Arctic Centre Reports 50

Environment, Local Society and Sustainable Tourism

Edited by Jukka Jokimäki, Marja-Liisa Kaisanlahti-Jokimäki, Seija Tuulentie, Kari Laine and Marja Uusitalo

2007

UNIVERSITY OF LAPLAND
LAPIN YLIOPISTO

Arctic Centre Reports 50

Environment, Local Society and Sustainable Tourism

Edited by Jukka Jokimäki, Marja-Liisa Kaisanlahti-Jokimäki, Seija Tuulentie, Kari Laine and Marja Uusitalo

Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism
(LANDSCAPE LAB)
EU LIFE Environment-project
Arctic Centre, University of Lapland

Painatuskeskus Finland, Rovaniemi 2007

Front cover photo: Ilpo Okkonen
Back cover photo: Markus Varesvuo/LKA/Kuvaliiteri

This publication is produced by the support of the EU LIFE Environment programme for the *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB) -project.

This publication is also available in: www.arcticcentre.org/landscapelab

ISSN 1235-0583
ISBN 978-952-484-168-9
ISBN 978-952-484-169-6 (PDF)

Painatuskeskus Finland, Rovaniemi 2007

Contents

Preface 4

I Environment

Tourism destination development and the environment: Paradoxes or progress?
Richard W. Butler & Antonia C. Butler 5

Bird species as indicators of environmental changes at tourist destinations
Jukka Jokimäki, Marja-Liisa Kaisanlahti-Jokimäki, Esa Huhta & Pirkko Siikamäki 13

Monitoring the effects of ski resorts on wildlife: Case studies from Italian Alps
Paola Laiolo 23

The impacts of ski resorts on wildlife in northern Finland
Maarit Ukkola, Pekka Helle, Esa Huhta, Jukka Jokimäki & Marja-Liisa Kaisanlahti-Jokimäki 31

Landscape analysis – The first step in managing sustainable land use at tourist destinations
Marja Uusitalo 42

Restoration ecology as a management tool in the development of sustainable tourism in arctic and alpine regions
Dagmar Hagen 52

Hardy plants for landscaping and restoration in northern Finland
Henna Pihlajaniemi, Mirja Siuruainen, Salla Kananen, Kari Laine, Sirkka-Liisa Peteri & Satu Huttunen 62

II Local Society

The problematique and opportunities of the relationship between tourism, community and the environment
Andrew Holden 68

Local participation as a prerequisite for socially sustainable tourism: Case studies from Ylläs and Levi ski resorts in northern Finland
Seija Tuulentie 75

Social sustainability at tourist destinations – local opinions on their development and future in northern Finland
Mikko Jokinen & Salla Sippola 89

The role of forestry at tourist destinations in northern Finland: Case studies from Ylläs and Levi
Leena Suopajärvi 100

Using action research in service development to promote sustainability
José C. García-Rosell 107

Protected areas and benefits: Russian experience
Svetlana U. Belova 119

Preface

Nature-based tourism is one of the most rapidly developing areas of the service industry, but many activities and infrastructure related to tourism are channelled into disturbance-sensitive natural and cultural environments or their near surroundings.

The basis of the EU LIFE Environment project *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB) lies in the increasing need for knowledge about the impacts of growing tourism on nature, culture and local communities. The objectives of the LANDSCAPE LAB -project are to develop and demonstrate methods for assessing the sustainability of the regional impacts of tourism. This book is a product of the international conference *Nature and Tourism: Tools for Sustainability, 22-24 May 2007 Rovaniemi, Finland* that was organised by the LANDSCAPE LAB -project co-ordinator, the Arctic Centre of the University of Lapland, and nine partners and two co-financing municipalities. Both scientific and practical approaches were discussed during the course of this interdisciplinary conference.

The invited keynote lecturers were Professor Andrew Holden, Doctor Paola Laiolo, Professor Richard Butler, and Doctor Dagmar Hagen. The four main themes of the conference were: 1. Ecologically, Culturally and Visually Sustainable Urban Structure for Tourist Destinations, 2. Scope and Types of Environmental Impacts of the Tourist Destinations, 3. Social and Cultural Sustainability of Tourist Destinations, and 4. Hardy Plants for Landscaping and Restoration in Northern Tourist Destinations.

In principle, the structure of this book follows that of the conference: the book combines conference themes 1, 2 and 4 under the broad title of *Environment*, and the more human oriented theme 3 was renamed *Local society.* There are seven articles under *Environment* and six articles under *Local society* chapters. Independent reviewers reviewed all the articles published in this book.

The conference organisers would like to thank all the speakers, the people presenting a poster and the other participants of the *Nature and Tourism: Tools for Sustainability* -conference for the multidisciplinary, inspiring and successful atmosphere of the seminar. The editors of this book are also grateful to all participants that submitted their articles for publication and to the reviewers who carefully checked the scientific quality of the papers.

Jukka Jokimäki
Chair of the *Nature and Tourism*: *Tools for Sustainability* -conference
Project Coordinator, LANDSCAPE LAB -project

Tourism destination development and the environment: Paradoxes or progress?

Richard W. Butler[1)] & Antonia C. Butler[2)]*

[1)] Hospitality and Tourism Management, University of Strathclyde, 94 Cathedral Street, Glasgow, G4 0LG, UNITED KINGDOM

[2)] Conferenz, Auckland, N.Z.

[*]corresponding author: richard.butler@strath.ac.uk

Abstract

The chapter discusses the relationship between the development of tourism destinations and the environment in which such development takes place. It notes the many inherent paradoxes and inconsistencies that exist when change takes place in tourism, beginning with the problems creted by the tension between the inertia and dynamism that is present in all forms of tourism. Change which occurs in tourism destinations and tourism is argued to be primarily evolutionary rather than revolutionary, and sustainability is seen as needing a balance between preservation and development. The paper notes the forces which affect and bring about change in tourism and the way these affect the development cycle of destinations, and argues for the inevitability of limits to growth if there is to be movement towards sustainability. The paper concludes on a pessimistic note because of the many examples of the failure of key players to implement policy, including limits to development, and the apparent willingness to adopt ever more problematic forms of development. The holistic approach needed to move towards sustainability in tourism and its relation to the environment is rarely achieved.

Keywords: key forces of change, paradoxes, processes, sustainability, tourism development

1. Introduction

While the formal study of tourism is a relatively new addition to the academic curriculum, tourism itself is a very old subject and one which has been described and discussed for many years. However, as it has become the subject of academic scrutiny in recent decades, it has also become apparent that while we have learned much about it, there is still a great deal more to be discovered, explained, and understood. Nowhere, perhaps, is this clearer than in the relationship between tourism and the environment. It is often assumed and stated that tourism is dependent on the environment, and argued that if the environment deteriorates in quality, then tourism is likely to decline. Such an argument has often been seen as a fundamental element in this author's model of the tourism life cycle (Butler 1980), although as more recent discussions of this model have illustrated (Butler 2006a,b) the relationship is not as simple as it may seem.

In exploring this relationship we come across several of the many paradoxes that can be found in tourism, elements which make tourism a fascinating if difficult subject for study, and an equally difficult one to plan and manage in the real world. The relationship between tourism destination development and the environment is a complex one, not least because of two key issues, one is definition of terms, and the other is the change that inevitably accompanies development and indeed, is an integral part of such a process. Without appreciating that tourism is dynamic and operates in a dynamic world, it is impossible to understand and deal with this relationship. It has to be appreciated that change is constant and that inconsistency and chaos can and do exist with order and rationality at different levels.

2. Tourism dynamics

Perhaps the most fundamental paradox that needs to be examined in the context of the subject matter of this paper deals with the nature of tourism itself. There is an inherent paradox in tourism between *Inertia* and *Dynamism* (Fig. 1). While we may think of tourism as being a highly dynamic subject, as shown by the development of new activities and new destinations, along with changes in tourist preferences and behaviour, it also exhibits great inertia.

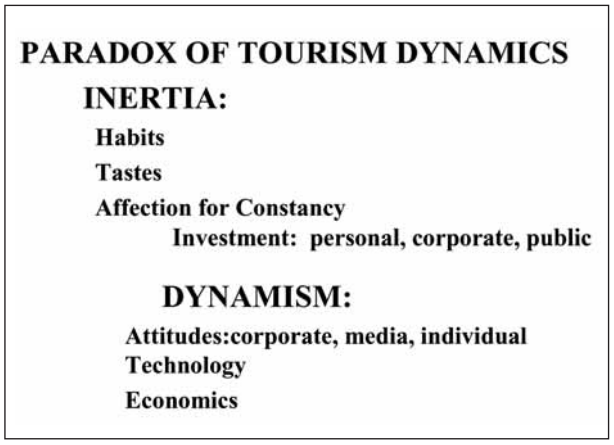

Figure 1.
Paradox of tourism.

The dynamism which we credit to tourism manifests itself in many forms, some as noted above, and tends to be driven by a number of mainly exogenous factors. These include basic economic *laws* such as economies of scale, which favour continued growth in tourism demand. A second major factor is the appearance of new technology, which again, tends to encourage an increase in demand, for example through air conditioning/central heating allowing comfortable visitation to areas of extreme temperature, improvements in travel speed, safety and comfort, and communications, allowing travel arrangements to be made more easily. Finally, through the attitudes of key players, there is a willingness and desire to affect change. Corporate attitudes support the creation and marketing of new offerings, the media regularly and often dramatically reports on new developments and tastes, and individuals are also naturally attracted by new goods and services.

The inertia that is a feature of tourism comes about from combination of both exogenous and endogenous forces. In the first case, people are creatures of habit, and generally have to be persuaded to do things differently, or go to different places. For many decades, tourists returned almost unthinkingly to the same holiday destination year after year, a pattern which can still be observed in some areas. Similarly, tastes take a long period to develop and are not changed easily, generations may stick with the same preferences and not until the next generation stamps its own preferences on the market does major change come about. Finally, given this affection for constancy, various forms of investment in tourism related facilities and infrastructure will tend to encourage individuals, companies and communities to stick with what they have. An investment in a summer home is likely to cause people to return to that area many times, while investment in commercial property has seen owners undertake renovations rather than move to new areas, although this is changing in some areas when costs make relocation and development cheaper than renovation or restoration. Similarly, those in charge of tourist destination communities often fail to look beyond tourism, or to look beyond their offering in tourism and thus miss the nature and dimension of competition until their product is in decline in terms of market appeal and visitor numbers.

The tension between dynamism and inertia has characterised tourism for centuries and can explain what often seem to be illogical developments or failure to develop or redevelop destinations. Partly this is due to confusion over the nature of change in tourism and tourists over time. Development of destinations inevitably means change in a variety of forms, and this change may have positive and negative effects on the environment of the destination. One result is often the loss of the *natural* attributes of the destination on which tourism was initially based, and in some cases their substitution with *artificial* attractions, which may result in the attraction of a new market and the loss of the original market, which in turn has many other implications.

To understand the relationship between tourist destination development and the environment in which it occurs, it is necessary to consider the two basic types of change which occur in tourism. One is *evolutionary change* and the other is *revolutionary change*. Evolutionary change is change which is gradual and generally consistent, building on existing structures, is rather predictable, and often caused by endogenous, local forces. It often proceeds at a relatively slow pace and may be unnoticed for some time until some critical level is reached or surpassed, often related to the carrying capacity or tolerance level of some element. Revolutionary change, on the other hand, tends to be sudden and variable, often destroying existing structures rather than changing them, is generally unpredictable and most often caused by exogenous forces. It is the revolutionary type of change that is discussed by Russell and Faulkner (1999) in their innovative article on *Movers and Shakers*, the *chaos makers* in tourism (see also Russell 2006). Not surprisingly, in some local residents' minds, evolutionary change, which represents an iterative and slow process, is more acceptable

than revolutionary change which can require considerable personal adjustments.

The second major issue noted above is that of definition. To many casual observers *environment* is taken to represent only the physical (natural or ecological) environment. In reality, however, in the context of tourism destination development, the term environment is better taken to mean the complete context or surroundings in which the development is taking place, which inevitably includes not only the ecological environment, but also the socio-cultural and political-economic realms, as well as the man-made environment (a quadruple bottom line perhaps, compared to the traditional triple bottom line of sustainable tourism?). When environment is looked at in such terms, then the relationship between tourism and environment becomes more complex and clearly more mutually dependent.

When environment is taken to mean only the more limited *natural* context, tourism can quite often survive and even flourish while the ecological surroundings decline in quality, depending on the forms of tourism involved (Fig. 2). Many major tourist destinations such as London, New York, Athens, and Beijing, experience increased tourist numbers and expenditure, while their ecological health deteriorates (not primarily because of tourism). In the context of more classic tourism destinations, the ecological environment is quite often changed very significantly as development progresses, and in some cases this change may have little impact on tourist volumes. With the wider definition, however, a decline in quality of several of the elements of the broader environment can quite rapidly be reflected in a subsequent and related decline in tourism. Russo (2006) has illustrated the negative spiral of decline which can encompass such locations with his example of Venice.

At this point we encounter a second paradox where increased development can both attract and repel tourists, depending on their taste and purpose of trip. Wheeller's (2006) analogy with the career of Elvis Presley is a good example of this, and its subsequent conclusion (although we might note that in the context of Presley his posthumous career is continuing unabated). Tourism academics in particular, along with former tourists now retired and living in tourist destinations are very prone to bemoan what they see as a loss of natural attributes of a destination as development takes place. Part of their possibly justified

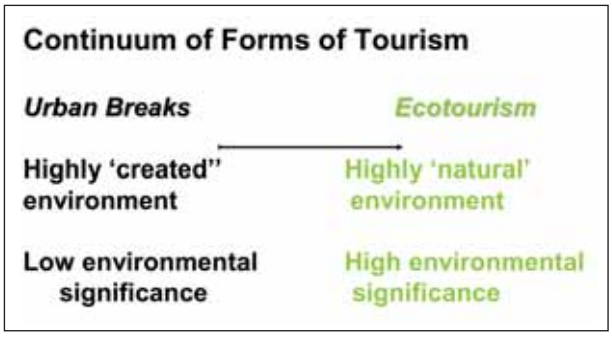

Figure 2.
Continuum of forms of tourism.

concern is that once pressure and change from tourism development have begun, they are hard to control or limit, and total transformation of communities can result (Plog 1973). As the overall environment changes the appeal of a destination declines, leading to a down-turn in visitor numbers and a decline in visitor expenditure. This results in fewer funds being available for reinvestment, restoration, redevelopment or rejuvenation leading to a continuous decline in quality of experience for the visitor and locals alike, as Russo (2006) notes.

Such a process is at the heart of the models of Plog (1973) and Butler (1980), but in reality, while these models have been shown to be valid in many situations, the relationship between tourism development and the environment is more complex. Tourism is multi-faceted and destinations shown in Figure 2 range from large cities to untouched wild areas, and highly created environments to highly *natural* ones. The degree, type, and scale of development that is acceptable to tourists, local residents, and other interested parties, will vary markedly from one end of the continuum to the other. Similarly the *sustainability* or level of sustainable development will also vary from destination to destination. An acceptable level of development in Las Vegas or Dubai (at least to tourists and locals) is far removed from what would be acceptable in the high Arctic or a World Heritage site (if indeed any development would or should be acceptable there).

3. Balancing sustainability and the environment

While it has been argued (Hunter & Green 1995) that balance is not an element to consider in sustainability, that it is not a view supported here. Once a place has begun to

attract tourists and provide economic returns, it is unlikely not to be subjected to pressure for further development. A balance has to be struck between the varied interrelated parties (Fig. 3) as to what should be the appropriate level of development, as well as the appropriate type of tourism to be promoted, and the scale and rate of development to be allowed.

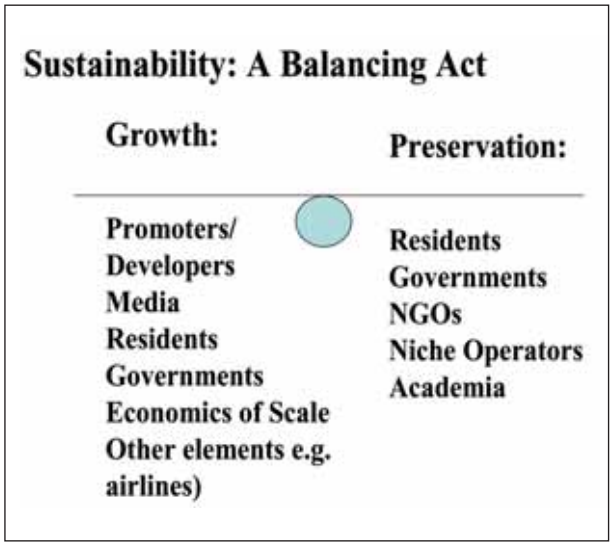

Figure 3.
Sustainability: A balancing act.

Where the balance has to be set should be the result of agreement between stakeholders, whose views may well run between extreme laissez faire capitalism and extreme ecology. In reality sustainability is usually found at some point between resource (environmental) conservation and preservation (shown by the question mark (?) in Fig. 4). As noted above, this will vary from one location to another. The early sustainable development mantra of "Think globally, act locally" ignores the fact that these core actions can counteract one another. No amount of local sustainable ecotourism development can compensate for the carbon footprint made by tourists travelling to that development. Additional development of any type has both local and global implications as far as tourism is concerned. It is not plausible in the context of an activity as global as tourism, to separate the implications of even a small scale local development from its international market. Patrons of an ecolodge in Amazonia are unlikely to be local Brazilians, but almost certainly long haul foreigners.

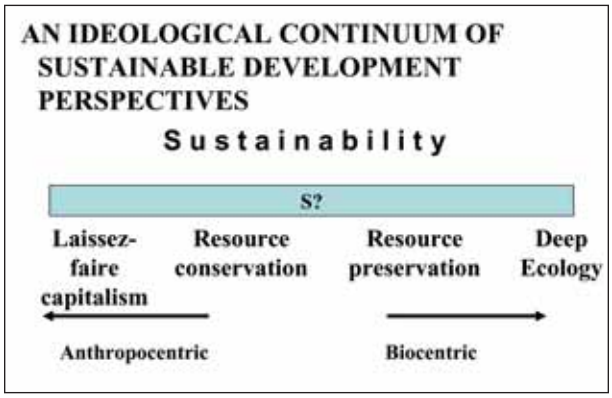

Figure 4.
An ideological continuum of sustainable development perspectives.

4. The development process

Tourism is a set of activities which are undertaken by individuals at locations which they perceive to be attractive for those activities. Increasingly however, what is an attractive environment for many forms of tourism is often equally appealing to other forms of economic development, especially residential development, both for those working in footloose industries (recognized by Ullman (1960) almost half a century ago) and those in retirement. High amenity for tourism normally represents high amenity for most activities. Resources for tourism (climate, coasts, scenery) in earlier years may not have been appreciated, because before the growth of tourism in the second half of the twentieth century, there was no market for them. However, just as such attributes can rapidly be appreciated and become resources, inappropriate or over use can render them valueless again. Another paradox is shown in Figure 5 where the changing use/appreciation of an environment from local use to tourism can be subjected to such extensive development that the location changes from tourism use to ultimately conventional urban development. The trio of wilderness/natural area, rural village and tourist city can very easily just become a tourist city and even a conventional city if development planning and regulation is not appropriate.

Dynamism:

Changing Uses of the Environment

Local Uses>>>>Tourism Use>>>>
Retirement>>>>Non leisure Use>>>Urban

Figure 5.
A dynamic process and the uses associated with the dynamism.

Sustainable development though places considerable emphasis on local input and control (WCED 1987). Great attention is paid to ensuring the views of the stakeholders are considered in the development process but often the unstated assumption is that local opinion is homogenous and static. In reality it is often dynamic and divided. People's views change as opportunities arise or disappear. It is perhaps more important to ensure development involves Traditional Ecological Knowledge (often based on the accumulated wisdom of generations), rather than merely local opinion at one point in time (Butler & Menzies 2007). As well, if the views of all stakeholders should be considered, then tourists as consumers should also have their views identified and incorporated into planning. Potential sustainable development that does not meet the needs and requirement of the market (tourists in this case) will fail to be sustainable on economic grounds and thus fail, however ecologically or culturally sound it may be.

