and some found this as opportunity to improve their physical condition. Around half found themselves stronger than they thought before. Some indicated that courses showed their physical weakness. | |
| Skills/knowledge | Practical outdoor skills, knowledge about biodiversity, communication, team management, decision making etc. | |
| Natural environment | In the majority of cases natural environment is mentioned in the context of physical activities. Specific features – landscape, weather; appreciation, surprise, novelty, sense of discovery. | |
| Personal growth | Empathy, initiative, ability to reach personal goals, step out of comfort zone. | |
| Challenges | Contacts with local society, efforts to find motivation, enthusiasm when in physical discomfort. | |

* Other types of activity possible.
Source: author

Concluding comments in the reports and diaries repeatedly voice desire to continue specific physical activities, engage friends, inspiration and energy to start some research. All students have stressed the notable experience despite physical and emotional pressure. The majority stresses the high importance of practical insight in future profession and recommends to include more of experiential-based education courses in the program.

Conclusions

Data analysis reveals that students felt more challenges (physically than emotionally or from the perspective study load), benefits of the individual and the society in a wider perspective. The research shows that the role of use of experience-based education methods in study programs of a university are significant. Integration of physical activities, valuable knowledge and practical experience outdoors reflects synergetic value. For the vital society concept, of which students are a significant part, the simplest step would be reducing the institutional barriers e.g. introducing changes in study programs, encouraging academics to “go out of the auditorium”. At the same time, continuity of certain type of activities that could affect intrapersonal, interpersonal, community and physical environment barriers is more than necessary.



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The influence of visitor characteristic and natural park facilities on physical activity levels. A case of study.

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Introduction

Recreational and sport activities in protected natural areas (PNA) have increased in recent years. Protected natural areas are not only promising means to satisfy current health-enhancing physical activity (PA) recommendations, but they also are an ideal environment to promote physical activity (Bedimo-Rung et al., 2005, Mowen et al., 2012). However, few investigations have examined user characteristics and park facilities in relation to park-based PA levels or intensities. The purpose of this study is to examine the influence of PNA visitors (socio-demographic data, recreational behaviour, motivations and preferences) and PNA facilities (PA areas, supporting activities, etc.) in respect to metabolic equivalent (MET) expenditure: sedentary, light, moderate and vigorous activities. The work has prominent potential to help decision makers in developing the sound policy and managerial guidance to increase understanding about the complex relationships between user physical activity level and park amenities.

Methods

Visitors ($n=1427$) to the Alt Pirineu Natural Park (Spain) completed self-structured surveys. The surveys were held at 16 entrances to the Park along 12 months. The purpose of the survey was to study and analyse visitors type and intensity of PA (independent outcomes) according to the MET compendium (Ainsworth et al., 2011) in relation to the dependent outcomes: a) visitors socio-demographic data (age, gender, residence, level of education and occupation); b) visitors recreational behaviour (temporal season, frequency of visit, length of the visit, group composition, accommodation); c) PA facilities by entrances (trails, snow areas and other PA areas) and e) supporting facilities by entrances (parking, picnic area, viewpoints, shelters, information points and specific signposting). The logistic regression models was used to assess the influence of dependent outcomes predicted by PA intensity level.

Results and discussion

The results revealed that two hundred thirty-eight visitors (16.8%) reported light-intensity PA (i.e., staying to the entrances, driving 4x4 vehicle, fishing trout), 907 (63.9%), moderate-intensity PA (i.e., hiking, mushrooming, riding ATV or motor-bike, snow shoeing, downhill skiing), and 270 (19.3%) reported vigorous-intensity PA (i.e., backpacking, climbing hills, MTB, Nordic skiing and ski touring). A minor portion (n=25) of the reported activities were unclassified and therefore were discharged. The study results should not be generalized to all PNA and certainly not to local parks. However, they show consistent patterns that may help managers and agencies to increase PNA-based PA or, simply, to make parks more attractive to people whose characteristics, recreation behaviour and preferences are related to different levels of PA behaviour.