5. The forces involved in development

While the Tourism Area Life Cycle (TALC) may be correct in portraying the process of destination development, it does not claim to explain the forces at work which influence the process: Gale and Botterill (2005) argue for a richer examination of the reasons for responses or, lack or responses, to issues arising from changes in the overall environment of a destination, that is, a need to *explain* the *causes* rather than *describing* the *symptoms* of these changes. It is important to note that forces can be categorized as positive or negative, depending on whether they are driving a development through the TALC to its decline phase (negative) or favouring development halting at a state of sustainability (positive). Another paradox emerges here, as forces may act in different direction depending on circumstances. Changes in consumer taste, for example may be both positive and negative depending on the type of tourism and the destination characteristics. Figures 6 and 7 illustrate *apparent* (Fig. 6) and *underlying* (Fig. 7) forces acting as driving and restraining factors in tourism development.

APPARENT DRIVING AND RESTRAINING FORCES IN TOURISM

DRIVING FORCES	RESTRAINING FORCES
• Change in visitor characteristics	Change of key attractions
• Deterioration of environments	Using untapped resources
• Loss of original attractions	Maintaining uniqueness
• Exceeding levels of capacity	Reinvestment in infrastructure
• Negative resident attitudes	Reinvestment in facilities
• Loss of local control	Limiting growth rates
• Lack of competitiveness	Adopting capacity concept
• Excessive rate of development	Long term planning
• Inappropriate type of development	Adaptive management
	Targeting new markets

Figure 6.
Apparent driving and restraining forces in tourism.

UNDERLYING DRIVING AND RESTRAINING FORCES IN TOURISM

• DRIVING FORCES	RESTRAINING FORCES
• Lack of leadership	Local initiative
• Absentee control	External support
• Lack of market awareness	Ongoing research
• Inertia	Entrepreneurial activity
• Local divisions	Local consensus
• Key individuals	Key individuals
• Lack of economic integration	Symbiosis among activities
• Proportion of incomers	Proportion of lifelong residents

Figure 7.
Underlying driving and restraining forces in tourism.

The elements in Figure 6 are perhaps better viewed as symptoms of change in a destination, while those in Figure 7 are closer to those identified by Gale and Botterill (2005). Those tested as Driving Forces are elements which drive a destination to the *stagnation* and perhaps *decline* phase of its TALC, while restraining forces are those which serve to keep a destination at its *consolidation* or 'sustainable' state. By concentrating our attention on those forces in Figure 7 we may be better able to control and shape the

relationship between destination developments and their environments, and thus make the developments of a more sustainable and long term nature than has been the case in many destinations in the past. We would also then be enriching our knowledge of the processes guiding destination dynamics which would, perhaps, allow the adoption of proactive planning approaches rather than simply trying to catch up with short term changes in market preferences, which has characterised many recent tourism developments.

6. Discussion

Despite the rather optimistic note of the previous section, one cannot remain very positive about the nature of the relationship between tourism development and the environments in which it takes place. Two examples can serve to explain why this paper is critical of the likely future direction of tourism. One is the way in which the latest jumbo airliner, the Airbus 380, is likely to be used. While it can carry up to 850 passengers, only one or two airlines appear to have ordered the plane in its most energy efficient format. Most airlines are limiting capacity to around 500-550 passengers to allow extra comforts for the higher paying business and first class passengers. The economic imperative again appears to be overruling the environmental ethic.

The second example is so-called 'space tourism', whereby tourists would engage in several forms of flight, some sub-orbital, some even to an orbiting space hotel. The cost in terms of energy and resources to allow people a few minutes of orbital weightlessness or to sit for days looking at screens showing pictures of the earth (there would be no real windows in a space hotel for tourists because of space sickness) is obscenely high and demonstrates a total lack of any sustainability concerns on the part of the promoters, governments and potential customers. This last point brings up another paradox, namely surveys which show that potential tourists say they are willing to pay more for a 'green' or sustainable holiday, while most in fact make their vacation purchases and destination choice based on price (Miller 2001). Martin Brackenbury (chair of the WTO Business Council 2002) noted that the one Euro-a-day ecotax in the Balearic Islands "put off many visitors. Even a small price rise has a significant effect because for many people the cost of the holiday is more important than where it is" (emphasis added). Such apparent ignorance towards environmental protection by customers and the lack of criticism of such attitudes by the WTO does not bode well for the future of sustainable tourism development.

6.1. Limits

It is clear that the concept of sustainable tourism implies limits, perhaps in the form of applying restrictions on tourism to comply with the carrying capacities of tourist destinations. Yet the fact remains that few places have even defined limits let alone introduced and implemented them. There are a number of reasons for this. In the context of leisure (tourism and recreation included) the concept of limits is relatively new, little studied or understood and notrarely economically supported by either industry or government. Tourism is an industry and few industries like governmental regulation or the implication of controls or limits. Many of the economic benefits from tourism accrue to industry and to national level governments, while many of the socio-cultural and ecological costs accrue to local residents and regional/ local governments, thus there is rarely agreement over the introduction of controls or limits. This situation is unlikely to change. Finally enforcing limits is not simple as Figure 7 shows, as many questions have to be answered (Fig. 8). Alternatives to enforcing limits (engineering modification of sites, rotating and selective closure of damaged sites, information dissemination to change use patterns, zoning of uses by time and space, enforcing skill requirements in participants, providing alternative developments and pricing) have been tried in different countries with only varying degrees of success in attempts to reduce negative impacts and preserve environmental quality in destinations. Only pricing appears to be generally effective, as it does allow a reduction in volume (and impacts) to be matched by an increase in per capita expenditure, so overall income can be maintained. This does not bode well for the vast majority of tourists who are on limited incomes or potential tourists from developing countries who cannot yet afford to enjoy holidays even at current relatively low prices.

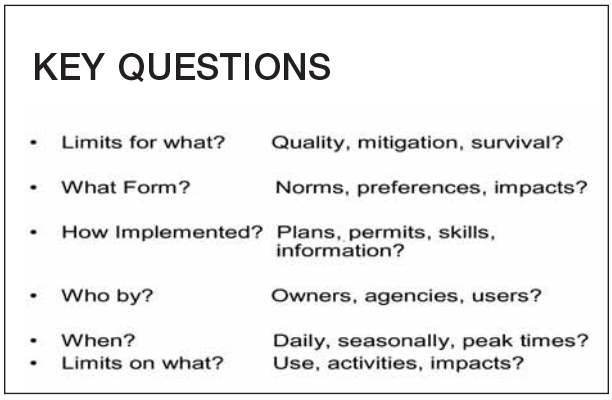

Figure 8.
Key questions related to enforcing limits.

7. Conclusions

There is no easy solution to the difficult relationship between destination development and the environment. That in itself is disappointing but what is really depressing is that this problem has been known for several decades and steadfastly ignored or has been overridden by economic priorities. This is not necessarily wrong, at least not in all places. The type of development seen in Las Vegas and Dubai is not a major environmental catastrophe at the local scale. What is more of a problem is the level of resources required to get customers there and provide them the comforts they now demand. Locally perhaps, Las Vegas is not a problem, even if tourism to it is certainly a global issue.

In order to significantly improve the relationship between destination developments and the environments in which they are situated, there needs to be recognition of some basic facts. Tourism as such can never achieve sustainability as long as travel is included in the equations. The best that can be achieved is to make destination developments and travel more sustainable. This will require more than policies, guidelines, codes of ethics and of behaviour, and wishful thinking, namely targets; indicators, monitoring, implementation of regulations and policy enforcement. The practice of giving international awards for improving levels of sustainability in mass resorts close to markets would be far more beneficial globally than giving such awards to small scale new eco-developments in locations far distant from markets, thus requiring long haul unsustainable travel to reach them.

Unfortunately, many destination planners and developers appear to think that they can achieve sustainability by upgrading and renewing their facilities. In fact, rejuvenation and moving *up market* are not the same as becoming more sustainable, and can in fact, be worse or less sustainable. *Up market* guests demand and consume more resources per capita than conventional mass tourists. Sustainable tourism is a holistic global concept, but at the community level benefits are long term, many costs are borne individually and the goals may not meet local community needs and priorities, which may legitimately be jobs and income. Sustainability (seen as a better relationship between destination developments and their environments) has to meet an economic test or it will not be successful. All stakeholders must be convinced that they will benefit economically as well as culturally and ecologically from a more sustainable approach, for such efforts to be successful. If stakeholders are not convinced of the economic benefits of sustainability, in almost all cases the economic imperative will win out over other considerations, at least in the short and medium term. The three legged stool of sustainability cannot be stable on only one or two legs over the long term, and the long term is the focus that tourism destination development should have.

References

Brackenbury, M. 2002: Chairman, WTO Business Council Speech, Madrid, World Tourism Organisation.

Butler, C.F. & Menzies, C. 2007: Traditional Ecological Knowledge and Indigenous Tourism. -Tourism and Indigenous Peoples: Issues and Implications (eds. Butler R.W. & Hinch, T.): 15-27. Elsevier, London.

Butler, R.W. 1980: The Concept of a Tourist Area Cycle of Evolution and Implications for Management of Resources. -The Canadian Geographer 24: 5 12.

Butler, R.W. 2006a: The Tourism Area Life Cycle Vol.1: Applications and Modifications. -Channelview Publications, Clevedon.

Butler, R.W. 2006b: The Tourism Area Life Cycle Vol.2: Conceptual and Theoretical Issues -Channelview Publications, Clevedon.

Gale, T. & Botterill, D. 2005: A realist agenda for tourist studies, or why destination areas really rise and fall in popularity. -Tourist Studies 5: 151-174.

Hunter, C. & Green, H. 1995: Tourism and the Environment: A Sustainable Relationship? -Van Nostrand Reinhold, London.

Miller, G. 2001: The Development of Indicators for the Promotion of Sustainable Tourism. -Unpublished PhD, School of Management, University of Surrey, Guildford.

Plog, S.C. 1973: Why Destination Areas Rise and Fall in Popularity. -Cornell Hotel and Restaurant Association Quarterly 13: 6-13.

Russell, R. 2006: Chaos theory and its Application to the TALC model. -The Tourism Area Life Cycle Vol.2: Conceptual and Theoretical Issues (ed. Butler, R.W.): 164-179. Channelview Publications, Clevedon.

Russell, R. & Faulkner, W. 1999: Movers and Shakers Chaos Makers in Tourism. - Tourism Management 20: 411-423.

Russo, A. P. 2006: A Re-foundation of the TALC for Heritage Cities. - The Tourism Area Life Cycle Vol.1: Applications and Modifications (ed. Butler, R.W): 139-161. Channelview Publications, Clevedon.

Ullman, E. L. 1960: Geography Theory in Underdeveloped Areas. -Essays on Geography and Economic Development in Norton (ed. Ginsburg, S.): 26-32. -University of Chicago, Department of Geography Research Paper 62.

Wheeller, B. 2006: The King is Dead. Long Live the Product: Elvis, Authenticity, Sustainability, and the Product Life Cycle. -The Tourism Area Life Cycle Vol.1: Applications and Modifications (ed. Butler, R.W.): 339-348. -Channelview Publications, Clevedon.

World Commission on Environment and Development (WCED) 1987: Our Common Future. - Oxford University Press, Oxford.

Bird species as indicators of environmental changes at tourist destinations

Jukka Jokimäki[1)], Marja-Liisa Kaisanlahti-Jokimäki[1)], Esa Huhta[2)] & Pirkko Siikamäki[3)]*

[1)] Arctic Centre, University of Lapland,
P.O. Box 122, FI-96101 Rovaniemi, FINLAND
[2)] Kolari Research Unit, Finnish Forest Research Station,
Muoniontie 21 A, FI-95900 Kolari, FINLAND
[3)] Oulanka Research Station, University of Oulu,
Liikasenvaarantie 134, FI-93999 Kuusamo, FINLAND
[*]corresponding author: jukka.jokimaki@ulapland.fi

Abstract

The increasing number of visitors at northern Finnish tourist destinations has increased the need to explore the impacts of tourism on nature. It has been found that birds make suitable and good indicators of environmental change. The purpose of this paper is to present suitable bird indicators to evaluate the state and monitor the changes in nature at urbanising tourist destinations (ski resorts). We hypothesize that urban species may increase their abundance whereas species sensitive to disturbance or those that prefer more natural areas may decrease in abundance with the urbanisation of the ski resort. The study was conducted along an urban gradient from towns (n = 2) via tourist destinations (n = 8) to the surrounding forests around each tourist destination (n = 8) in northern Finland. A single-visit 5-min point count survey method with a 50 m fixed radius survey circle was used. A total of 29 bird species were observed in towns, 44 species in ski resorts and 38 species in forests. The species composition varied between towns, ski resorts and the surrounding forests. Twelve bird species occurring in the forests were absent from the ski resorts and eight species observed in towns did not occur in ski resorts. The Tree Pipit, Redstart, Mistle Thrush and Brambling were more abundant in the forests than they were at the ski resorts. Eight species (the Sand Martin, White Wagtail, Fieldfare, Garden Warbler, Great Tit, Blue Tit, Magpie and House Sparrow) were more abundant in the towns than they were in the ski resorts. The results of this study indicate that the ski resorts induce the urban sprawl to wilderness areas by supporting the colonization of urban bird species (e.g. the Feral Pigeon, House Martin, House Sparrow, Blue Tit and corvids) in these areas. We propose that urban exploiters, ski resort avoiders and resident bird species are suitable indicators to monitor the level of urbanization and wilderness characters of nature in ski resorts.

Keywords: birds, environmental change, indicators, ski resorts, tourism

1. Introduction

The increasing number of visitors at northern Finnish tourist destinations has increased the need to explore the impacts of tourism on the nature. The relative importance of tourism as an income source has increased along with the simultaneous relative decrease in traditional northern sources of livelihood. In many rural municipalities, the income from tourism exceeds the income from agriculture and forestry (Saastamoinen *et al*. 2000). The number of registered overnight stays in various types of accommodations in Finnish Lapland increased by 2.7 % per year from 1993 to 2004 (Regional Council of Lapland 2003) and totalled more than 2 million in 2005 (Regional Council of Lapland 2007). Since the beginning of the 1980s, several tourist destinations have developed into tourist centres with focused tourism and compact infrastructures.

The expansion of tourism into pristine areas may have negative impacts on nature. Human recreational activities are often considered potential threats to biodiversity by restricting animal access to resources that otherwise would be exploited (Gill 2007). Outdoor recreation may disturb wildlife, increase the energetic costs of individuals and nest losses, change wildlife behaviour and lead to the avoidance of otherwise suitable habitats (Burger & Gochfeld 1998, Miller *et al.* 1998, Miller & Hobbs 2000, Taylor & Knight 2003, Gonzales *et al.* 2006, Liddle 1997). The combined impacts of infrastructure, roads, power lines, trails and cabins may decrease the size of the habitats and cause the fragmentation of habitats suitable for wildlife species (Reimers *et al.* 2003). Downhill ski resorts are particularly controversial because of their negative impacts on the landscape (Holden 1999). The impacts of their infrastructure and associated human activities on adjacent natural areas are often more severe than the impacts of more general tourist activities further away from ski resorts (Pickering *et al.* 2003).

The concept *sustainable tourism* can be understood in three basic dimensions: ecological, socio-cultural and economic sustainability (see also WCED 1987, Saarinen 1998, WTO 2004, UNEP & WTO 2005), where ecological sustainability is concerned with ecological changes caused by recreation and tourism and their acceptability over the long term (WTO 2004).

Birds have been found suitable and good indicators of environmental changes (Furness & Greenwood 1993). They are relatively easy to detect, identify and census and their ecology is relatively well known in relation to other taxa. Birds are sensitive to many kinds of environmental disturbances and they can be used for environmental monitoring (Furness & Greenwood 1993). For example, red list indices for birds (Butchart *et al.* 2007) have been used to measure global trends in the status of biodiversity, and wild bird indicators based on the population trends of breeding birds have been used at the national level to represent the state of the countryside (Gregory *et al.* 2005). In general, healthy wildlife populations are seen as useful indicators of sustainable land-use policies and of the general quality of life.

This paper presents suitable bird indicators to evaluate the state and monitor the changes in the nature at urbanizing tourist destinations (hereafter referred to as ski resorts). First, we compare species composition along an urban gradient from towns via ski resorts to forest areas. Secondly, we examine which bird species prefer or avoid the most urbanised areas of the tourist destinations. Finally, we select individual bird species or species groups that can be used to monitor the environmental changes going on at tourist destinations. We hypothesize that urban species may increase their abundance whereas species sensitive to disturbance or those that prefer more natural areas may decrease in abundance with the urbanisation of the tourist destinations.

2. Material and methods

2.1. Study area

The study was conducted along an urban gradient from towns (n = 2) via tourist destinations (n = 8) to the surrounding forests around each tourist destination (n = 8) in northern Finland (Fig. 1). The population density in northern Finland is approximately 1.9 inhabitants/km^2 (Statistics Finland 2006). Practically all the main tourist destinations/ski resorts located in northern Finland were included in this study.

Figure 1.
Study area (circles = ski resorts and triangles = towns).

According to various statistical sources (e.g. statistics provided by the municipalities and entrepreneurs), the number of beds at tourist destinations varies from 1,500-16,000 and the number of registered overnights in June varied from 1,100-19,500. There are only a few hundred permanent inhabitants at ski resorts; there are 35,000 inhabitants in the town of Rovaniemi and 18,000 inhabitants in the town of Kuusamo. Forests cover 50-60% of the landscape with Scots Pine (*Pinus sylvestris*) as the dominant tree species.

2.2. Bird surveys

Breeding birds were surveyed and the number of breeding pairs was estimated by using the single-visit 5-min point count method with a 50 m fixed radius survey circle (Koskimies & Väisänen 1988). A total of 40 survey stations were established in towns, 165 in ski resorts and 145 stations around the ski resorts. The bird surveys were replicated during June 2005 and 2006. The survey stations were situated in the most urbanized areas of the towns and ski resorts. In the forests, the survey stations were located at least 100 meters from the nearest road in uninhabited areas. The distance between individual survey stations in the study area was at least 400 meters.

2.3. Statistical methods

Since there was no significant variation in species abundance between the study years, the data from the two study years were pooled for further analyses. The non-parametric Kruskall-Wallis χ^2 -test and Mann-Whitney U-test were used to compare the species abundances between the towns, ski resorts and their surrounding forests. When conducting multiple tests at the bird species level, the P value for indicating significance differences was set at $P < 0.01$. In other analyses, the P value was set at $P < 0.05$.

Two species´ groups were formed based on our results of species level analyses: 'urban exploiters' and 'ski-resort avoiders'. In addition to these two groups, a group of resident species was formulated. The Latin names of the bird species are given in the Table 1.

3. Results

A total of 1,691 breeding bird pairs representing 62 bird species were observed during the two-year study in two towns and eight tourist destinations and their surrounding forests. A total of 29 bird species were observed in the towns, 44 species in the ski resorts and 38 species in the forests (Table 1).

Table 1.
Species observed within a 50 m radius in towns, ski resorts and forests in 2005-2006.