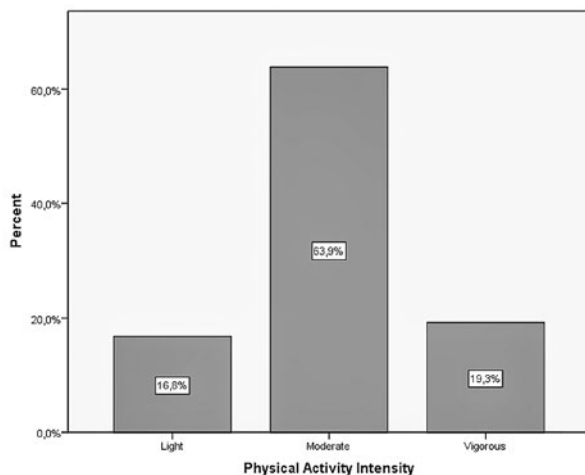


Figure 1. *Physical activity intensities reported by visitors of the Alt Pirineu Natural Park*

Conclusions

Physical activity levels can be improved in Protected Natural Areas by providing selected services beyond walking a path or others physical activity areas. Light-intensity physical activity performed for a long time or vigorous-intensity physical activity for a short time may be appropriate to promote health-related physical activity. However, the health outcome is strongly related to the individual characteristics (e.g., fitness condition, health status) as well as expectations, preferences and trip behaviour. Accordingly, managers and policymakers may target healthy opportunities for different population groups (e.g., more or less basic physical activity areas; shorter or more demanding treks related to low or high fitness conditions; family oriented guided activities; supporting facilities to enhance less frequent visitors).

Targeting visitors according to their MET expenditure provides an objective measure of changes in population behaviour when visiting PNA. These changes may provide monitoring data of one of the most relevant health risk factor for cardiovascular diseases, that is, low physical activity behaviour and low physical fitness.

Acknowledgements

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GASTRONOMY AND NATURE AREAS

Analysis of the state and offer of the hospitality facilities in special nature reserves in Vojvodina

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Special Nature Reserves (abbreviated - SNR) are the most valuable protected areas, in which nature is unchanged or slightly changed. These include the habitats of endangered and rare species of wild plants, animals and fungi, without settlements or with rare settlements where man lives in line with nature. The establishment of the SNR is carried out in order to preserve the existing natural features, gene pool, ecological balance, monitoring of natural phenomena and processes, preservation of traditional way of life (Epler Wood, 2002; Szabados and Kicošev, 2006).

These rare natural oasis with preserved geo, bio and landscape diversity become part of the tourist offer, which requires the organization to provide food and beverage services to visitors. Such services complement their impression of visited area, regardless of the motive for the visit, which an essential factor is various and authentic offer of food (but also drinks) prepared exclusively with ingredients from these areas. Accordingly, the task was to investigate the situation and offer of hospitality facilities of special nature reserves on the territory from the perspective of tourism development in order to observe the current situation.

The survey was conducted on the territory of AP Vojvodina (abbreviated APV), which has 16 protected special nature reserves including (www.pzzp.rs): SNR "Deliblatska peščara", SNR "Obedska bara", SNR "Okanj bara" SNR "Ludaško jezero", SNR "Carska bara", SNR "Gornje Podunavlje", SNR "Koviljsko - petrovaradinski rit", SNR "Pašnjaci velike droplje", SNR "Slano Kopovo", SNR "Karadjordjevo", SNR "Zasavica", SNR "Selevenjske pustare", SNR "Kraljevac" and SNR "Bagremara", SNR "Ritovi donjeg Potisja" and SRP "Titelski breg".

For the purposes of data collection we carried out field research, personal insight and interviews with the persons responsible for these areas.

Insight into situation in hospitality facilities and offer, but from the perspective of ownership, as an important factor in the development of the regional economy led to finding that only two managers of protected areas in Vojvodina have hospitality facilities in their ownership, namely:

- Conservation Movement in Sremska Mitrovica, which manages the SNR "Zasavica" and

- Fish farm “Ečka” ad headquartered in Lukino Selo, which manages the SNR “Carska bara”.

Interestingly, Zasavica and Carska Bara are the most visited protected areas in Vojvodina. In the past five years, Zasavica has been visited by over 220.000 people (just in 2012, it had 80.000 visitors, during the exhibition of World of Dinosaurs) while Carska Bara by 70.000.

The SNR “Zasavica” is known for cultivating special mangalica breed, which meat has a high-quality nutritional composition, creating significant economic opportunities through the production of traditionally produced fermented sausages (Zekić et al., 2011) and other meat products, as well as through the production of cheese from the milk of donkeys bred in the reserve, which is perhaps the most expensive cheese in the world (1 kg = 1.000 euros). These are the elements that make the reserve a significant destination in the development of selective forms of tourism, but certainly the gastronomic tourism.