		Towns	Ski resorts	Forests
Black-headed Gull	*Larus ridibundus*	x		
Merlin	*Falco columbarius*		x	
Capercaillie	*Tetrao urogallus*			x
Black Grouse	*Tetrao tetrix*			x
Willow Grouse	*Lagopus lagopus*			x
Hazel Grouse	*Bonansa bonansia*			x
Wood Pigeon	*Columba palumbus*		x	x
Feral Pigeon	*Columba livia domestica*		x	x
Cuckoo	*Cuculus canorus*		x	x
Black Woodpecker	*Dryocopus martius*			x
Great Spotted Woodp.	*Dendrocopos major*	x	x	x
Swift	*Apus apus*	x		
Sand Martin	*Riparia riparia*	x		
Swallow	*Hirundo rustica*	x	x	
House Martin	*Delichon urbica*	x	x	
Tree Pipit	*Anthus trivialis*		x	x
Meadow Pipit	*Anthus pratensis*		x	
Yellow Wagtail	*Motacilla flava*			x
Pied Wagtail	*Motacilla alba*	x	x	x
Grey Wagtail	*Motacilla cinerea*		x	
Waxwing	*Bombycilla garrulus*		x	x

		Towns	Ski resorts	Forests
Dunnock	*Prunella modularis*			x
Robin	*Erithacus rubecula*		x	x
Bluethroat	*Luscinia svecica*	x		
Black Redstart	*Phoenicurus ochruros*			x
Redstart	*Phoenicurus phoenicurus*		x	x
Whinchat	*Saxicola rubetra*	x		x
Northern Weathear	*Oenanthe oenanthe*		x	
Fieldfare	*Turdus pilaris*	x	x	
Song Thrush	*Turdus philomelos*	x	x	x
Redwing	*Turdus iliacus*	x	x	x
Mistle Thrush	*Turdus viscivorus*			x
Red-flanked Bluetail	*Tarsiger cyanurus*			x
Garden Warbler	*Sylvia borin*	x		
Willow Warbler	*Phylloscopus trochilus*	x	x	x
Chiffchaff	*Phylloscopus collybita*			x
Goldcrest	*Regulus regulus*			x
Spotted Flycatcher	*Muscicapa striata*	x	x	x
Pied Flycatcher	*Ficedula hypoleuca*	x	x	x
Treecreeper	*Certhia familiaris*		x	
Siberian Tit	*Parus cinctus*		x	x
Willow Tit	*Parus montanus*		x	x
Great Tit	*Parus major*	x	x	x
Blue Tit	*Parus caeruleus*	x	x	
Siberian Jay	*Perisoreus infaustus*		x	x
Jay	*Garrulus glandarius*		x	
Magpie	*Pica pica*	x	x	
Jackdaw	*Corvus monedula*	x		
Hooded Crow	*Corvus corone cornix*	x	x	
Raven	*Corvus corax*		x	x
House Sparrow	*Passer domesticus*	x	x	
Chaffinch	*Fringilla coelebs*	x	x	x
Brambling	*Fringilla montifringilla*		x	x
Greenfinch	*Carduelis chloris*	x	x	x
Siskin	*Carduelis spinus*		x	x
Redpoll	*Carduelis flammea*	x	x	x
Two-barred Crossbill	*Loxia leucoptera*		x	x
Crossbill	*Loxia curvirostra*		x	x
Parrot Crossbill	*Loxia pytyopsittacus*		x	x
Bullfinch	*Pyrrhula pyrrhula*		x	x
Yellowhammer	*Emberiza citrinella*	x	x	
Reed Bunting	*Emberiza schoeniclus*	x	x	
Species richness		29	44	38

3.1. Bird species composition

The species composition varied between the towns, ski resorts and surrounding forests (Table 1). Of the 62 observed bird species, five species were observed only in the towns, seven species were detected only in the ski resorts and ten bird species were observed only in the forests (Table 1). Twelve of the bird species occurring in forests were absent from the ski resorts and eight species observed in towns did not occur in the ski resorts (Table 1).

Table 2.
The dominant bird species (> 5% of the total number of pairs) in different habitats within a 50 m radius in 2005-2006.

Towns	%	Ski resorts	%	Forests	%
Fieldfare	15.4	Willow Warbler	12.9	Brambling	25.7
White Wagtail	11.7	Pied Flycatcher	9.8	Willow Warbler	15.7
Great Tit	8.6	Redstart	9.2	Redstart	12.7
Magpie	8.6	House Martin	6.2	Redpoll	8.3
House Sparrow	8.0	Chaffinch	5.6	Siskin	7.4.
Chaffinch	8.0	Great Tit	5.4		
Willow Warbler	7.4	Brambling	5.1.		
Black-headed Gull	7.4	Fieldfare	5.1		
Total %	75.1		59.3		69.8

The dominant bird species and their proportion to the entire bird assemblages differed between habitats (Table 2). The Willow Warbler was the only species that was included in the list of dominant bird species in every habitat. Three dominant species (the Brambling, Willow Warbler and Redstart) were the same in the ski resorts and forests, whereas four dominant species (the Fieldfare, Magpie, Chaffinch and Willow Warbler) were the same in the towns and ski resorts. Eight species were included in the list of dominant species in the towns and ski resorts and 5 species in the forests. The pooled percentage of dominant bird species was highest in the towns (75.1%) and lowest in the ski resorts (59.3%).

The Tree Pipit, Redstart, Mistle Thrush and Brambling were more abundant in the forests than they were in the ski resorts (Mann-Whitney U-test, $P < 0.01$). Eight species (the Sand Martin, White Wagtail, Fieldfare, Garden Warbler, Great Tit, Blue Tit, Magpie and House Sparrow) were more abundant in the towns than they were in the ski resorts (Mann-Whitney U-test, $P < 0.01$).

3.2. Species´ groups

Based on the occurrence or the abundance of species in different habitants, two species´ groups were formulated. The urban exploiter group included species that occurred only in the towns or species that were more abundant in the towns than in the ski resorts (i.e. the White Wagtail, Fieldware, Great Tit, Blue Tit, Magpie, Hooded Crow, House Sparrow, Greenfinch, Feral Pigeon, Swift and Jackdaw). The ski resort avoiders group included species that occurred in the forests but were absent from the ski resorts or species that were more abundant in the forests than in the ski resorts (i.e. the Capercaillie, Tree Pipit, Redstart, Mistle Thrush and Brambling).

The pooled abundance of the urban exploiters decreased from the towns via the ski resorts to the forests (Kruskall-Wallis χ^2-test, $P < 0.05$; Fig. 2a). The pooled abundance of the ski resort avoiders increased from the towns via the ski resorts to the forests (Kruskall-Wallis χ^2-test, $P < 0.05$; Fig. 2b). The proportion of resident bird species decreased from the towns via the ski resorts to the forests (Kruskall-Wallis χ^2-test, $P < 0.05$; Fig. 2c).

4. Discussion

4.1. Bird species richness

A total of 44 breeding bird species was observed in the most urbanized areas of the ski resorts during the two study years, which accounted for 71% of the total number of observed species. Jokimäki and Kaisanlahti-Jokimäki (2003) also found that a high proportion species (67%) breeding in the Pyhä-Luosto Natura 2000 area was also breeding in the Luosto and Pyhä ski resort areas in northern Finland. Dominant bird species constituted only 59% of the total number of pairs breeding at the ski resorts in our study.

These results indicated that the breeding bird assemblages were quite diverse at the northern ski resorts. One reason for the high species richness is that the bird species composition at ski resorts seems to be a mixture of bird assemblages of urban, semicultural and forest habitats. Our observation differed from the results obtained from urban ecological studies that have shown a clear decrease in species richness along with urbanization (Jokimäki & Suhonen 1993, Jokimäki 1996). It might be that the level of urbanization is not so high or the spatial scale is so small in northern ski resorts that the negative impacts of urbanization on bird richness has not yet been observed.

Our results differed from the results gained in the Italian Alps, where woodland (Laiolo & Rolando 2005) and grassland bird species richness (Rolando *et al*. 2007) decreased because of tourism-related activities. Ski runs and their edges have lower species richness than more natural habitats or areas far a way from ski runs. The disagreement between our results and the results from the Alps may be partly explained by different study designs.

Supporting to our results, the data obtained from a smaller scale analysis of breeding birds with the same study method and study area as in this study indicated a relatively high breeding bird species richness in areas with tourism related constructions such as open fires or cabins (Aalto *et al.* 2007).

Our study was conducted at the local-regional scale. If the bird community structure is similar between ski resorts, then ski resorts might cause a decrease in biodiversity on a larger scale. However, only a few scientific publications concerning the urbanized parts of ski resorts were available,

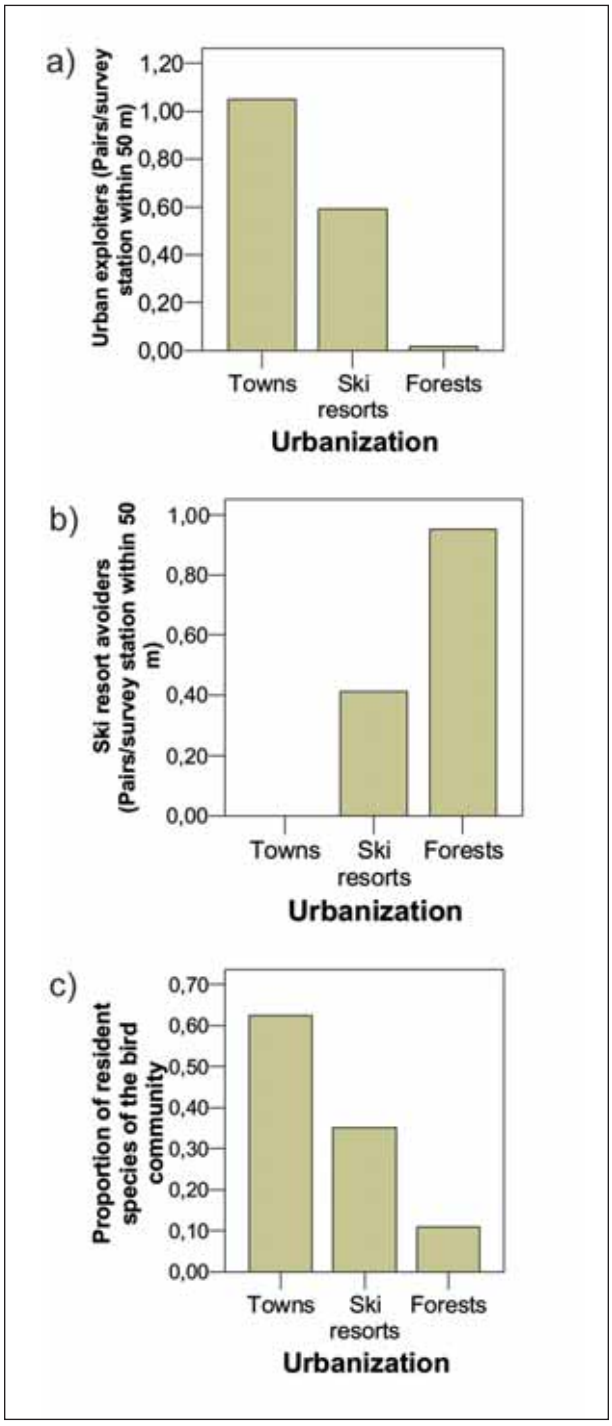

Figure 2.
Abundance of urban exploiters (a) and ski resort avoiders (b), and proportion of resident bird individuals (c) along an urban gradient.

so it was not possible to conduct a more detailed comparison of our results with others. Obviously, more research on the subject is needed before generalizing the results to other areas.

4.2. Bird species composition

Bird species composition has changed at the ski resorts. The results of this study indicate that the ski resorts induced urban sprawl to wilderness areas by supporting the colonization of some urban bird species (e.g. the Feral Pigeon, House Martin, House Sparrow, Blue Tit and corvids) in these areas. The abundances of many human-associated species were higher in the ski resorts than they were in the surrounding forests. In general, the urban exploiters (human-associated species) benefited, whereas the ski resort avoiders (mainly coniferous forest species and old forest species (see Jokimäki & Kaisanlahti-Jokimäki 2003) suffered from the urbanization of the ski resorts. In their study, Laiolo and Rolando (2005) also indicated that woodland species suffered from tourism in the Italian Alps.

Although the ski resorts already show some urban features in their bird communities, some urban species did not occur in the ski resorts. Moreover, the abundances of most other urban species are still lower in ski resorts than in towns. In fact, the bird species composition of the ski resorts in our study areas resembles more the species composition of forests than towns. Due to the relatively young age of the urban components of ski resorts, some urban bird species (such as the Jackdaw) have not yet colonized ski resorts.

4.3. Bird indicators

One of the aims of this study was to find bird species or groups of species that respond to the urbanisation of ski resorts at the local or regional levels. We propose that urban exploiters, ski resort avoiders and resident bird species might be suitable indicators to monitor both the level of urbanisation and the wilderness characteristics of nature at ski resorts. Our results indicate that these species´ groups show either a positive (urban exploiters and resident bird species) or negative (ski resort avoiders) relationship to the urbanization processes underway at the ski resorts. Our survey method, a point count survey, is an unsuitable method to survey rare birds such as owls or birds of prey; many of these species are sensitive to disturbance and therefore possible to include within a ski resort avoider group.

The species´ groups presented here also respond to factors other than tourism. Urbanization is the main driving force to which urban exploiters respond (Blair 1996, Jokimäki 1996, Fernández-Juricic & Jokimäki 2001). Ski resort avoiders, which in our case were coniferous forest species, respond mainly to activities related to forestry. There are many driving forces affecting the abundance of resident bird species, such as winter climate and food availability. However, according to the Finnish Bird Atlases (Hyytiä *et al.* 1983, Väisänen *et al.* 1998), the ski resorts have obviously supported the northward expansion of many human-associated species such as the Blue Tit and Greenfinch. The distribution of these species as well as other urban exploiters is almost totally restricted around the towns, villages and ski resorts in northern Finland. The ski resort areas may have negative impacts on coniferous species because deciduous trees and shrubs have been favoured over conifers in landscape management and gardening at ski resorts.

Some species of urban exploiters (3 out of 11 species) and ski resort avoiders (4 out of 5 species) were migratory. Therefore, their presence and abundance at ski resorts could be independent of ski resort areas. For this reason, urban exploiters may be better indicators than may ski-resorts avoiders. In addition, the urban exploiters are more abundant than the ski-resorts avoiders are, and larger data are more suitable for effective statistical analyses and gives more reliable results.

We have preferred species´ groups over individual species when selecting indicators. The selection of these groups was based on quantitative measurements of the degree to which the birds specialize in or avoid particular habitats, in our case the most urbanised areas of the ski resorts. Monitoring specific habitat alternations is most revealing if birds are grouped by habitat use strategies (Järvinen & Väisänen 1979). The use of individual species as an indicator is also restricted because species composition varies between biogeographical areas. However, same ecological groups can be produced independently of geographical location or species composition.

The proposed local or regional indicators mainly

constitute common bird species. There are also other species (such as threatened bird species or EU Wild Bird Directive species) that are more sensitive to ski resorts and tourism-related activities than common bird species are. Other indicators are available to monitor the state of these more sensitive species. The Red List Index (the proportion of species threatened with extinction) is based on the IUCN Red List of bird species. However, according to Gregory *et al.* (2005), this index overlooks common species and is not a good measure of the general state of nature and its changes. Instead of collecting field data, it is possible to collect population trends from literature, but this method suffers from sampling bias (Gregory *et al.* 2005). It is also possible to extract population trends from existing wide-scale monitoring schemes and produce national level indicators such as the UK Wildlife Bird Indicator or use a corresponding multi-national data set to produce European bird indicators such as the European wild bird indicator (Gregory *et al*. 2005). These indicators are more suitable for local or regional monitoring.

There are some practical problems in the use of the indicators proposed in this study. There are no existing data available about bird abundances at the ski resorts, so new data must be collected. Collecting the data concerning these indicators requires surveys of the entire bird community and therefore, special expertise in bird identification is needed. Fortunately, many amateur birdwatchers are able to conduct these surveys. If extensive surveys concerning the entire bird community are impossible to conduct (e.g. because of the lack of suitable researchers, time or money), we propose surveys of magpies and crows because they are easy to identify. These species indicate the urbanization level of the ski resorts; the more magpies and crows that occur in the ski resort, the more urbanized it is. Based on the data presented here, no single species could be identified to monitor the wilderness values of the ski resorts.

4.4. The ski resort monitoring scheme

In order to evaluate the current state and to monitor the change in nature at the ski resorts by using the above three bird species´ groups or magpies and crows, we suggest 20 permanent survey stations to be established in the most urbanised parts of the ski resorts and an additional 20 survey stations are set up as control sites in the surrounding areas. The distance between individual survey stations must be at least 400 meters in order to avoid double counting the same individuals. A 5-min single-visit point-count (Koskimies & Väisänen 1988) is a cost-effective method to collect the data.

We hope that the information presented in this paper will help regional managers to evaluate and monitor the state and change in nature at tourist destinations. Understanding and predicting the likely consequences of ski resorts and tourism on ecosystems and species is a major perquisite to achieving the sustainable use of natural resources at the tourist destinations. More information on suitable bird indicators and their use and applications is needed to further evaluate the development underway at the tourist destinations and their surroundings. Before-after-control-impact (BACI) research, where bird communities are analysed before and after the enlargement of the ski resorts, may open up possibilities for experimental research on the impacts of ski resorts on birds.

Acknowledgements

This study is a part of the EU LIFE Environment project *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB). Dr Raimo Virkkala kindly commented on the draft of this article.

References

Aalto, M., Sulkava, P., Huhta, E., Aalto, P. & Putkonen, M. 2007: Impacts of nature-based tourism on bird communities of Pallas-Yllästunturi National Park in Finnish Lapland. - Nature and Tourism: Tools for Sustainability, International Conference. Arctic Centre, University of Lapland, Rovaniemi, Finland, 22-24 May 2007. Abstract Book (eds. Kaisanlahti-Jokimäki, M.-L., Jokimäki, J., Kivilahti, R. & Härkönen, J.): 7. Lapin yliopistopaino, Rovaniemi.

Blair, R. B. 1996: Land use and avian species diversity along an urban gradient. -Ecological Applications 6: 506-519.

Burger, J. & Gochfeld, M. 1998: Effects of ecotourism on bird behaviour at Loxahatchee National Refuge, Florida. - Environmental Conservation 25: 13-21.

Butchart, S. H. M., Akçakaya, R. H., Chanson, J., Baillie, J. E. M., Collen, B., Quader, S., Turner, W.R., Amin, R., Stuart, S. N. & Hilton-Taylor, C. 2007: Improvements to the Red List Index. -PloS ONE 2(1): e140. doi:10.1371/journal.pone.0000140.

Fernández-Juricic, E. & Jokimäki, J. 2001: A habitat island approach to conserving birds in urban landscapes: case studies from southern and northern Europe. -Biodiversity and Conservation 10: 2023-2043.

Furness, R.W. & Greenwood, J. J. D. 1993: Birds as monitors of environmental change. -Chapman & Hall, London.

Gill, J. A. 2007: Approaches to measuring the effects of human disturbance on birds.-Ibis 149 (s1): 9-14 doi:10.1111/j.1474-919X.2007.00642.x

Gonzales, L. M., Arroyo, B. E., Margalida, A., Sanchez, R. & Oria, J. 2006: Effects of human activities on the behaviour of breeding Spanish imperial eagles (Aquila adalberti): management implications for the conservation of a threatened species. -Animal Conservation 9: 85-93.

Gregory, R. D., van Strien, A., Vorisek, P., Gmelig Meylin, A. W., Noble, D. G., Foppen, R. P. B. & Gibbons, D. W. 2005: Developing indicators for European Birds. -Philosophical Transactions of the Royal Society B: 360: 269-288.

Holden, A. 1999: High impact tourism: a suitable component of sustainable policy? The case of downhill skiing development at Cairgorm, Scotland. -Journal of Sustainable Tourism 7: 97-107.

Hyytiä, K., Kellomäki, E. & Koistinen, J. (eds.) 1983: Suomen lintuatlas. -SLY :n Lintutieto Oy, Helsinki.

Jokimäki, J. 1996: Patterns of bird communities in urban environments. -Arctic Centre Reports 16. Lapin yliopistopaino, Rovaniemi.

Jokimäki, J. & Kaisanlahti-Jokimäki, M.-L. 2003: Pyhätunturin ja Luoston matkailukeskusten ja niiden ympäristön lintujen pistelaskennat sekä tekopesäkokeet vuosina 1996, 2001 ja 2002. -Lapin yliopisto, Arktinen keskus. Moniste.

Jokimäki, J. & Suhonen, J. 1993: Effects of urbanization on the breeding bird species richness in Finland: a biogeographical comparison. -Ornis Fennica 70: 71-77.

Järvinen, O. & Väisänen, R. A. 1979: Changes in bird populations as criteria of environmental changes. -Holarctic Ecology 2: 75-80.

Koskimies, P. & Väisänen, R. A. 1988: Monitoring bird populations in Finland. A manual. -Helsingin yliopisto, Helsinki,

Laiolo, P. & Rolando, A. 2005: Forest bird diversity and ski-runs: a case of negative edge effect. -Animal Conservation 8: 9-16.

Liddle, M. 1997: Recreational Ecology. -Chapman & Hall, London.

Miller, S. G. & Hobbs, N. T. 2000: Recreational trails, human activity, and nest predation in lowland riparian areas. -Landscape and Urban Planning 50: 227-236.

Miller, S. G., Knight, R. L. & Miller, C. K. 1998: Influence of recreational trails on breeding bird communities. -Ecological Applications 8: 162-169.

Pickering, C. M., Harrington, J. & Worboys, G. 2003: Environmental impacts of tourism on the Australian Alps protected areas – Judgments of protected area managers. -Mountain Research and Development 23: 247-254.

Regional Council of Lapland 2003: Lapland Tourism Strategy 2003-2006. -Lapland Regional Council, Rovaniemi. Available from: http://www.lapinliitto.fi/englanti/matstraeg.pdf [20.10.2007]

Regional Council of Lapland 2007: Lappi – Matkailustrategia 2007-2010. Luonnos. -Lapin liitto, Rovaniemi. Availabel from: http://www.lapinliitto.fi/paatoksenteko/lh221007/liite8.pdf [20.10.2007]

Reimers, E. S., Eftestol, S., Colman, J. E. 2003: Behaviour responses of wild reindeer to direct provocation by a snowmobile or skier. -Journal of Wildlife Management 67: 747-754.

Rolando, A., Caprio, E., Rinaldi, E. & Ellena, I. 2007: The impact of high-altitude ski-runs on alpine grassland bird communities. -Journal of Applied Ecology 44: 210-219.

Saarinen, J. 1998: Kestävyys, kantokyky ja matkailun kehittyminen: näkökulmia kestävän matkailun problematiikkaan. - Kestävyys luonnon virkistys- ja matkailukäytössä (eds. Saarinen, J. & Järviluoma, J). -Metsäntutkimuslaitoksen tieodonantoja 671: 15-31.

Saastamoinen, O., Loven. L. & Sievänen, T. 2000: Nature-based tourism in forested north-Europe – case of Finland. -Finnish Forest Research Institute Research Papers 792: 7-17.

Statistics Finland 2006: Statistical Yearbook of Finland 2006. -Karisto Oy, Hämeenlinna.

Taylor, A. R. & Knight, R. L. 2003: Wildlife response to recreation and associated visitor perceptions. -Ecological Applications 13: 951-963.

UNEP & WTO 2005: Making tourism more sustainable. A guide for policy makers. -A UNEP & WTO publication.

Väisänen, R. A., Lammi, E. & Koskimies, P. 1998: Muuttuva pesimälinnusto. -Kustannusosakeyhtiö Otava, Helsinki.

WCED 1987: Our common future. -The World Commission on Environment and Development. -Oxford University Press, Oxford.

WTO 2004: Indicators of sustainable development for tourism destinations: a guidebook. -WTO, Madrid.

Monitoring the effects of ski resorts on wildlife: Case studies from Italian Alps

Paola Laiolo

Doñana Biological Station (CSIC), Department of Conservation Biology, Avenida M. Luisa s/n, 41013 Sevilla, SPAIN
paola@ebd.csic.es

Abstract

In this article, two study cases on the effects of ski resorts on the avifauna of Italian Alps are presented. The effects of skiruns on the bird communities breeding in forests are analysed by comparing bird diversity of forest plots located in forest interior, at the edge of skiruns, and at the edge of pastures. Also the effects of winter sport activities on the daily movements of the Alpine Chough *Pyrrhocorax graculus* are considered. Skiruns had negative effects on forest birds, and plots at their edges presented lower bird species richness and diversity than those located in forest interior, or at the edges of pastures, where avian diversity thrived. Forest plots at skirun edges were avoided by both typical forest birds and by birds dwelling in ecotones. When considering the Alpine Chough behaviour in winter, birds from areas where no winter sport activity occurred adjusted their winter movements according to snow cover, with large daily movements and use of low altitude feeding grounds when snow cover was deep. In ski resort areas, birds reduced their movements when snow cover was deepest, and gathered in high altitude ski resorts to feed on scraps provided by tourists throughout winter. Both studies showed that ski resorts create disturbance in the alpine ecosystem, by causing forest bird diversity to drop and altering animal behavioural patterns. The restoration of the gradual transition from forest to open habitat through the management of edge vegetation seem to be best solution to preserve bird diversity in skirun areas. The Alpine Chough shift towards sedentary habits could be avoided by encouraging low-intensity farming systems at valley bottoms, which can provide a diverse food supply as an alternative to human food scraps.

Keywords: Alps, bird diversity, forests birds, Pyrrhocorax graculus, ski resorts, winter

1. Introduction

Anthropogenic habitat fragmentation is recognized as one of the greatest threats to animal populations and biodiversity. The effects of fragmentation are not merely due to the loss of suitable habitat, and features such as patch size, distance between fragments and matrix composition can complement the effects of habitat loss (Andrén 1994). All these features affect individual behaviour, conditioning resource and habitat use, movements and home ranges. Dispersal dynamics can be eventually disrupted, in turn influencing the distribution, abundance, and persistence of populations, with effects that become perceivable also at the community level (Serrano & Tella 2003, Driscoll 2004). Among the causes of man-made habitat alteration, agriculture, forestry and urbanization are by far the most relevant and best studied. Land management for recreational activities plays a minor role in habitat loss and its impact is more recent, but it can potentially create problems to animal populations and communities.

Among tourist activities in the Alps, ski resorts cause large scale changes to the habitat and landscape levels. Bulldozers and power shovels are used for soil removal (to provide comfortable slopes for skiers), large amount of chemicals are spread for soil stability and artificial seeding, if any, is conducted to control for soil erosion. Forest patches are abruptly clear-cut and after construction tree pruning and cutting of shrubs are carried out at regular intervals (Siniscalco *et al.* 1997, Urbanska *et al.* 1998). Skiruns also attract people to habitats that would otherwise be undisturbed, creating disturbance and stress for some animal species (Arlettaz *et al.* 2007), and providing new food resources that increase the density of generalist predators (Watson & Moss 2004).

The European Alps are important biodiversity spots and are also becoming important refuges for species that extend their ranges down to lowlands, where natural habitats are rapidly diminishing in extent because of human-driven habitat transformation (Laiolo *et al.* 2004). Actually, many alpine habitats are anthropogenic in nature (like many grazed open fields), but these are long-established habitats with a complex structure and plant composition, a crucial factor for most wildlife. On the other hand, European Alps include locations where most winter tourist activities aggregate from across the continent, and this brings up the need to understand their impact on wildlife.

I present here two study cases on the direct and indirect effects of ski resorts on birds in Italian Alps. The first one is a study carried out at the community level, and deals with the effects of ski resorts on forest breeding bird diversity. The second one deals with the effects of human presence at high altitude ski resorts on the winter movements, home ranges and time budget of a typical alpine species, the Alpine Chough *Pyrrhocorax graculus*. Data presented here were already published in previous papers (Rolando *et al*. 2003, Laiolo & Rolando 2005). This paper summarizes the results of these previously two studies.

2. Methods

2.1. Skiruns and breeding birds of montane forests

This study was carried out in the alpine valleys hosting the XX Olympic Winter Games of Torino (western Italian Alps, Piemonte Region) in April-June 2006. We sampled the avifauna breeding in mixed and coniferous forests by means of point counts. In 252 point counts we recorded the presence and abundance of all the bird species seen or listened in a radius of 50 meters. Each plot was located at a minimum distance of 200 m from the next nearest sampling plots. Counts lasted 7 minutes and were carried out only once, between sunrise and 5 hours later. The study was designed to survey the bird communities of forest interior and those at the edges between the forest and two anthropogenic elements of fragmentation, pastures and skiruns (Fig. 1). In forest interior plots (n = 112 plots), the centre of plots was located at more than 200 m from edges, in the other cases the centre of plots was located 50 m from skiruns and pastures, so that the external perimeter of plots embraced forest edge on one side (n = 68 plots at skirun edge, n = 72 plots at pasture edge).

In the analyses, the bird community was divided into three ecological groups: woodland species (birds typical of forest and open forest habitats), ecotone-shrub species (species that use grassland and woodland alternatively or dwell in shrubby areas) and grassland species (birds that require open fields both for breeding and foraging) (Appendix 1). We tested for differences in mean bird species richness, diversity (Shannon index) and the pooled abundance of woodland, ecotone-shrub and grassland species among the three plot types (forest-interior, skirun-edge and pasture-edge) by means of nested ANOVAs (plots nested into ten study localities).

2.2. Skiruns and Alpine Chough spatial ecology

The ranging behaviour of the Alpine Chough, a high-altitude corvid distributed throughout the Palearctic, was studied. The species nests in holes and crevices of mountain cliffs and feeds in grasslands above the timberline in spring and summer (Rolando & Laiolo 1997, Laiolo & Rolando 2001). The Alpine Chough is a social species, occurring in flocks of variable size according to the season, and gathering into large communal roosts

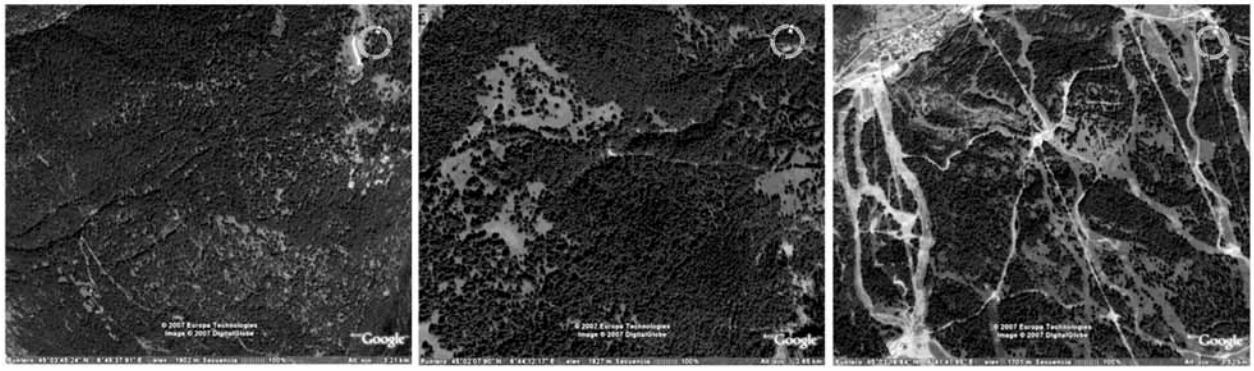

Figure 1.
Aerial photographs showing examples of the study areas. Pictures represent a continuous forest (left), a forest fragmented by pastures (centre) and a forest fragmented by skiruns (right). Pictures were downloaded from Google Earth (http://earth.google.es/).

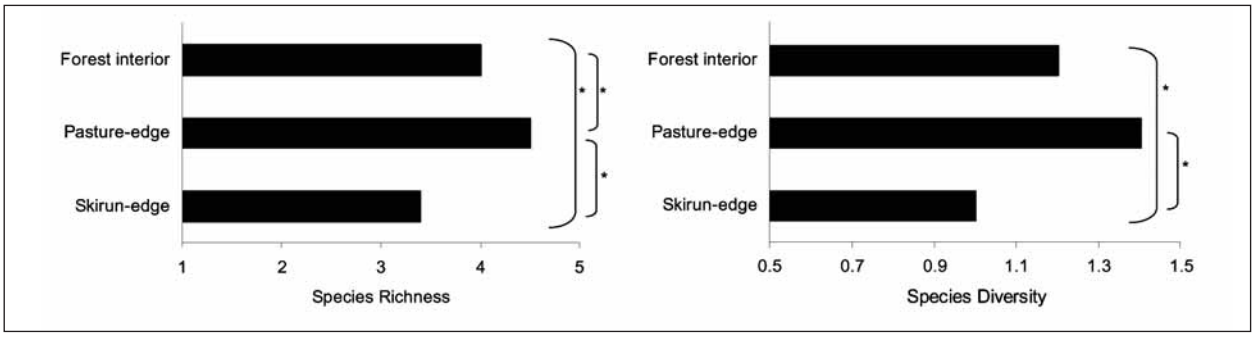

Figure 2.
Mean bird species richness and diversity in plots located in forest interior, at the edges of pastures and at the edges of skiruns in the Alps. LSD post-hoc tests were used for pair-wise comparisons of means, and significant differences are highlighted with asterisks (: P < 0.05).*

during winter nights. The species was studied in two areas of western Italian Alps (Aosta Valley region) located 60 km far from each other. One area is represented by a highly visited high altitude ski resort located near Mount Cervino (Cervinia village, at 2,000 m a.s.l.), the other one occurs in a protected area (Gran Paradiso National Park). Cervinia hosts ca 2,000 resident inhabitants and 10,000 visitants in the ski season. The natural park area is mainly visited by tourists in summer, when it can host up to 60,000 visitors.

Bird movements were studied by means of radio-tracking techniques. Birds were baited with bread and sultana raisins and then captured with nylon nooses tied to a grid. Transmitters were glued on the central feathers of bird tail. Birds were also marked by bleaching some feathers, to allow individual recognition at distance. Overall, 17 birds were tracked in the ski resort area, and another 17 in the natural park area. The study was carried out in November 1997—March 1998 and November 1998—March 1999 in the ski resort area, and in October 1996—May 1997 and November 1997—May 1998 in the natural park area. Bird position was recorded at 30 minutes time intervals. Each marked bird was tracked on average 42 days (range 17—88) in the natural park and 37 days (23—45) in the ski resort area. Ranges V software (Kenward & Hodder 1996) was used to calculate range size by means of the Kernel analysis (including 95% of the fixes). Time budgets were calculated as the relative frequencies of fixes while foraging, resting or flying. More detailed information about the study areas, methods and statistics can be found in Rolando *et al*. (2003) and Laiolo and Rolando (2005).

3. Results

3.1. Skiruns and breeding birds of montane forests

Breeding bird species richness ($F_{2, 225} = 7.6$, $P < 0.001$) and diversity ($F_{2, 225} = 7.7$, $P < 0.001$) differed between habitats (Fig. 2). The greatest bird species richness and diversity were found in plots located at the edge of pastures; plots set at the edge of skiruns hosted the lowest bird species richness and diversity.

Woodland species preferred forest interior and pasture-edge plots, and were less abundant at the margin of skiruns ($F_{2, 225} = 5.1$, $P < 0.01$; Fig 3). Conversely, ecotone species were associated to pasture-edges ($F_{2, 225} = 5.3$, $P < 0.05$; Fig. 3). Grassland birds appeared to avoid forest interior plots and be more abundant at the edges of forests, although differences among plot types were not significant ($F_{2, 225} = 2.2$, n.s.; Fig. 3).

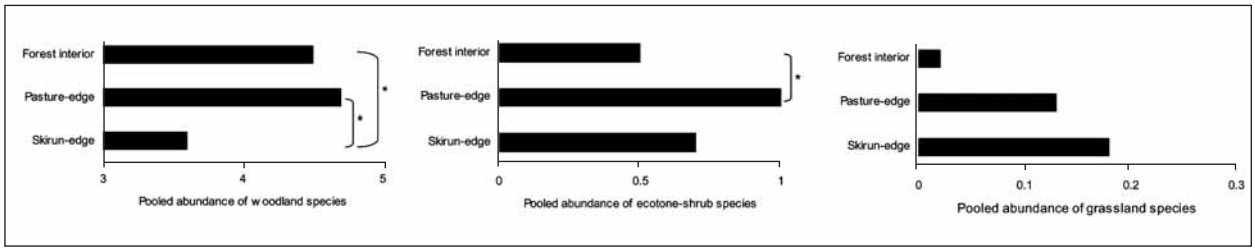

Figure 3.
Mean pooled abundance of woodland, ecotone and grassland bird species in plots located in forest interior, at the edges of pastures and at the edges of skiruns in the Alps. LSD post-hoc tests were used for pair-wise comparisons of means, and significant differences are highlighted with asterisks (: P < 0.05).*

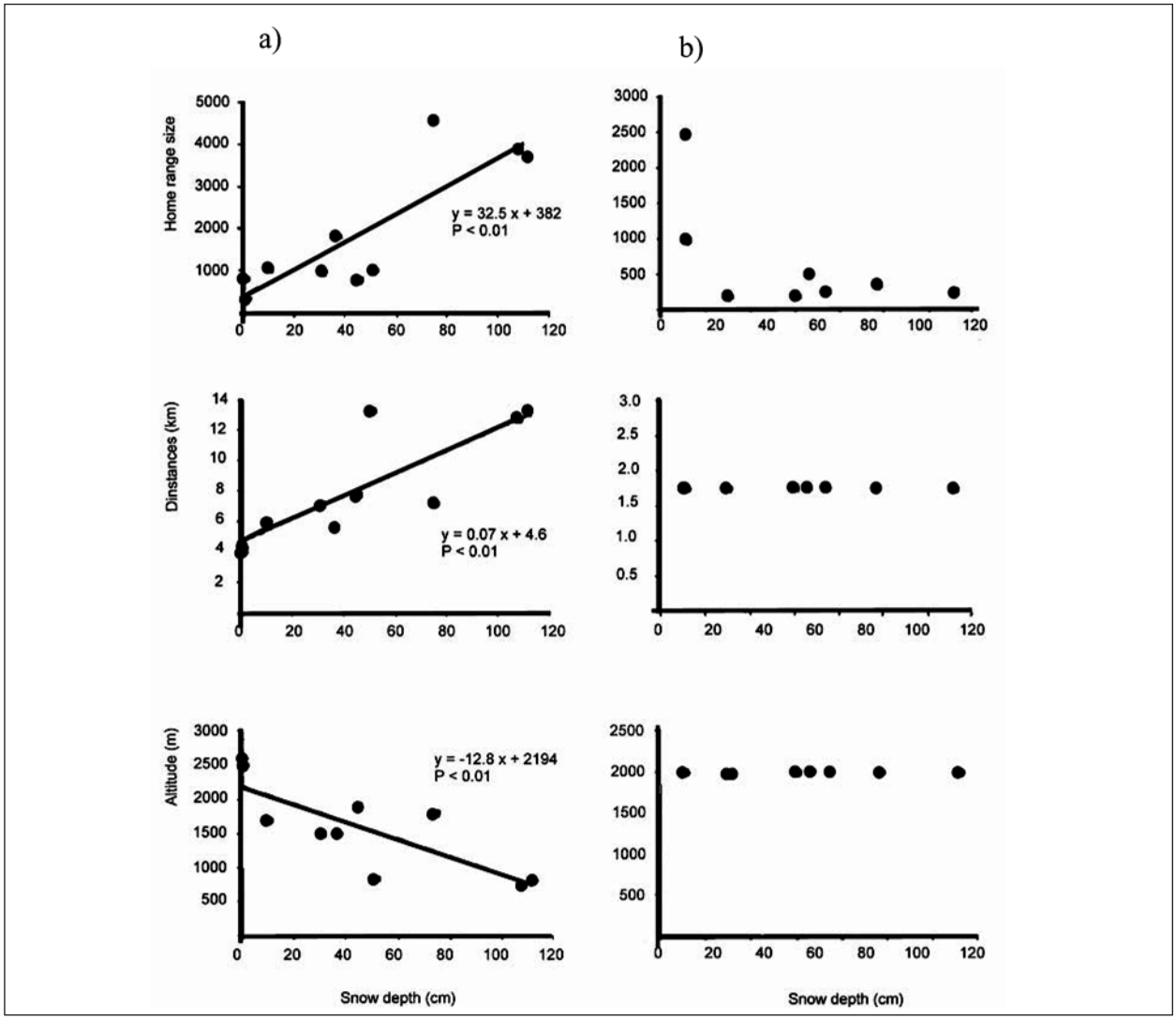

Figure 4.
Relationships between Alpine Chough home range size, movement length, altitude and snow depth in the Alps in winter. Data from a natural park area (a) and a ski resort area (b) are shown. Modified from Rolando et al. (2003).

3.2. Skiruns and Alpine Chough spatial ecology

Wintering Alpine Choughs used to roost communally at almost 4,000 m a.s.l. in both study areas. In the natural park area birds tended to feed in shrubberies and pastures around the timberline before snowfalls (on average 61% of fixes in this period), while moved to lower altitude feeding grounds (apple orchards at approximately 1,000 m a.s.l.) after snowfalls. In the latter habitat, birds spent on average 68% of their daytime in January and February. In the ski resort area, Alpine Choughs occurred in pastures and shrubberies at the treeline before snowfalls (63.3% of fixes in this period), but moved up to the high altitude ski resorts around Cervinia village (2,000-2,500 m a.s.l.) when snow cover was deep and the tourists started visiting the area (68% of fixes). Here birds fed on scraps provided by humans and became typical urban dwellers, although they always got back to the undisturbed roosting cliffs at night.

Snow cover significantly affected bird movements and home ranges (as highlighted by Kernel analysis), but the two populations responded differently to winter conditions. In the natural park area, the deeper the snow cover, the larger the bird home ranges, the longer the bird movements, and the lower the altitudes of home ranges (Fig. 4a). In the ski resort area, no relationship was found between individual movements and snow cover, although there was a tendency towards larger home ranges when no snow covered the ground (Fig. 4b).

When dealing with bird activities, individuals from the natural park area spent more time foraging when snow cover was deeper, whereas the opposite occurred in the ski resort population (Fig. 5).

Again, differences were found when considering the time of foraging, concentrated in the first day hours in the natural park area, and later in the tourist zone, matching the arrival time of skiers and the start of picnics (Fig. 6).