Zasavica has a simple hospitality facility that offers a standard, but quite authentic offer, such as: Podolian cattle goulash, mangalica goulash, goulash of donkey meat, bacon, paprika flavoured sausage and sausages, which they produce.

Unlike Zasavica, Carska Bara contains “Sibila” Hotel, with a capacity of 40 beds, with a national restaurant specialized in the preparation of fish and wildlife, with an emphasis on fish that are grown in their ponds. As a specialty, they recommend to their guests Catfish with truffles, Povrltarski smuđ (Perch) and Carp from Ečka with protected origin (Kalenjuk et al., 2012), which guarantees its nutritional qualities. Standard gastronomic offer includes specialties typical for Vojvodina cuisine including Imperial fish soup, stuffed and smoked carp, fish burgers, fried and grilled fish and the similar.

Interviewing the heads of protected areas it is concluded that one of the main reasons why they avoid dealing with hospitality is the lack of money for hiring additional skilled labour and “unprofitability”. What is certain and what can be seen in the cases of Zasavica and Carska Bara is that they do not recognize the opportunity and the chance to make money and do not see the connection between hospitality facilities for food and drinks and an increase in the number of visitors in protected areas, which can bring them extraordinary profits that can be used to finance active protective measures in protected areas.



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Nature park “Šargan – Mokra gora” as a major hot spot for promoting Serbian gastronomy

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Nature Parks represent protected natural areas with preserved natural values. In addition to these natural values, Nature Parks also represent areas where people can satisfy other needs such as scientific, educational, cultural, health and recreational or tourism needs that are in harmony with the traditional way of life and sustainable development principles (“Official Gazette” RS 36/2009 and 88/2010). Thanks to tourism activities and promotion of several Nature Park values there has been an increase in popularity of these protected areas mainly because they can also offer other values and possibilities besides natural values.

One of these values are cultural values of which gastronomy plays an integral part. By consuming local food and drinks, visitors can familiarize themselves with the peculiarities of the area in which they are residing. This fact is confirmed in the research of Okumus et al. (2005) which shows that traditional gastronomy should represent a solid base of the tourism offer in each destination where visitors can feel the authentic cultural experience by consuming gastronomy products.

The goal of this paper is to determine the structure of the gastronomic offer in restaurants which are located in the area of “Šargan-Mokra Gora” Nature Park and to investigate which national dishes are included in the offer and promoted as representative dishes of Serbian gastronomy.

The Nature Park is located between the Tara and Zlatibor Mountains in Western Serbia. When it comes to gastronomy, what makes it unique and diverse is its favorable geographical location. This area is well known for livestock farming which is the dominant economic activity in the area. Therefore, meat and other products of animal origin, accompanied by mountain cereal and fruit represent basic ingredients used by local people for preparing meals.

The area of the Nature Park has a large number of restaurants. For the purposes of our research we focused on seven randomly selected restaurants of which “Drvengrad” at Mečavnik and “Šarganska osmica” offer food and lodging services and are categorized as tourist facilities. The other objects are several different types of restaurants: “Viskonti”, “Lotika”, “Jatare”, “Vitasi” and “Mladost”. We obtained our research results by interviewing the management of these facilities, the management of the Nature Park as well as by examining and analyzing the current menus.

In the offer of each restaurant national and local dishes are dominant: a bun with egg, serbian cream cheese and gravy, sour milk, "mokrogorska" local plate (smoked ham, local cheese "mokrogorski" and a special kind of pork cracklings), corn bread called *proja*, *kačamak* (white corn flour cooked with salty water and cream cheese), "šargan" cheese pie made with local kind of cheese, various types of homemade bread and cake, cooked cabbage in terracota pots, veal baked in terracota pots at high heat made from glow, lamb cooked in milk and roasted lamb. The dessert offer includes lazy pies with apples and sour cherries, pies with prunes and fresh cheese, fried dough with homemade jam from forest fruit and baklavas. All objects have an indication that they serve traditional dishes. What makes this part of Serbia recognizable are the cured meat products which are dried by using beech wood. The most famous of these products, "Užički pršut", which has protected geographical origin, is not properly highlighted and promoted even though it is one of the most prized and valued products of the area.

In order for the current offer to improve, it needs to be completed with products which have been in use for centuries by the local people: forest honey, sweet sirup made from wild strawberries, homemade juniper brandy.