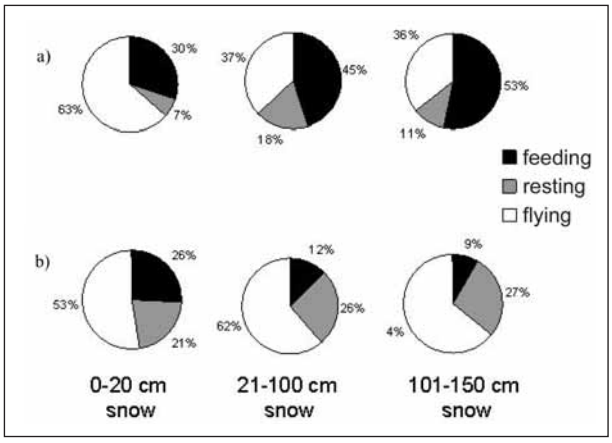

Figure 5.
Relative percentage of observations of Alpine Choughs while feeding, resting and flying in relation to different snow depths in the Alps during winter. Data from a natural park area (a) and a ski resort area (b) are shown. Modified from Rolando et al. (2003).

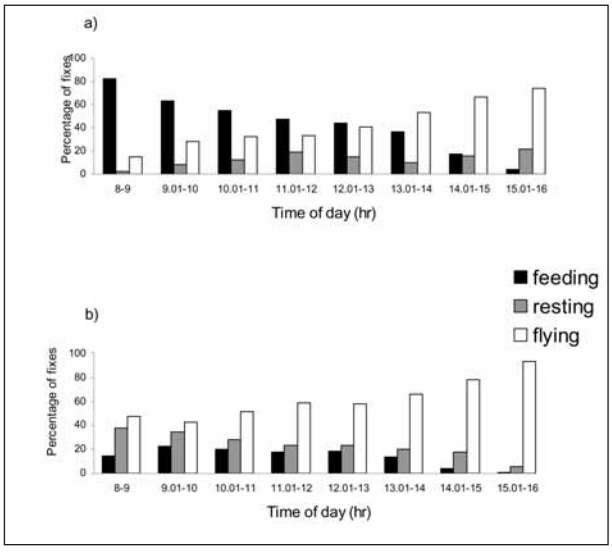

Figure 6.
Daily partitioning of activities in the Alpine Chough during winter. Data from a natural park area (a) and a ski resort area (b) are shown. Modified from Rolando et al. (2003).

4. Discussion

4.1. Skiruns and breeding birds of montane forests

Bird species richness and diversity of forests perforated by skiruns were significantly lower than those of undisturbed forests. I hypothesise that these findings may be explained by considering both habitat structure and resource availability. Skiruns create high contrast edges and bisect patches, and the forest ends abruptly. Conversely, pasture-edges are older than skirun edges, and both the structure and the plant composition are generally thought to be more complex along natural, old-established edges where there has been a constancy of light penetration (Fuller 1995, Huhta *et al*. 1998). The highest heterogeneity of pasture edges might have contributed to the positive edge effect, while the homogeneous structure of skirun edges resulted poorly attractive to the bird community in general.

Skiruns have high proportion of bare ground, due to soil erosion, compaction and use of chemicals in artificial snow, and this can negatively condition the availability of food resources for birds. Conversely, at pasture-edges the shrub layer is denser, and shrubs may flower more regularly than in the heavily shaded forest interior, thus the density of pollinator prey may peak. Grazed patches may also be richer in invertebrates depending upon the availability of organic matter (dung) (McCracken *et al*. 1995). Jokimäki *et al*. (1998) found out that arthropods abundance decreased from the edge to forest interior, although no difference was found with respect to the edge type when comparing clear cut with tree-less mire.

Typical ecotone bird species preferentially dwell in plots at the edges of pastures, whereas woodland birds are more abundant in forest interior or at the edge of pastures. The latter finding probably depends on the relative paucity of true forest specialists. Forest generalists make up a major share of woodland birds in the study area (see Appendix 1) and may equally occur at the forest interior or at the edge of pastures. In general, forest plots at skirun edges are avoided by both typical forest birds and by ecotone birds, which constitute the bulk of the species sampled.

4.2. Skiruns and Alpine Chough spatial ecology

Alpine Choughs from the natural park area and those from the ski resort area behaved in opposite ways with respect to snow cover and winter conditions. Birds from the first area roamed a lot at valley bottoms and showed large home ranges. Alpine Choughs from ski resort area moved long distances only prior to heavy snowfalls. In deep snow conditions these birds reduced their movements and became urban dwellers.

Birds from the natural area took advantage of the traditional Alpine farming systems of low and middle altitudes (in particular, of extensive apple cultivations). When this farming system disappeared, as in the ski resort site, wintering Alpine Choughs developed a closer association with humans, which guaranteed a permanent food supply, although of low quality (Rolando *et al.* 2003).

It is worth noting that the association with humans tended to be limited to daylight hours and winter times. Birds kept roosting, nesting and foraging during breeding in natural areas, either if they belonged to the natural park or to the ski resort populations. The high altitude breeding ranges rarely included human settlements, and this may prevent the Alpine Chough to cause harmful attacks to humans to defend nest sites, as it has been occasionally reported in avian species breeding in urban or suburban habitats (Jones & Thomas 1999).

5. Conclusions

Skiruns, by causing habitat fragmentation and degradation, can disturb the forest bird community through a negative edge effect. In this case, biodiversity conservation could be achieved by restoring the gradual transition from forest to open habitat created by skiruns, through the management of edge vegetation and side canopies.

Negative effects of winter sport activities or structures were documented by other studies. Rolando *et al*. (2007) found out that the diversity of breeding birds of alpine grassland can decrease in skirun areas above the treeline.

Watson and Moss (2004) found that ski resorts can determine an increase of predation by the Carrion Crow (*Corvus corone corone*) on some vulnerable species (such as the Ptarmigan *Lagopus mutus*). Arlettaz *et al*. (2007) showed that the presence of skiers in Swiss Alps can severely stress Black Grouse individuals (*Tetrao tetrix*).

In the case of a species with an opportunistic and flexible behaviour such as the Alpine Chough, ski resorts can indirectly provide new and alternative food supplies, at the cost of the disruption of bird habits and changes in diet and foraging behaviour. Artificial feeding can affect individual winter survival, and this may ultimately condition recruitment rate and age classes partitioning, with effects on Alpine Chough social behaviour (Delestrade 1999).

References

Andrén, H. 1994: Effects of habitat fragmentation on birds and mammals in landscapes with different proportions of suitable habitat: a review. -Oikos 71: 355-366.

Arlettaz, R., Patthey, P., Baltic, M., Leu, T., Schaub, M., Palme, R., & Jenni-Eiermann, S. 2007: Spreading free-riding snow sports represent a novel serious threat for wildlife. -Proceedings of the Royal Society B-Biological Sciences 27: 1219-1224.

Delestrade, A. 1999: Foraging strategy in a social bird, the alpine chough: effect of variation in quantity and distribution of food. -Animal Behaviour 57: 299-305.

Driscoll, D. A. 2004: Extinction and outbreaks accompany fragmentation of a reptile community. -Ecological Applications 14: 220-240.

Fuller, R. J. 1995: Bird life of woodland and forest. -Cambridge University Press, Cambridge.

Huhta, E., Jokimäki, J. & Helle, P. 1998: Predation on artificial nests in a forest dominated landscape – the effects of nest type, patch size and edge structure. –Ecography 21: 464-471.

Jokimäki, J., Huhta E., Itämies, J. & Rahko, P. 1998: Distribution of arthropods in relation to forest patch size, edge and stand characteristics. – Canadian Journal of Forest Research 28: 1068-1072.

Jones, D. N. & Thomas, L. K. 1999: Attacks on humans by Australian magpies: management of an extreme suburban human-wildlife conflict. –Wildlife Society Bulletin 27: 473-478.

Kernward, R. E. & Hodder, K. H. 1996: Ranges V. An analysis system for biological location data. -Institute of Terrestrial Ecology, Wareham, UK.

Laiolo, P. & Rolando, A. 2001: A comparative analysis of the breeding biology of the Chough Pyrrhocorax pyrrhocorax and the Alpine Chough P. graculus coexisting in the Alps. -Ibis 143: 33-40.

Laiolo, P., Dondero, F., Ciliento, E., & Rolando, A. 2004: Consequences of pastoral abandonment for the structure and diversity of the alpine avifauna. -Journal of Applied Ecology 41: 294-304.

Laiolo, P. & Rolando, A. 2005: Forest bird diversity and skislopes: a case of negative edge effect. -Animal Conservation 7: 9-16.

McCracken, D. I., Foster, G. N. & Kelly, A. 1995: Factors affecting the size of leatherjacket (Diptera: Tipulidae) populations in pastures in the west of Scotland. -Applied Soil Ecology 2: 203-213.

Rolando, A. & Laiolo, P. 1997: A comparative analysis of the diets of the Chough Pyrrhocorax pyrrhocorax and the Alpine Chough Pyrrhocorax graculus co-existing in the Alps. -Ibis 139: 388-395.

Rolando, A., Laiolo, P. & Carisio, L. 2003: Urbanization and the flexibility of the foraging ecology of the Alpine Chough Pyrrhocorax graculus in winter. -Rev. Ecol. (Terre Vie) 58: 337-352.

Rolando, A., Caprio, E., Rinaldi, E. & Ellena, I. 2007: The impact of high-altitude ski-runs on alpine grassland bird communities. -Journal of Applied Ecology 44: 210-219.

Serrano, D., & Tella, J. L. 2003: Dispersal within a spatially structured population of lesser kestrels: the role of spatial isolation and conspecific attraction. -Journal of Animal Ecology 72: 400–410.

Siniscalco, C., Barni, E., Rosa, A. & Montacchini, F. 1997: Vegetation dynamics after seeding in Susa Valley ski runs (W-Italian Alps). -Revue Valdotaine d'Histoire Naturelle 48: 307-315.

Urbanska, K. M., Erdt, S. & Fattorini, M. 1998: Seed rain in natural grassland and adjacent ski run in the Swiss Alps: a preliminary report. -Restoration Ecology 6: 159-165.

Watson, A. & Moss, R. 2004: Impacts of ski-developments on ptarmigan (Lagopus mutus) at Cairn Gorm, Scotland. - Biological Conservation 116: 267-275.

Appendix 1.
List of the bird species recorded in the 252 plots. Species were classed as grassland, ecotone-shrub and woodland birds according to their ecological preferences.

Common name	Scientific name	Ecological group
Black Grouse	*Tetrao tetrix*	ecotone-shrub
Great Spotted Woodpecker	*Dendrocopos major*	woodland
Black Woodpecker	*Dryocopus martius*	woodland
Green Woodpecker	*Picus viridis*	woodland
Tree Pipit	*Anthus trivialis*	ecotone-shrub
White Wagtail	*Motacilla alba*	grassland
Wren	*Troglodytes troglodytes*	woodland
Dunnock	*Prunella modularis*	ecotone-shrub
Whinchat	*Saxicola rubetra*	grassland
Robin	*Erithacus rubecula*	woodland
Black Redstart	*Phoenicurus ochruros*	grassland
Redstart	*Phoenicurus phoenicurus*	woodland
Ring Ouzel	*Turdus torquatus*	ecotone-shrub
Blackbird	*Turdus merula*	woodland
Fieldfare	*Turdus pilaris*	ecotone-shrub
Mistle Thrush	*Turdus viscivorus*	ecotone-shrub
Lesser Whitethroat	*Sylvia curruca*	ecotone-shrub
Garden Warbler	*Sylvia borin*	ecotone-shrub
Blackcap	*Sylvia atricapilla*	woodland
Bonelli's Warbler	*Phylloscopus bonelli*	woodland
Chiffchaff	*Phylloscopus collybita*	woodland
Goldcrest	*Regulus regulus*	woodland
Firecrest	*Regulus ignicapillus*	woodland
Long-tailed Tit	*Aegithalos caudatus*	woodland
Coal Tit	*Parus ater*	woodland
Willow Tit	*Parus montanus*	woodland
Crested Tit	*Parus cristatus*	woodland
Blue Tit	*Parus caeruleus*	woodland
Great Tit	*Parus major*	woodland
Treecreeper	*Certhia familiaris*	woodland
Short-toed Treecreper	*Certhia brachydactyla*	woodland
Nuthatch	*Sitta europaea*	woodland
Jay	*Garrulus glandarius*	woodland
Nutcracker	*Nucifraga caryocatactes*	woodland
Carrion Crow	*Corvus corone corone*	ecotone-shrub
Chaffinch	*Fringilla coelebs*	woodland
Citril Finch	*Serinus citrinella*	woodland
Redpoll	*Carduelis flammea*	woodland
Bullfinch	*Pyrrhula pyrrhula*	woodland
Crossbill	*Loxia curvirostra*	woodland
Rock Bunting	*Emberiza cia*	grassland
Yellowhammer	*Emberiza citrinella*	grassland

The impacts of ski resorts on wildlife in northern Finland

Maarit Ukkola[1)], Pekka Helle[2)], Esa Huhta[1)], Jukka Jokimäki[3)], Marja-Liisa Kaisanlahti-Jokimäki[3)]*

[1)] Kolari Research Unit, Finnish Forest Research Institute, Muoniontie 21 A, FI-95900 Kolari, FINLAND
[2)] Oulu Game and Fisheries Research, Finnish Game and Fisheries Research Institute, Tutkijantie 2 E, FI-90570 Oulu, FINLAND
[3)] Arctic Centre, University of Lapland, P.O. Box 122, FI-96101 Rovaniemi, FINLAND
*Corresponding author: pekka.helle@rktl.fi

Abstract

The expansion of tourism to natural areas may have many kinds of effects on wildlife species. There is still a lack of adequate scientific knowledge about these impacts on fauna. We examined potential effects of ski resorts on four grouse and five mammalian species in northern Finland. We studied density data which included both late-summer and mid-winter line transect counts in 88 wildlife triangles (12 km each) within a radius of 40 kms around ten tourist destinations in northern Finland. Counts were conducted during 1989—2006 by volunteer hunters. Landscape structure data (CORINE Land Cover 2000) within the study area were analyzed in Geographic Information Systems (GIS). Variation in the abundances of wildlife species were assessed with general linear model. We found out that distance from a tourist destination to a transect count area was significant only for mountain hare and mustelids, in both cases, their density increased towards the ski resorts. The density of adult grouse, juvenile grouse, mountain hare and mustelids were positively correlated with the mixed forests. The density of adult grouse and juvenile grouse were positively correlated and the density of pine marten and mustelids were negatively correlated with the agricultural land. The density of studied species varied between ski resorts, the density of most species decreased to the north. Densities of species varied between years, and this highlights the importance of multi-year studies. According to our results, the distance from the ski resort does not have drastic negative effects on the studied wildlife species on this scale. The location of the ski resort and the general landscape structure around ski resort seems to affect more the density of wildlife species than the ski resort *per se*. Although our time period in this study was rather long, it is possible that the impacts of tourism might arise with a delay.

Keywords: disturbance, grouse, mammals, predator species, tourism, wildlife triangle

1. Introduction

There is a long tradition in tourism in Lapland, northern Finland, but the activity has expanded to a significant means of living for only a few decades; at the moment the leisure industry is one of the most important means of living in the North. The total number of registered overnight stays has increased steadily about 2.5% yearly in Lapland (Regional Council of Lapland 2003). Most of the important ski resorts are located near valuable nature areas, like national parks belonging in the Natura 2000 conservation network. The increased pressure caused by tourism could be seen also in these areas. The amount of visitors in national parks located in Lapland has almost tripled during 1992-2000 (Regional Council of Lapland 2003). The increasing numbers of visitors require more space, infrastructure and other facilities, and correspondingly less space is available to disturbance-sensitive wildlife species. Nowadays, in addition to wildlife, also tourists seek naturally attractive and silent places.

The growing popularity of outdoor activities among tourists increases the potential for conflicts between humans and nature. Recreation activities are spreading into new areas and the existing leisure facilities are extended. However, the scientific knowledge about the impacts of tourism on wildlife is still inadequate. The expansion of tourism (including outdoor sports and recreation as well as building infrastructure) to natural areas may have many kinds of effects on wildlife species. These impacts can be either direct, like animals killed in cable-collisions (e.g. Miquet 1986, Storch 1998) and wastes providing supplementary food for some animal species (e.g. Pickering *et al.* 2003), or indirect, like habitat fragmentation or habitat alteration due tourism infrastructure (e.g. Storch 2000). In addition, the expansion of tourism into pristine areas may disturb wildlife, increase the energetic costs of individuals and nest losses, change wildlife behaviour, and lead to the avoidance of otherwise suitable habitats (Burger & Gochfeld 1998, Miller *et al.* 1998, Miller & Hobbs 2000,

Taylor & Knight 2003, Gonzales *et al.* 2006).

Grouse (tetraonid birds), as a representative of wildlife species, are considered to be good indicator species for habitat and landscape quality (Lindén & Helle 1996). For example the Capercaillie (*Tetrao urogallus*) in Central Europe has been shown to act as an umbrella species for several endangered mountain birds, which are listed in the Bird Directive (Suter *et al.* 2002). Grouse species are often characterized by a comparatively limited habitat preference, which makes them sensitive to habitat changes (e.g. Rolstad & Wegge 1987, Sachot *et al.* 2003). They have large home range sizes and consequently large areas are essential for viable populations, and a focus on grouse secures that areas of sufficient sizes are taken into consideration for management concepts in nature protection. Indeed, most grouse species are highly sensitive to human disturbance which needs to be taken into account with regard to tourism projects (Zeitler 2000).

Several harmful effects caused by tourism on grouse species have been reported. For example in ski resort areas collisions with wire fences, overhead wires and ski wires have been reported to kill often grouse in Haute-Tarentaise, France (Miquet 1986) and at Cairn Corm, Scotland (Watson & Moss 2004). Disturbance caused by snow sport free-riders in the Alps showed increase in the concentration of faecal stress hormone in Black Grouse (*Terao tetrix*) (Arlettaz *et al.* 2007). Cross country ski trails have been reported to reduce available winter range for capercaillie (Ménoni & Magnani 1998). In Scotland, the use of trees by capercaillies was lower close to tracks (Summers *et al*. 2007). Brenot *et al.* (1996) found out in Midi Pyrénées that when capercaillie habitat overlaps with cross country skiing facilities, numbers of capercaillie wintering in the area declined nearly by half during seven years since the station was opened.

It has been shown that the presence of humans in Black Grouse winter habitat may result in a negative energy budget which causes deaths by starvation or make weakened birds an easy prey to predators (Ménoni & Magnani 1998). In addition disturbance at the traditional leks, which are often situated at sites such as ridges and hilltops and are also attractive for winter sports, can negatively affect the social system of the Black Grouse and thus their reproductive success (Ménoni & Magnani 1998). In downhill skiing areas, cleaning-up activities related to the ski centre´s closing for the summer, as well as an early start of the summer hiking season may cause disturbances for black grouse during incubation and brood rearing (Zeitler 2000).

Enlargement of tourist destinations and recreation activities to natural areas may alter landscape structure so that wildlife have less or degradated habitat to live. Tourism-related infrastructure (buildings, trails, roads, ski-lifts etc.) increases the area unsuitable for the wildlife, causes fragmentation and new infrastructure usually leads to an increase in human use of the area. Fragmentation can lead to habitat loss at the local level and to loss of a population´s connectivity and gene flow at the landscape level (Saunders *et al.* 1991).

In addition, there is some evidence that abundances of generalist avian nest predators are higher in urbanized area than in forests (Jokimäki & Huhta 2000). Anthropogenic wastes and feeding in urban landscapes may help to maintain high densities of corvids (Väisänen 1994). Corvid incidence was significantly related to tourism in the Bavarian Alps in Germany (Storch & Leidenberger 2003) and Cairn Gorm in Scotland (Watson & Moss 2004) at this may have major ramifications for prey species such as grouse.

Some mammal species may also be sensitive for tourism (Bolger *et al.* 1997, Hadley & Wilson 2004). Avoidance of tourist resorts by reindeer have been document both in Finland (Helle & Särkelä 1993) and Norway (Vistnes & Nellman 2001). Human caused disturbance have been reported to be harmful especially for large-sized carnivores (Matthiae & Stearns 1981). However, some predator species, like cats, may be extremely abundant in urbanized areas (Bolger *et al.* 1997). The vicinity of ski resort may attract foxes and increase the density of species because of the anthropogenic food that the resortoffer. Several studies have demonstrated that foxes use anthropogenic food (garbage) when living or regularly visiting human settlement (Vainio *et al.* 1997, Pickering *et al.* 2003, Contesse *et al.* 2004). Also many small-sized mammal species are able to use anthropogenic food resources (Odell & Knight 2001, McKinney 2002).

The aim of this study was to evaluate the possible impacts of ski resorts on densities of grouse, small game predator species and mountain hare (*Lepus timidus*) in northern Finland. We hypothesized that the abundances of species (especially grouse) would increase with the

increasing distance from ski resorts because of the decreasing human disturbance. The opposite hypothesis is that ski resorts - by increasing productivity of habitats and providing waste - may increase densities of species benefiting directly or indirectly from human activity.

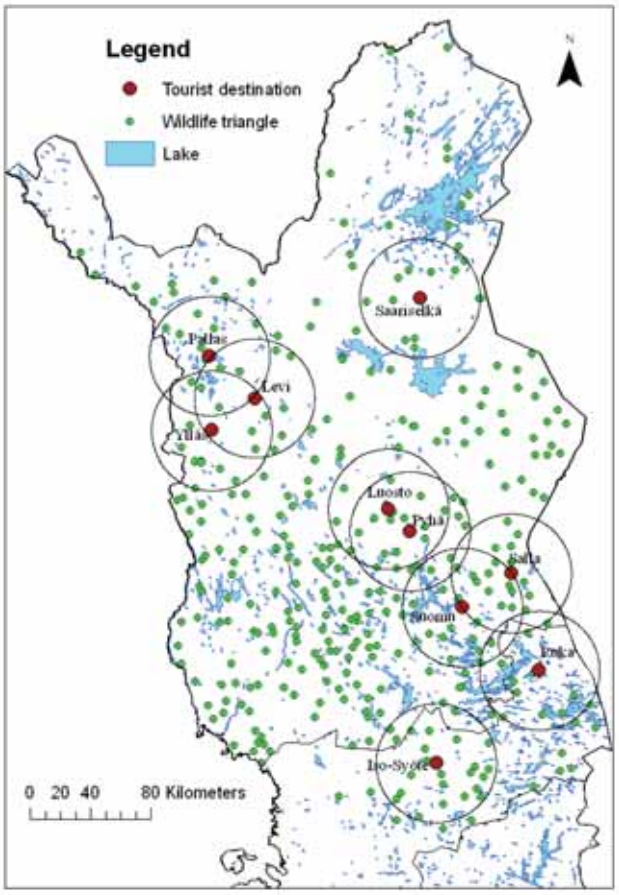

Figure 1. Study sites (ski resorts) in northern Finland. All established wildlife triangles in northern Finland are indicated by green circles.

2. Material and methods

2.1. Study area

The study area (ca. 36,500 km^2) is mainly located within the northern boreal zone and only the most southern parts of the study area are located within the midboreal zone (Ahti *et al.* 1968). Coniferous forests and open mires are characteristic features of the landscape. The average length of the growing season (days with an average temperature of +5ºC or higher) is approximately 100-120 days in the northern parts of the study area. Snow covers the ground 6—7 months of a year.

The study was conducted around ten tourist destinations: Iso-Syöte, Levi, Luosto, Pallastunturi, Pyhätunturi, Ruka, Saariselkä, Sallatunturi, Suomu and Ylläs (Fig. 1). Population density is on average ca. 1.9 inhabitants/km^2 in Lapland and ca. 20 inhabitants/km^2 in the tourist destinations. All of these tourist destinations are downhill skiing centres and the height of these destinations varies from about 400 meters to over 700 meters a.s.l.

Since these tourist destinations are ski centres, their main tourist season is winter. However, nature based tourism is increasing and other seasons are also becoming more popular. The number of registered overnight stays in Lapland was about 2 millions in the year 2005 (Regional Council of Lapland 2007). The numbers of registered overnight stays in the destinations and other basic features are presented in Table 1. In addition to downhill skiing there are many kinds of activities available for tourists: cross-country skiing, snowshoe walking, ice climbing, dog-sled and reindeer safaris, snowmobile driving etc. In the snow-free time leisure activities are also several: hiking, berry picking, paddling, fishing, mountain biking, bird watching, rock-climbing, hunting and buggy driving. All these activities may cause human disturbance to wildlife.

Table 1.
Some basic features of the ski resorts studied. The numbers of registered overnights are from the year 2000. The figures for Pallas and Suomu were unavailable. The numbers of beds, area of the destination, length of ski tracks and snowmobile routes are from the beginning of the 21st century.

Ski resort	Registered overnight stays	Beds	Length of ski tracks (km)	Length of snowmobile routes (km)
Pallas	-	130	160	150
Levi	271,640 (Kittilä)	16,000	230	750
Ylläs	267,339 (Kolari)	16,000	320	300
Saariselkä	276,524	11,000	240	1,000
Luosto	122,090 Pyhä-Luosto (together)	3,500	95	250
Pyhätunturi		3,500	70	250
Sallatunturi	66,971	2,500	110	160
Suomu	-	1,500	40	150
Ruka	332,227 (Kuusamo)	16,000	216	500
Iso-Syöte	51,025 (Pudasjärvi)	5,000	120	197

2.2. Wildlife triangle data

The wildlife triangle is the basic unit when assessing wildlife populations in Finland. This monitoring program is organized by the Finnish Game and Fisheries Research Institute and Hunters' Central Organization and run by volunteer hunters. The triangle is an equilateral triangle-shaped line with four kilometers compass-straight sides, thus having a twelve kilometers length. Triangles are permanent and randomly located in forested areas. There are about 1600 triangles founded in Finland and they are studied twice a year: in the late-summer and in the mid-winter. The main goal of summer censuses is to count grouse with a three men census team from a 60 m wide belt. During the winter count all the snow tracks of mammals are recorded. Winter counting is possible to do by one person and the actual count is recommended to be carried out one day after a precheck or a good snowfall. The unit for grouse densities is individuals/km^2 on forest land and for densities of mammal species crossings/24 h/10 km (Lindén *et al.* 1996).

For the study we used the data from 88 wildlife triangles in the surroundings of the tourist destinations within radius of 40 kilometers. All these triangles were counted at least ten times during the study period (1989-2006). The distance from the center point of each triangle to the nearest ski resort was measured. If there were more than one tourist destination within the radius of 40 kms from a wildlife triangle, only the nearest tourist destination and distance was included. As a center point of the ski resort, we used the biggest hotel or the nearest hotel to the main ski lift.

From summer censuses we obtained the density data for Capercaillie, Black Grouse, Hazel grouse (*Bonasa bonasia*) and Willow Grouse (*Lagopus lagopus*). From winter counts the track density data of important small game predators of coniferous taiga, red fox (*Vulpes vulpes*), stoat (*Mustela erminea*), least weasel (*Mustela nivalis*) and pine marten (*Martes Martes*) were obtained. Also the data of mountain hare, an important prey species for many predators, was assessed by using winter survey data. The analyses were run separately for adult and juvenile grouse, because the possible effects of ski resorts may be different for adult survival and breeding success. The densities of different grouse species were pooled to find out the general effects of the ski resorts on wildlife rather than their effects on individual grouse species. There where no remarkable differences between the grouse species in their response to the distance between ski resort and the wildlife survey triangle. The data of stoat and least weasel were pooled for further analyses because the snow tracks of these species are difficult to separate.

2.3. Landscape data and analyses

Landscape analyses were carried out with ArcMap (ArcGis 9.2) from the CORINE2000 Land Cover (CLC2000). CORINE2000 classification of Finland is based on automated interpretation of satellite images and data integration with existing digital map data.

We formed circular landscapes around each wildlife triangle center point a using radius of 2,500 meters (about 19.63 km^2 in area), and calculated the proportions of different habitat classes. The distance of the corners of the triangle from the center point is about 2.3 km, and a circle with a 2.5-km radius reasonably covers the triangle

area (see Helle & Nikula 1996).

To achieve more meaningful variables for analyses we combined some habitat classes. Discontinuous urban fabric was combined with sport and leisure facilities to represent artificial areas. Non-irrigated arable land and land principally occupied by agriculture, with significant areas of natural vegetation were combined to agricultural areas. Shrubs/open areas were derived from classes of moors and heathland, transitional woodland/shrub (including clear cutting areas and sapling stands) and bare rock. Water courses and water bodies were combined to water areas. Broad-leaved forest, coniferous forest, mixed forest and peatbogs were used as separate classes.

2.4. Statistical methods

Principal component analysis (PCA; McGarigal *et al.* 2000) was chosen to minimize the effects of multicollinearity and to reveal patterns in the data for habitat structure. PCA is an unconstrained ordination technique: it does not attempt to define the relationship between a set of independent variables and one or more dependent variables, but leaves this to subsequent analyses (McGarigal *et al.* 2000). Only components with an eigenvalue greater than 1.0 where accepted for the further analyses.

We used general linear model (GLM) to assess factors affecting the densities of studied species. In the model the independent variables were tourist destination (as a fixed factor), year (as a random factor), distance from the triangle to the nearest ski centre and the two first habitat components derived from PCA (as covariates). The interaction term between tourist destination and distance was also included. Since the distance did not make major difference, the interaction term was not included in the final model.

The effects of latitude and longitude were tested by the stepwise linear regression analysis. Relationships between densities of prey species and the predator species were analyzed with general linear model. Only those triangles which were counted both in the summer and in the winter where used in these analyses. The model for densities of prey species consisted of habitat components (PC1 and PC2), year and the abundance of red fox. Red fox was chosen to the model because the densities of predator species correlated with each other, and red fox is a crucial factor in limiting the numbers of hares and grouse (see Lindström *et al.* 1994). All statistical analyses were conducted with SPSS 9.05 for Windows.

3. Results

Coniferous and mixed forests and shrubs/open areas were generally the most dominating habitat classes around the wildlife triangles around the ski resorts (Table 2).

Table 2. Mean proportions (± sd) of the habitat classes in the wildlife triangles around the ski resorts.

Habitat	Pallas	Levi	Ylläs	Saariselkä	Luosto	Pyhätunturi
Artificial areas	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.003 ± 0.008
Agricultural areas	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.0 ± 0.0	0.011 ± 0.020
Broad-leaved forest	0.064 ± 0.083	0.075 ± 0.069	0.050 ± 0.065	0.014 ± 0.022	0.023 ± 0.024	0.032 ± 0.051
Coniferous forest	0.224 ± 0.147	0.296 ± 0.140	0.250 ± 0.188	0.540 ± 0.249	0.258 ± 0.168	0.208 ± 0.136
Mixed forest	0.368 ± 0.153	0.265 ± 0.125	0.467 ± 0.158	0.251 ± 0.216	0.335 ± 0.186	0.459 ± 0.196
Shrubs/open areas	0.148 ± 0.203	0.241 ± 0.200	0.211 ± 0.082	0.146 ± 0.187	0.281 ± 0.112	0.188 ± 0.118
Peatbogs	0.180 ± 0.095	0.117 ± 0.091	0.022 ± 0.015	0.036 ± 0.032	0.066 ± 0.032	0.077 ± 0.055
Water areas	0.018 ± 0.016	0.006 ± 0.129	0.001 ± 0.003	0.014 ± 0.011	0.025 ± 0.026	0.021 ± 0.033

Habitat	Sallatunturi	Suomu	Ruka	Iso-Syöte
Artificial areas	0.0 ± 0.0	0.000 ± 0.002	0.0 ± 0.0	0.0 ± 0.0
Agricultural areas	0.009 ± 0.021	0.006 ± 0.011	0.043 ± 0.039	0.005 ± 0.008
Broad-leaved forest	0.031 ± 0.055	0.014 ± 0.040	0.0 ± 0.0	0.003 ± 0.008
Coniferous forest	0.252 ± 0.163	0.464 ± 0.206	0.438 ± 0.163	0.363 ± 0.183
Mixed forest	0.406 ± 0.179	0.247 ± 0.205	0.191 ± 0.194	0.260 ± 0.154
Shrubs/open areas	0.191 ± 0.079	0.192 ± 0.113	0.146 ± 0.098	0.260 ± 0.117
Peatbogs	0.103 ± 0.108	0.041 ± 0.046	0.052 ± 0.077	0.097 ± 0.116
Water areas	0.009 ± 0.011	0.036 ± 0.034	0.130 ± 0.142	0.013 ± 0.014

Table 3.
Variables derived by principal component analysis describing landscape composition within the wildlife triangle areas. The component loadings of the original variables as well as eigenvalues and proportion of variance are also shown. The highest component loadings are in bold type.

Variable	PC1	PC2
Artificial areas	0.222	0.596
Agricultural areas	-0.257	**0.832**
Broad-leaved forest	0.610	0.019
Coniferous forest	-0.841	-0.111
Mixed forest	**0.837**	0.285
Shrubs/open areas	-0.013	-0.402
Peatbogs	0.012	-0.377
Water	-0.416	0.631
Eigenvalues	2.069	1.844
Percentage variation explained	25.9	23.0

In the principal component analysis four components had eigenvalues greater than 1.0 and they accounted for 77.3% of the total variation in the landscape structure. However, the two first components explained most of the variation. The first component accounted for 25.9% of the total variation and it correlated positively with the amount of mixed and broad-leaved forests (Table 3). The second component accounted for 23.0% of the total variation and it correlated positively with agricultural, artificial and water areas (Table 3). We used these two main components in our further analyses and we named them as *Mixed forests* and *Agricultural land*.

In general, densities of wildlife species varied between ski resorts (Table 4). The density of most species was dependent on latitude. The density of red fox ($F_{1,1032} = 13.01$, $t = -3.61$, $P < 0.001$), adult grouse ($F_{1,1178} = 103.82$, $t = -10.19$, $P < 0.001$) and mountain hare ($F_{1,1032} = 55.18$, $t = -7.43$, $P < 0.001$) decreased to the north. The density of adult grouse ($F_{2,1178} = 56.26$, $t = 2.84$, $P < 0.01$) and mountain hare ($F_{2,1032} = 29.74$, $t = 2.03$, $P < 0.05$) increased to the west, whereas the density of pine marten increased to the east ($F_{1,1032} = 16.13$, $t = -4.02$, $P < 0.001$).

According to the results of the general linear modeling (Table 5), the density of mountain hare and mustelids increased towards the ski resorts. The density of adult grouse, juvenile grouse, mountain hare and mustelids were positively correlated with the *mixed forest* component (Table 5). The density of adult grouses and juvenile grouses were positively correlated and the density of pine marten and mustelids were negatively correlated with the *agricultural land* component (Table 5).

Table 4.
Mean (± sd) abundances of species around the ski resorts. The ski resorts are ranged from north to south. N = no. of triangle counts.

Ski resort	N	Mean					
		Red fox	Mustelids	Mountain hare	Pine marten	Adult grouse	Juvenile grouse
Pallas	57	2.3 ± 2.6	1.5 ± 2.5	5.8 ± 7.4	1.0 ± 1.3	2.7 ± 2.4	4.0 ± 6.5
Levi	37	3.9 ± 2.8	2.1 ± 4.0	5.2 ± 4.7	0.7 ± 1.1	3.4 ± 3.7	3.2 ± 4.8
Ylläs	83	3.1 ± 2.4	1.9 ± 3.0	8.7 ± 9.7	0.6 ± 1.4	4.7 ± 5.2	3.8 ± 5.0
Saariselkä	67	1.9 ± 1.6	1.1 ± 1.6	2.1 ± 2.9	0.3 ± 0.5	3.2 ± 3.2	3.3 ± 5.2
Luosto	57	2.5 ± 2.2	0.9 ± 1.5	8.3 ± 9.6	0.3 ± 0.6	4.3 ± 3.8	5.9 ± 9.0
Pyhätunturi	183	3.8 ± 3.3	2.5 ± 6.4	12.9 ± 13.5	0.5 ± 1.0	7.4 ± 6.0	8.8 ± 11.3
Sallatunturi	194	3.7 ± 6.1	2.0 ± 2.7	13.9 ± 15.6	0.3 ± 0.8	6.9 ± 7.2	7.2 ± 8.2
Suomu	169	3.7 ± 4.7	2.0 ± 4.0	12.7 ± 15.1	0.4 ± 0.8	6.4 ± 5.3	7.1 ± 8.9
Ruka	44	3.2 ± 2.8	2.2 ± 3.0	10.5 ± 8.5	0.5 ± 1.1	9.3 ± 6.8	12.0 ± 14.6
Iso-Syöte	142	4.0 ± 3.3	1.6 ± 2.8	15.1 ± 16.7	0.6 ± 0.8	8.8 ± 6.3	8.7 ± 8.9

Table 5.
Results of the general linear model for the animal densities under study.

a) Adult grouse

Source	B	Std. Error	df	F	T	p
Intercept	10.781	0.870	1, 52.458	73.886	12.391	< 0.001
Year			17, 1149	10.110		< 0.001
PC1	0.982	0.189	1, 1149	27.018	5.198	< 0.001
PC2	0.966	0.180	1, 1149	28.889	5.375	< 0.001
Distance	0.010	0.017	1, 1149	0.374	0.612	ns
Destination			9, 1149	17.466		< 0.001

b) Juvenile grouse

Source	B	Std. Error	df	F	t	p
Intercept	13.858	1.452	1, 112.712	64.200	9.542	< 0.001
Year			17, 1149	4.756		< 0.001
PC1	1.044	0.315	1, 1149	10.969	3.312	< 0.01
PC2	0.877	0.300	1, 1149	8.547	2.923	< 0.01
Distance	-0.028	0.028	1, 1149	1.012	-1.006	ns
Destination			9, 1149	7.205		< 0.001

c) Mountain hare

Source	B	Std. Error	df	F	t	p
Intercept	17.856	2.200	1, 78.750	75.534	8.116	< 0.001
Year			17, 1003	6.288		< 0.001
PC1	2.966	0.540	1, 1003	30.165	5.492	< 0.001
PC2	0.285	0.529	1, 1003	0.289	0.538	ns
Distance	-0.118	0.046	1, 1003	6.568	-2.563	< 0.05
Destination			9, 1003	10.400		< 0.001

d) Red fox

Source	B	Std. Error	df	F	t	p
Intercept	3.519	0.704	1, 315.504	76.120	4.997	< 0.001
Year			17, 1003	1.944		< 0.05
PC1	0.016	0.173	1, 1003	0.009	0.095	ns
PC2	0.087	0.169	1, 1003	0.263	0.513	ns
Distance	-0.002	0.015	1, 1003	0.017	-0.130	ns
Destination			9, 1003	2.708		< 0.01

e) Pine marten

Source	B	Std. Error	df	F	t	p
Intercept	0.700	0.164	1, 394.284	37.506	4.265	< 0.001
Year			17, 1003	1.603		ns
PC1	0.011	0.040	1, 1003	0.072	0.268	ns
PC2	-0.165	0.039	1, 1003	17.532	-4.187	< 0.001
Distance	-0.001	0.003	1, 1003	0.050	-0.223	ns
Destination			9, 1003	3.811		< 0.001

f) Mustelids

Source	B	Std. Error	df	F	t	p
Intercept	1.283	0.628	1, 50.848	40.816	2.042	< 0.001
Year			17, 1003	10.040		< 0.001
PC1	0.435	0.154	1, 1003	7.974	2.824	< 0.01
PC2	-0.464	0.151	1, 1003	9.421	-3.069	< 0.01
Distance	-0.044	0.013	1, 1003	11.105	-3.332	< 0.01
Destination			9, 1003	2.341		< 0.05

The density of adult and juvenile grouse, mountain hare, redfox and mustelids varied between study years (Table 5). The variation of the abundance of the mountain hare was significantly explained also by the density of red fox (Table 6).

Table 6.
Results of the general linear model for densities of predator and prey species.

a) Mountain hare

Source	B	Std. Error	df	F	T	p
Intercept	7.004	1.928	1, 25.326	46.650	3.632	< 0.001
Year			17, 843	5.171		< 0.001
PC1	2.285	0.473	1, 843	23.291	4.826	< 0.001
PC2	0.797	0.473	1, 843	2.834	1.683	ns
Red fox	1.306	1.129	1, 843	103.075	10.153	< 0.001

b) Adult grouse

Source	B	Std. Error	df	F	T	p
Intercept	8.030	0.849	1, 22.244	114.409	9.459	< 0.001
Year			17, 843	7.935		< 0.001
PC1	0.375	0.208	1, 843	3.233	1.798	ns
PC2	1.653	0.208	1, 843	62.978	7.936	< 0.001
Red fox	0.079	0.057	1, 843	1.934	1.391	ns

c) Juvenile grouse

Source	B	Std. Error	df	F	T	p
Intercept	10.389	1.399	1, 28.375	88.116	7.427	< 0.001
Year			17, 843	3.902		< 0.001
PC1	-0.040	0.343	1, 843	0.014	-0.116	ns
PC2	2.216	0.343	1, 843	41.688	6.457	< 0.001
Red fox	0.107	0.093	1, 843	1.308	1.144	ns

4. Discussion

Abundances of most studied species were not dependent on the distance from ski resorts to the wildlife triangle. Only the densities of mountain hare and mustelids seemed to be affected by the distance: the densities increased towards the ski resorts. This suggests that ski resorts do not disturb the studied species. Ski resorts may offer suitable foraging environments, like edge habitats and open areas. For mustelids the possible explanation may be their main prey species, small rodents, which probably prefer these kinds of areas. Most vole species in Finland eat bark of trees and bushes, roots of saplings,

Carex species and grasses, and this nourishment may be more plentiful in the edge environments and open areas. Since the stoat and especially the least weasel are specialized to predate voles, their distribution follows the habitats of voles. The local level study (Heikkilä *et al*. 2007) conducted within our study areas, in Levi and Ylläs ski resorts and Pallas-Yllästunturi National Park, support our results. According to the study of Heikkilä *et al*. (2007), the densities of the mountain hare and mustelids were higher in ski resorts and campfire sites than in control areas located in the Pallas-Yllästunturi National Park. Also the density of voles was higher in the areas with tourism related infrastructure than in natural control areas.