Based on our research results we can conclude that the Nature Park "Šargan-Mokra Gora" is an important hot spot for the promotion of Serbian gastronomy. However, it is still not being used to its fullest potential. The Park itself could influence the formation of a unique gastronomy offer and the preserved natural environment and the implementation of current ecological trends in food production could contribute to achieving this. Considering that the diet in this areas is based on animal origin products, free range livestock farming as well as organically farmed products would complete the gastronomy offer of this area. Also, making organic spice gardens within the restaurant facilities would contribute to creating unforgettable tastes and aromas which every tourist would want to take along with him.



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Gastronomic offer of Gornje Podunavlje Special Nature Reserve for the purpose of authentic development of tourism

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Special Nature Reserves (SNR) represent the protected areas (PA) of intact and preserved nature. Due to their environmental value and presence of rare wild species, the protected areas are gaining more attention of tourists, so there is indication of upward trend in the number of visitors in these areas (McCool and Spenceley, 2014). It is anticipated that the high growth in the number of visitors will continue in the future. By visiting the protected areas, visitors have the opportunity to get acquainted not only with natural values, but also with cultural heritage that makes each destination more authentic and allows tourists take away unforgettable and synergetic experience.

Regardless of the reason for the visit, the food is an integral part of tourism offer and completes the experience of the destination itself. The aim of this study is to explore the gastronomic offer in restaurants that are located in the area of the selected Special Nature Reserve in order to determine the current offer in the facilities, with an emphasis on the offer of local agricultural, food and culinary products.

The survey was conducted in the Special Nature Reserve "Gornje Podunavlje" that is located in the northwest of the Autonomous Province of Vojvodina and it occupies an area of 19,648 ha and presents one of the best preserved wetlands in the Danube River Basin area (www.pzzp.rs). The area extends along 70 km of river Danube course, which represents an important tourist road, but also the habitat of a large number of fish that are found on the menu of the neighboring restaurants.

Within the reserve there is a large number of authentic restaurants such as taverns and granges, typical of the Pannonia Plain and the Danube, whose offer is based on meals of fish and dishes made of wild game. For the purposes of the study only taverns were chosen and there are the following ten: "Pikec", "Velika Čarda", "Srečko", "Kod carine", "Vagon", "Zlatna kruna", "Šaran", "Štuka", "Harčac" and "Brunai". The result of the research is reached by an interview with the management of both restaurants and protected area and by personal insight into the structure of the written offer-menu, followed by an analysis and synthesis of the data collected.

During the research it was discovered that most of the taverns, which are located in the area of the Reserve, are privately owned, while the tavern "Štuka" is the property of the fishermen's association.

Since inns fall into category of restaurants that provide food and drink (Božin, 2006), research also observed that both taverns “Štuka” and “Zlatna krana” offer accommodation services with a total capacity of 40 beds .

The restaurants offer to their visitors, who are lovers of nature, both music of tambourine players and specialties such as fish soup, fish stew with dumplings and homemade noodles, smoked river fish, fish pate, fish baked or grilled on a disc harrow, goulash of pike and sturgeon, fried perch, “drunk” carp and similar dishes. However, studies have concluded that resources owned by the Special Nature Reserve are not fully utilized in order to develop genuine hospitality through gastronomy.

The taverns should primarily have on their offer dishes made of freshwater fish from this area, accompanied by local and national dishes. After examining the menus, it is noticed that the taverns offer dishes of sea fish and seafood and international specialties which are not typical for this area. This certainly raises the question of environmental protection and application of the term “food miles” which is quite well known in the world and it represents local, authentic and fresh products.

All restaurants in the area have on their menu “Jelen beer”, made by Apatin brewery, which has a label of geographic origin and represents this area in the right way, although the visitors are often served with local spirits-brandy and white wine.

By placing emphasis on wide variety of foods that are originating from the area of the Reserve and close surroundings, the offer acquires another dimension and the food can be marketed as organic, local and authentic thus following current trend throughout the world. The placement of such offers in the market sets higher standards, achieves competitiveness, and the listed items provide a greater degree of environmental protection, which directly have influence on raising environmental awareness among producers and consumers (tourists). There are a small number of destinations that can place this product on the touristic market because Gornje Podunavlje Special Nature Reserve has a rich reserve of freshwater fish, preserved nature, cultural heritage and taverns as authentic restaurants that can be better exploited for the purpose of sustainable development of tourism. Similar research could be done with a focus on wild game whose offer is quite attractive in this area.



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