The densities of all species varied between ski resorts, most species we more abundant in southern than northern ski resorts. The density differences between ski resorts are probably due to the general decrease of productivity from south to north. The density of wildlife species, except pine marten, varied between the study years. This result is in accordance with earlier studies (e.g. Siivonen 1954, Lindén 1989) that have reported marked temporal, sometimes cyclic variation in the densities of game species. These results highlight the importance of multi-year researches while studying the habitat associations of wildlife species.

The density of mountain hare and adult and juvenile grouse correlated positively with the *mixed forest* habitat component. Hiltunen *et al.* (2004) have found out that hares prefer thickets of willow (*Salix* spp.), downy birch (*Betula pubescens*) and spruce (*Picea abies*) in summer. In addition aspen (*Populus tremula*) is documented to be an important source of nutriment for hares in their winter diet in Finnish Lapland (Pulliainen & Tunkkari 1987). Dense understories are important for mountain hare's habitat use, possibly because they offer both food and shelter against predators (Hiltunen *et al.* 2004). The importance of mixed forests for grouse was not surprising, since all grouse species are known to require both conifers and broad-leaved trees either as food sources or as shelter from predators (e.g. Seiskari 1962, Pulliainen 1982, Sachot *et al.* 2003, Åberg *et al.* 2003).

Densities of adult and juvenile grouse correlated positively and densities of pine marten and mustelids correlated negatively for the *agricultural land* component. In the case of grouse this component probably reflects the general productivity of the landscape. It has been noticed in earlier studies that on a smaller spatial scale, probability to detect a grouse hen with a brood was significantly higher in wildlife triangles situated in the vicinity of fields (Kurki & Lindén 1995, Kurki *et al.* 2000). Agricultural lands have been cleared in areas with high productivity. Therefore the productivity of the surrounding forest stands may also be higher and provide a better brooding habitat for grouse (Kurki & Lindén 1995, Kurki *et al.* 2000). Pine marten instead is referred to be a strictly forest-dependent species (Storch *et al.* 1990), this can be seen both as a positive connection between pine marten density and mixed forests, and as a negative connection between its density and agricultural land in our study.

Kurki *et al.* (1998) demonstrated that the negative effect of increasing proportion of agricultural land was dominant for pine marten abundance in northern Finland. They suggested that the existence of agricultural fields probably indicates the presence of villages, and disturbance and hunting pressure may be higher near villages, resulting in the negative correlation between pine marten abundance and agricultural land. This may also be one possible reason for the avoidance of agricultural areas in the case of mustelids. Another possible explanation for the negative effect of farmland to abundance of mustelids is that mustelids are more (vole) specialized predator than the red fox and the pine marten (see Hanski *et al.* 1991), and more dependent on the forest landscape than generalist predator species which dominate agricultural landscapes (see Hansson 2002).

The landscape data were available of one year (2000) only so we do not know how the landscape has altered during the studied eighteen years. In addition, we did not have digital data of the location of snowmobile and cross-country ski routes etc., which may cause human disturbance and landscape altering, and thus negatively affect on, for example, grouse during display season on leks. More information is needed about the spatial distribution and frequency of use of cross-country ski-routes and snowmobile routes. In this study, the nearest wildlife triangle was situated 3.8 kilometers away from a ski resort and perhaps for that reason the distance from the ski resorts was not significant factor explaining the variation of the density of most wildlife species. To study this possibility more detailed, new wildlife triangles should be established nearer the ski resorts.

5. Conclusions

Overall, the distance from ski resort appeared to have no drastic effects on the densities of studied wildlife species. Species densities were not lower in the vicinity of ski resorts than further away; in fact abundances of the mountain hare and mustelids were higher near the ski resorts. This suggests that human disturbance is not affecting negatively the species, at least in the scale of this study. The location of the ski resort and the general landscape structure around the resort seems to affect more the density of wildlife species than the ski resort *per se*. Although our time period in this study was rather long, it is possible that impacts of tourism may arise with a delay. Human caused disturbance is only one variable among several other factors influencing a wildlife population, and the causal relationships between the presence of humans and the dynamics of species are difficult, if not impossible, to prove analytically (Zeitler 2000).

Acknowledgements

We appreciate the assistance of many volunteers, who collected the data in the field. We thank the Finnish Environment Institute (SYKE) for providing the landscape data. This study is a part of the EU LIFE Environment project *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB). Dr. O. Rätti and Dr. P. Sulkava kindly commented the first version of the manuscript.

References

Ahti, T., Hämet-Ahti, L. & Jalas, J. 1968: Vegetation zones and their sections in northwestern Europe. –Annales Botanici Fennica 5: 169-211.

Arlettaz, R., Patthey, P., Baltic, M., Leu, T., Schaub, M., Palme, R. & Jenni-Eiermann, S. 2007: Spreading free-riding snow sports represent a novel serious threat for wildlife. –Proceedings of Biological Sciences 274: 1219-1224.

Bolger, D. T., Alberts, A. C., Sauvajot, R. M., Potenza, P., McCalvin, C., Tran, D., Mazzoni, S. & Soulé, M. E. 1997: Response of rodents to habitat fragmentation in coastal southern California. –Ecological Applications 7: 552-563.

Brenot, J.-F., Catusse, M. & Menoni, E. 1996: The effects of the Plateau de Beille cross-country ski station (Ariège) on an important population of the capercaillie Tetrao urogallus. – Alauda 64: 249-260.

Burger, J. & Cochfeld, M. 1998: Effects of ecotourism on bird behaviour at Loxahatchee National Refuge, Florida. – Environmental Conservation 25: 13-21.

Contesse, P., Hegglin, D., Gloor, S., Bontadina, F. & Deplazes, P. 2004: The diet of urban foxes (Vulpes vulpes) and the availability of anthropogenic food in the city of Zurich, Switzerland. –Mammalian Biology 69: 81-95.

Gonzales, L. M., Arroyo, B. E., Margalide, A., Sanchez, R. & Oria, J. 2006: Effects of human activities on the behaviour of breeding Spanish imperial eagles (Aquila adalberti): management implications for the conservation of a threatened species. –Animal Conservation 9: 85-93.

Hadley, G. L. & Wilson, K. R. 2004: Patterns of density and survival in small mammals in ski runs and adjacent forest patches. –Journal of Wildlife Management 68: 288-298.

Hanski, I., Hansson, L. & Henttonen, H. 1991: Specialist predators, generalist predators, and the microtine rodent cycle. –Journal of Animal Ecology 60: 353-367.

Hansson, L. 2002: Dynamics and trophic interactions of small rodents: landscape or regional effects on spatial variation? –Oecologia 130: 259-266.

Heikkilä, T., Sulkava, P., Huhta, E., Ukkola, M. & Helle, P. 2007: Effects of nature-based tourism on mammal densities on three different levels of disturbance in western Finnish Lapland. –Nature and Tourism: Tools for Sustainability, International Conference. Arctic Centre, University of Lapland, Rovaniemi, Finland, 22-24 May 2007. Abstract Book (eds. Kaisanlahti-Jokimäki, M.-L., Jokimäki, J., Kivilahti, R. & Härkönen, J.): 15. Lapin yliopistopaino, Rovaniemi.

Helle, P. & Nikula, A. 1996: Usage of geographic information systems (GIS) in analyses of wildlife triangle data. –Finnish Game Research 49: 26-36.

Helle, T. & Särkelä, M. 1993: The effects of outdoor recreation on range use by semidomesticated reindeer. – Scandinavian Journal of Forest Research 8: 123-133.

Hiltunen, M., Kauhala, K. & Lindén, H. 2004: Habitat use of the mountain hare Lepus timidus in summer: the importance of different vegetation layers. –Acta Theriologica 49: 479-490.

Jokimäki, J. & Huhta, E. 2000: Artificial nest predation and abundance of birds along an urban gradient. –The Condor 102: 838-847.

Kurki, S. & Lindén, H. 1995: Forest fragmentation due to agriculture affects the reproductive success of the ground-nesting black grouse Tetrao tetrix. –Ecography 18: 109-113.

Kurki, S., Nikula, A., Helle, P. & Lindén, H. 1998: Abundances of red fox and pine marten in relation to the composition of boreal forest landscapes. –Journal of Animal Ecology 67: 874-886.

Kurki, S., Nikula, A., Helle, P. & Lindén, H. 2000: Landscape fragmentation and forest composition effects on grouse breeding success in boreal forests. –Ecology 81: 1985-1997.

Lindén, H. 1989: Characteristics of tetraonid cycles in Finland. –Finnish Game Research 46: 34-42.

Lindén, H. & Helle, P. 1996: Preface: The welfare on wildlife reflects the welfare of nature – wildlife monitoring produces easily understandable parameters. –Finnish Game Research 49: 3.

Lindén, H., Helle, E., Helle, P. & Wikman, M. 1996: Wildlife triangle scheme in Finland: methods and aims for monitoring wildlife populations. –Finnish Game Research 49: 4-11.

Lindström, E. R., Andrén, H., Angelstam, P., Cederlund, G., Hörnfeldt, B., Jäderberg, L., Lemnell, P.-A., Martinsson, B., Sköld, K. & Swensson, J. E. 1994: Disease reveals the predator: sarcoptic mange, red fox predation, and prey populations. –Ecology 75: 1042-1049.

Matthiae, P. E. & Stearns, F. 1981: Mammals in forest islands in southeastern Wisconsin. –Forest island dynamics in man-dominated landscapes (eds. Burgess, R. L. & Sharpe, D. M.): 55-66. Springer Verlag, New York.

McKinney, M. L. 2002: Urbanization, biodiversity, and conservation. –BioScience 52: 883-890.

McGarigal, K., Cushman, S. & Stafford, S. 2000: Multivariate statistics for wildlife and ecology research. –Springer-Verlag New York, Inc., USA.

Ménoni, E. & Magnani, Y. 1998: Human disturbance of grouse in France. –Grouse News 15: 4-8.

Miller, J. R. & Hobbs, T. N. 2000: Recreational trails, human activity, and nest predation in lowland riparian areas. –Landscape and Urban Planning 50: 227-236.

Miller, S. G., Knight, R. L. & Miller, C. K. 1998: Influence of recreational trails on breeding bird communities. –Ecological Applications 8: 162-169.

Miquet, A. 1986: A contribution to the study of the relation between the black grouse (Tetrao tetrix L., Tetraonidae) and winter tourism in Haute-Tarentaise. –Acta Oecologica (Oecologia Applicata) 7: 325-335.

Odell, E. A. & Knight, R. L. 2001: Songbird and medium-sized mammal communities associated with exurban development in Pitkin County, Colorado. –Conservation Biology 15: 1143-1150.

Pickering, C. M., Harrington, J. & Worboys G. 2003: Environmental impacts of tourism on the Australian Alps protected areas. –Mountain Research and Development 23: 247-254.

Pulliainen, E. 1982: Autumn and winter habitat selection in the willow grouse (Lagopus lagopus) in northern Finland. –Suomen Riista 29: 46-52.

Pulliainen, E. & Tunkkari, P. S. 1987: Winter diet, habitat selection and fluctuation of a mountain hare Lepus timidus population in Finnish Forest Lapland. –Holarctic Ecology 10: 261-267.

Regional Council of Lapland 2003: Lapland tourism strategy 2003-2006. –Rovaniemi. Available from: http://www.lapinliitto.fi/englanti/matstraeg.pdf [20.8.2007].

Regional Council of Lapland 2007: Lappi elämänvoimaa. Matkailustrategia 2007-2010. Luonnos. –Available from: http://www.lapinliitto.fi/paatoksenteko/lh221007/liite8.pdf [10.10.2007].

Rolstad, J. & Wegge, P. 1987: Habitat characteristics of capercaillie Tetrao urogallus display grounds in southeastern Norway. –Holarctic Ecology 10: 219-229.

Sachot, S., Perrin, N. & Neet, C. 2003: Winter habitat selection by two sympatric forest grouse in western Switzerland: implications for conservation. –Biological Conservation 112: 373-382.

Saunders, D. A., Hobbs, R. J. & Margules, C. R. 1991: Biological consequences of ecosystem fragmentation: a review. –Conservation Biology 5: 18-32.

Seiskari, P. 1962: On the winter ecology of the capercaillie, Tetrao urogallus, and black
grouse, Lyrurus tetrix, in Finland. –Papers on Game Research 22: 1-119.

Siivonen, L. 1954: On the short-term fluctuations in numbers of tetraonids. –Papers on Game Research 13: 1-10.

Storch, I. 1998: Chairman´s column. –Grouse News 15: 3-8.

Storch, I. 2000: An overview to population status and conservation of black grouse worldwide. –Cahiers d'Ethologie 20: 153-164.

Storch, I. & Leidenberger, S. 2003: Tourism, mountain huts and distribution of corvids in the Bavarian Alps, Germany. –Wildlife Biology 9: 301-308.

Storch, I., Lindström, E. & de Jounge, J. 1990: Diet and habitat selection of the pine marten in relation to competition with the red fox. –Acta Theriologica 35: 311-320.

Summers, R. W., McFarlane, J. & Pearce-Higgins, J. W. 2007: Measuring avoidance by capercaillies Tetrao urogallus of woodland close to tracks. –Wildlife Biology 13: 19-27.

Suter, W., Roland, F. G. & Hess, R. 2002: Capercaillie (Tetrao urogallus) and avian biodiversity: testing the umbrella-species concept. –Conservation Biology 16: 778-788.

Taylor, A. R. & Knight, R. L. 2003: Wildlife response to recreation and associated visitor perceptions. –Ecological Applications 13: 951-963.

Vainio, M., Marjakangas, A., Lindgren, E., Tornberg, R. & Paaso, P. 1997: The winter diet of red fox in eastern Central Finland. –Suomen Riista 43: 56-64 (in Finnish with English Summary).

Vistnes, I. & Nellemann, C. 2001: Avoidance of cabins, roads, and power lines by reindeer during calving. –Journal of Wildlife Management 65: 915-925.

Väisänen, R. A. 1994: Winter birds in Finland in 1993/94 and the most abundant species in the censuses of last 19 winters. –Linnut 29: 20-26 (in Finnish with English Summary).

Watson, A. & Moss, R. 2004: Impacts of ski-development on ptarmigan (Lagopus mutus) at Cairn Gorm, Scotland. –Biological Conservation 116: 267-275.

Zeitler, A. 2000: Human disturbance, behaviour and spatial distribution of black grouse in skiing areas in the Bavarian Alps. –Cahiers d'Ethologie (2-3-4): 381-402.

Åberg, J., Swenson, J. E. & Angelstam, P. 2003: The habitat requirements of hazel grouse (Bonasa bonasia) in managed boreal forest and applicability of forest stand descriptions as a tool to identify suitable patches. –Forest Ecology and Management 175: 437-444.

Landscape analysis – The first step in managing sustainable land use at tourist destinations

Marja Uusitalo

Plant Production Research Rovaniemi, MTT Agrifood Research Finland, Tutkijantie 28, FIN-96900 Saarenkylä, FINLAND
marja.uusitalo@mtt.fi

Abstract

The industrial production of building elements has hastened the planning and construction processes, which is one factor that has accelerated the growth of tourist destinations. The signs of tourism burdening environment are also increasing in the northern periphery. It is possible to set sustainable objectives for the development of tourism by using landscape analysis. Several kinds of landscape analysis were carried out at the Ylläs, Levi and Olos tourist destinations in the Ounasselkä fell region in western Finnish Lapland. A group of specialists representing different disciplines studied the cultural, visual and ecological aspects of the landscape. Different physical elements and the perception of the landscape were analysed to indicate the landscape values and environmental state of the study areas and to demonstrate a tool package for the sustainable land use management of tourist destinations that are sensitive to change. The set of landscape analyses included information on geology, landscape structure, visual landscape, landscape image, soundscape and urban and green zones. Multidisciplinary landscape analysis that illustrates landscape from various points of view can assist the tourism managers and land use in many ways. It helps to find the places special and meaningful to tourists and local people (socio-cultural) and the most suitable building sites (ecological and visual sustainability). It also assists in determining the sustainable level of tourist activities, the acceptable change in landscape structure and land use and in creating a greenbelt system to buffer against the compaction typical to urbanization. Additionally, it can work as a system to monitor transformation and landscape change at tourist destinations. The set of methods were demonstrated and developed in the EU LIFE Environment funded project *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB).

Keywords: landscape analyses, land use, Lapland, sustainable tourism, tool package

1. Introduction

Natural and rural landscapes are often the major tourism attractions among foreign and domestic visitors to Finland (Sievänen 2001, IPK International 2007). Rural landscapes are developed through human interaction with nature and the major factor behind this interaction is primary production (Alanen 1997, Forsious-Nummela 1997). This form of land use has been held ground for hundreds or even thousands of years. Reindeer herding is the oldest livelihood in Lapland, going back an estimated 1,700 years (Lehtola 1996). Agriculture and forestry has been practiced for over 400 years in Lapland (Massa 1983, Kalpio & Bergman 1999). The interaction in traditional rural landscapes has been a slow process. Lapland is sparsely populated mainly because the late start to the short growing season and little fertile soil available for cultivation (Nissinen 1996, Viitala & Räinä 1997, Regional Council of Lapland 2007). Consequently, the rural communities have usually remained small and the infrastructure low.

Amenities and services constitute important driving forces in nature tourism in Lapland (Regional Council of Lapland 2003, Järviluoma 2006). These attractions are often built on infrastructure that may have negative impacts on the natural and cultural resources of tourism. According to the third Assessment of Europe's Environment (EEA 2003), the rapid growth of tourism increasingly burdens the environment through the use of water, land and energy and the development of infrastructure, buildings and facilities, the production of pollution and waste, land fragmentation and the increasing number of second homes being built. According to Hautajärvi (1995), the expansion of tourism has also had negative impacts on the biodiversity of nature and cultural landscapes formed by primary production in Lapland. Modern construction technology is one agent that has accelerated the expansion. Traditional construction methods, norms and materials were remodelled in the 1960s and 1970s, and the industrial production of building elements has hastened the planning and construction processes (Hankonen 1994).

The factors of nature become increasingly important in sustainable land use the further north we go mainly because the processes of nature in the North recover from human

impacts slowly or poorly (Mähönen 2002). Therefore, tourism managers are facing a huge challenge – creating the infrastructure and implementing the urban technology needed for accommodation, transport, nature activities and other services without disturbing or threatening the processes of nature, the local culture or the aesthetic values of tourist destinations.

Landscape features reflect the ecological, cultural and visual values and sustainability of regions. These values are identified during the planning process, which is a value-laden activity. Land use planning is an essential tool in managing the growth of tourism at tourist destinations. Landscape analysis constitutes the first step in planning sustainable tourism. A set of analyses is useful when gathering information on the landscape features of tourist destinations. Landscape analysis can also serve as a tool to combine urban and landscape structures. In addition, it is important to have the means to process the gathered landscape data into a spatial form and to combine all the information (Geographical Information System) for the syntheses of ecologically, culturally and visually sustainable land use.

The goals of LAPLAND –task (*Ecologically, Culturally and Visually Sustainable Urban Structure forTtourist Destinations*) were to highlight landscape values and to promote sustainability at tourist destinations in the *Tourist Destinations as Landscape Laboratories – Tools for Sustainability* (LANDSCAPE LAB) -project, which is funded by the EU LIFE Environment fund. In order to achieve the goals, landscape analyses were carried out at the Levi, Ylläs and Olos tourist destinations in the Ounasselkä fell region during 2005—2006 by seven organisations working with environmental and natural resources in northern Finland. The method of landscape analysis was adapted from Finnish landscape architecture (Rautamäki 1997).

2. Material and methods

The inventories of the physical and cultural features of the landscape are utilised in landscape impact evaluation, landscape management and land use planning. The landscape analysis phase often precedes the preparations of regional land use plans as well as local master and detailed plans in Finland. Some rarely used methods or new elements were introduced in the LANDSCAPE LAB -project, and they were included in the set of landscape analyses. These methods or elements are particularly relevant in managing tourism development. There are different ways to analyse (a) physical features, (b) perception and (c) interpretation (Fig. 1).

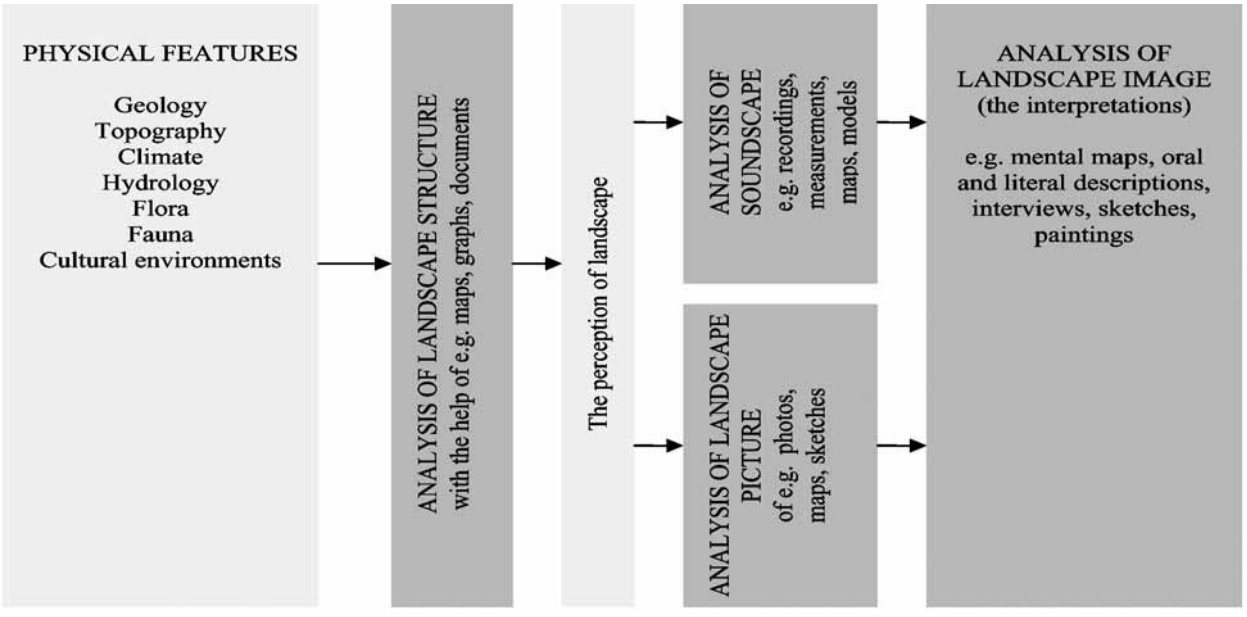

Figure 1.
Different methods of analysing landscape features (adapted from Rautamäki 1997).

2.1. The physical features of landscape

The landscape structure of an area is often understood as the visual structure of landscape or the structure of ecotypes or habitats. According to Panu (1998), landscape structure signifies the structure of nature and cultural factors in process. In other words, these factors are changing, interacting and defining the ecological productivity and are visible in a landscape picture. Many physical factors such as topography, bedrock, soil, hydrology, climate, flora, fauna and the signs of land use are analysed to define landscape structure (Rautamäki 1997). Many of the basic analyses already existed in the Ounasselkä fell region. They were completed in the LANDSCAPE LAB -project through conducting additional surveys to outline the strategies of land use and landscape management for sustainable tourism (see Uusitalo *et al*. 2006).

Geology builds the basis of the landscape structure (Rautamäki 1997). It defines the topography, the scale and orientation of the landscape and the hydrology and productivity of an area. The latter are also influenced by climate conditions. These factors are often indicated by variation in vegetation and animal life. The geological analyses in the LANDSCAPE LAB -project included detailed geological mapping, hydro-geological and erosion susceptibility studies, the analyses of quaternary deposit samples and surface water and groundwater (Johansson *et al.* 2006a,b). These surveys were carried out by a team of geologists from the Geological Survey of Finland (GSF). Maps that visualised the geological factors and combined information on topography, morphological formations, watersheds and catchment areas with water flow directions, mires, springs, hiking and skiing routes were made for upgrading analyses and recreational use.

Land use often shapes landscape structure and changes the landscape picture. Within the context of sustainability, it also affects the ecological productivity of the landscape and therefore it constitutes an important environmental factor (Panu 1998). Land use and the development of traditional cultural environments and rural landscapes are typically driven by geological factors (Rautamäki 1997). Human influence on environments is usually distinguishable as the newest layer on landscape on the geological time scale.

LANDSCAPE LAB also studied the history of land use. Firstly, the traditional rural biotopes of the Ylläs and Levi tourist destinations were mapped according to preliminary surveys (historical maps, literal documents and interviews with land owners) by the expertise of the Department of Natural Resources and the Environment of Lapland Nature Academy (LNA) (Kananen 2006a,b). Secondly, the surveys of present land use, urban technology and structures were made by the planning consults at the Finnish Consulting Group, Suunnittelukeskus Oy and the survey of building materials by Architectural Office Arktes. Current land use information was obtained from the local master and detailed plans (Suunnittelukeskus 2006).

The statistics on zoning and urban technology (e.g. the total area, floor space and number of plots per type of land use, the length of streets and electric power lines and the total area of ski slopes) were also studied. Moreover, the sustainability and visual quality of the building materials were analysed using the construction drawings, instructions, and site photographs (Arktes 2006). The gathered data indicated the degree of sustainable land use and the infrastructure of the tourist destinations. This issue was also dealt with in the analysis of landscape structure and green zone hierarchy.

2.2. The perception and interpretation of landscape

The landscape picture is the perceived two or three-dimensional optical character of the landscape structure that can be systematically documented (Rautamäki 1997). Lynch's (1975) method is one approach to analysing what can be seen. Lynch's method of studying the visual quality of environment and mapping visual factors has been adopted by (landscape) architecture. The method was used in LANDSCAPE LAB by MTT Agrifood Research Finland. The basic visual and spatial elements of districts (paths, edges, spaces, nodes, corridors, landmarks and vistas) were located and photographed while walking along the roads in the urban development areas of the Ylläs and Levi tourist destinations (Uusitalo 2006a,b). So-called landscape nodes are condensed by many landscape elements and landmarks, and they are often considered as important places or constructors of community and are given symbolic meanings (Lynch 1975, Rautamäki 1997).

Consequently, landscape nodes can be visually and culturally loaded sites holding many values.

According to Lynch (1975), the visual perception of landscape produces landscape images that can vary between people and cultures. Landscape can be understood as a biographic and topophilic object (Karjalainen & Raivio 1999). Our life history and values affect the way we perceive and sense landscape. This variation in perception should be noted when setting the objects of land use.

Levi, Ylläs and Olos are visited by heterogeneous groups of foreign and domestic tourists (Regional council of Lapland 2003). The LANDSCAPE LAB -project interviewed tourists in focus groups during two high seasons (the ski and autumn seasons). The tourists' experiences of the landscape were studied during the project (Rantala 2006). The researchers also aimed to find the basic landscape elements that are valued by the tourists (Uusitalo & Rantala 2006a,b). The information on the attractive and criticised sites was located on maps for further analysis.

Landscape is perceived by many senses, even though perception is sight-dominated (Bell 1999). This has also been noticed in the tourism business, which is interested in taking soundscapes into account in marketing (Poutanen & Tormilainen 2003). A soundscape is the combination of sounds in a certain area, place or site, and it is defined by personal experiences and interpretations in the manner of a landscape image (Shafer 1980, Poutanen & Tormilainen 2003). However, soundscapes usually change quicker than landscape pictures. The soundscapes of Levi, Ylläs and Olos were analysed by students at the Rovaniemi University of Applied Sciences in order to study the perception of landscape in the broader perspective: the sound volume was measured, sound sources (qualitative information) were documented and the experimental sites were mapped (Huusko *et al.* 2006). Thematic maps and 3D-digital terrain models of the soundscapes were produced from the data for further analysis. In addition, there was discussion on influence of snow, forest stands and buildings on the soundscapes.

2.3. Combining landscape and urban structures

According to Panu (1998), the analysis of landscape structure will point out the areas or zones that have different ecological productivity and susceptibility to change (carrying capacity). The available data from Levi and Ylläs were further studied in the upgrading analyses. Various data were chosen for overlapping in order to locate the zones of tolerance (resistance). Bedrock, surface geology, topography (slope gradients), climate, vegetation and land use were combined using GIS software (Uusitalo & Sarala 2006a,b). In addition, the landscape structure analysis along with the knowledge of building potential, hydrology and protected areas as well as the occurrence sites of threatened plant species were utilised in order to discover and outline the most suitable zones for the expansion of the urban development areas at the Ylläs and Levi tourist destinations.

Rautamäki (1997) and Panu (1998) have argued that landscape structure should be the driving force behind zoning. The location of different land use types, i.e. the division of urban (infrastructure) and green zones, should be connected to landscape structure. The greenbelt system or hierarchy of a population centre can adjust the infrastructure to the landscape structure. The system works as a buffer against the compaction of built-up areas or the fragmentation of green zones. The urban structure of Ylläs and Levi were studied. The green zones were classified by different factors that described their significance to the green structure of the tourist destinations. The size and the connectivity of green zones, their location on the landscape structure as well as nature and the cultural and visual values of the green zones were analysed using GIS software. The thematic maps from the previous analysis were overlapped for the valuation. The green structures at Ylläs and Levi tourist destinations were illustrated and the development of the greenbelt system was discussed (Fig. 2).

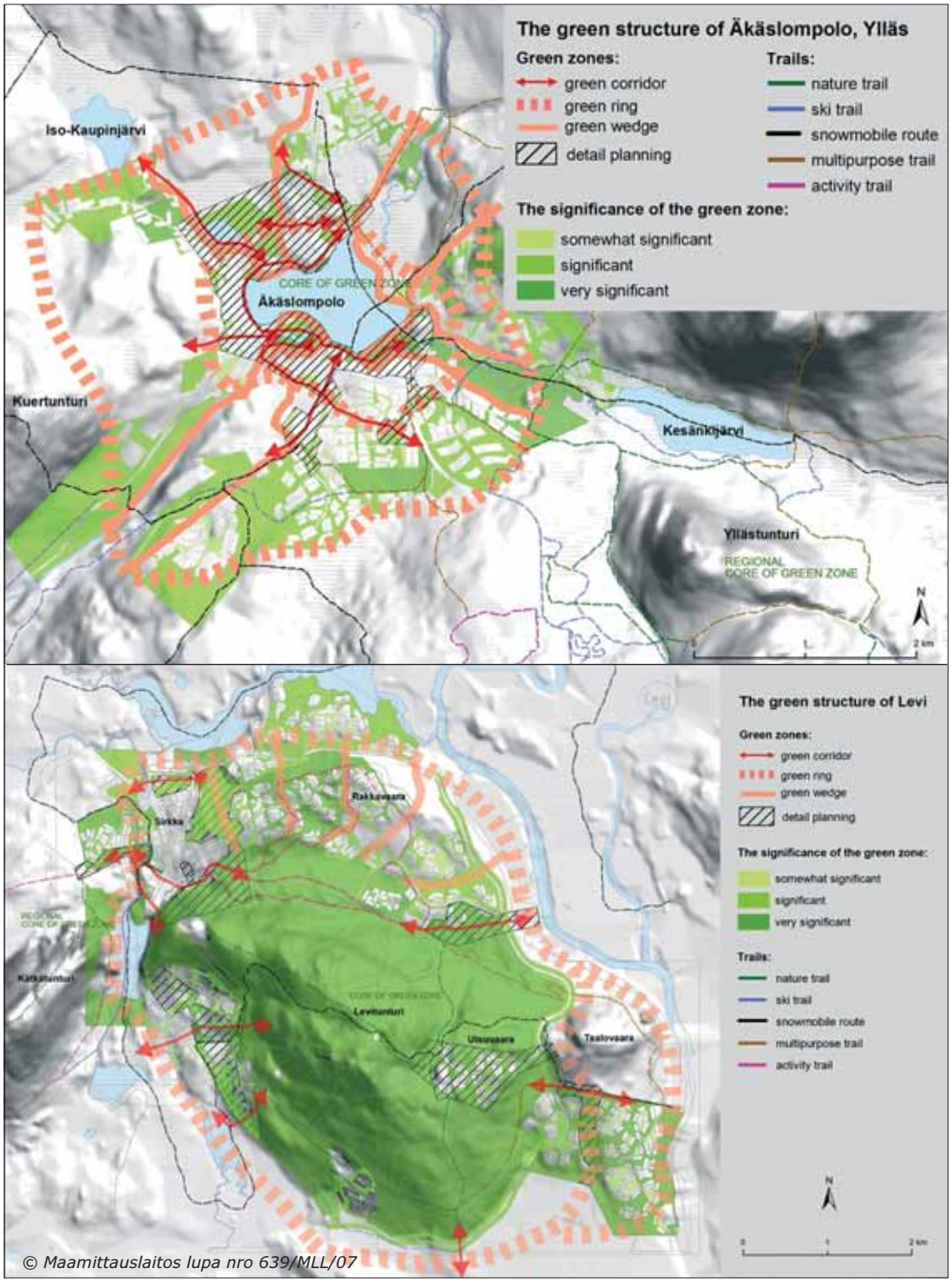

Figure 2.
The green structure of Ylläs and Levi. © Maamittauslaitos lupa nro 639/MLL/07. Pohjakartta-aineisto © Maanmittauslaitos lupa nro 639/MML/07.

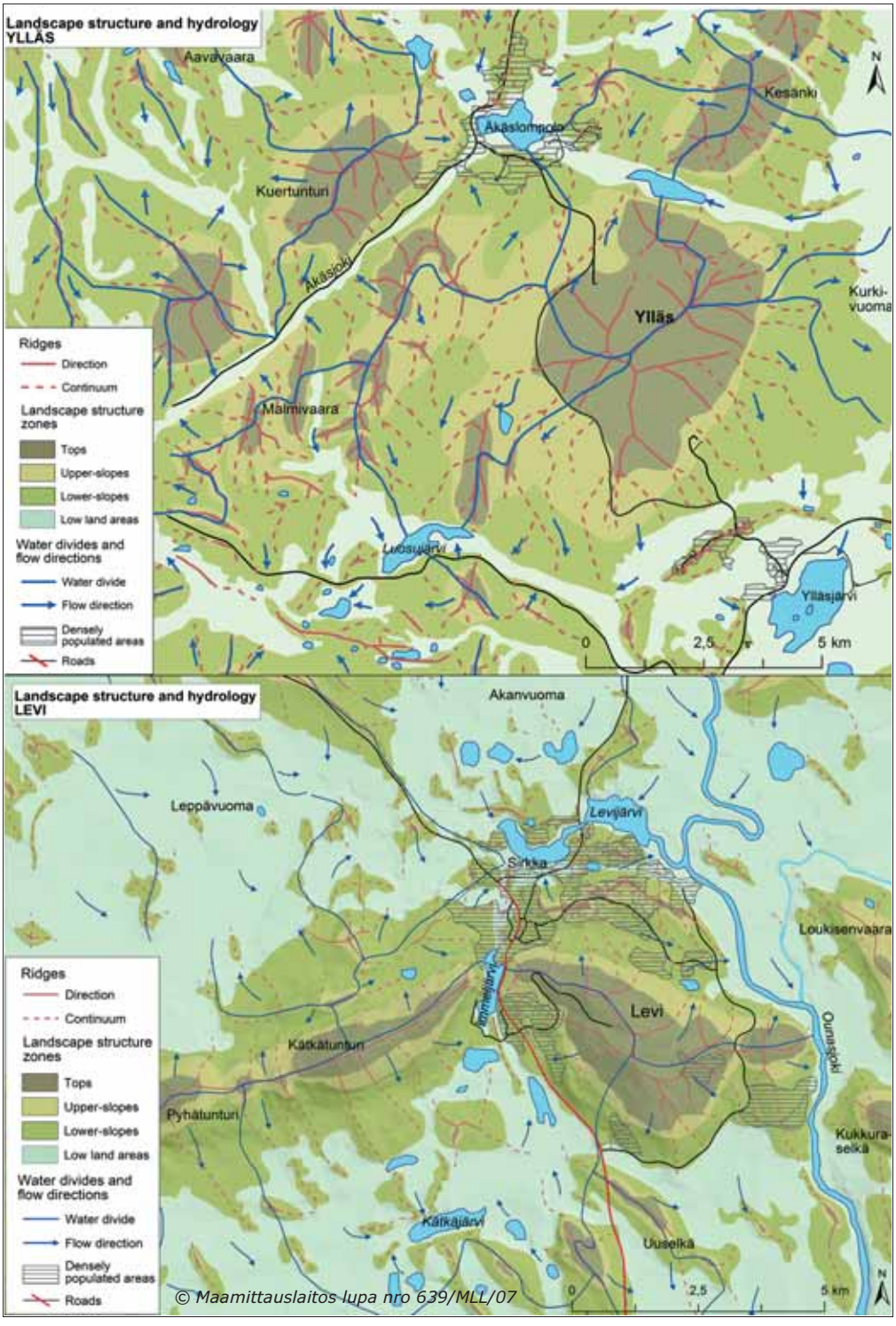

Figure 3.
The landscape structure of Ylläs and Levi. © Maamittauslaitos lupa nro 639/MLL/07. Pohjakartta-aineisto © Maanmittauslaitos lupa nro 639/MML/07.

3. Results and discussion

Ylläs and Levi have already undergone external and internal changes to become the core areas of regional development in the periphery of the Ounasselkä fell region in western Finnish Lapland (Kauppila 2004). According to Saarinen (2001), tourist destinations may start to resemble one another as well as resemble the tourists' home areas when the transformation of the tourist destinations moves on. The landscape analyses of this study indicated that Ylläs and Levi have many infrastructures and urban technologies; such as transportation and energy transfer systems, common to urban areas. The tourist destinations are expanding and compacting, which are typical to urbanization. Consequently, the latest building areas have expanded to the upper slopes or fell tops that provide solitude and attractive scenes but are sensitive to change (Fig. 3). Furthermore, the nature areas and green zones, including the traditional cultural environments, rural landscapes and biotopes, are becoming fragmented inside the urban structure or the urban areas of the tourist destinations (Fig. 3). On the other hand, while the compaction strategy of the infrastructure may create a city image, it can save the surrounding wilderness areas.

There are also differences between the tourist destinations and urban centres (see Uusitalo *et al.* 2006). The cultural and natural elements of the landscape have been shown to be the driving forces of tourism and the basic reasons for the current growth of Ylläs, Levi and Olos (Järviluoma 2006, Uusitalo & Rantala 2006a,b). In addition, the infrastructure of the destinations is oriented to recreational use when compared to cities (Uusitalo *et al.* 2007). Furthermore, there are part-time residents and tourists who have annually visited the destinations for decades and some of them have become attached to the landscape elements of the region. Since the elements have special or symbolic meanings for them, they are presumably more sensitive to the changes in the landscape (Uusitalo & Rantala 2006a,b). Moreover, the high seasons and the tourism activities influence the local communities by establishing a rhythm and transforming everyday life and traditional cultural environments (Mettiäinen 2007). Since consumers and local people are becoming increasingly environmentally conscious (Järviluoma 2006), achieving ecological, social and cultural sustainability is a fundamental aspect of nature-based tourism.

Multidisciplinary landscape analysis, which illustrates the landscape from various points of view, can assist land use planners and managers. The analysis helps them to become aware of the regional and local characteristics of a landscape that makes places special and meaningful to tourists and local people. The analysis also helps to determine the acceptable change in landscape structure and land use, the sustainable level of infrastructure and tourist activities and the most suitable building sites and styles. Since an analysis reflects the changes in landscape structure and the transformation of tourist destinations, it can work as a monitoring system for tourist destinations – if repeated at certain intervals.

The landscape analysis showed that the landscape of the Ounasselkä fell region has many features that are common to all tourist destinations in the region, e.g. they have similar geomorphology, vegetation and history of cultivation (see Uusitalo *et al.* 2006). These landscape elements create a good basis for co-operation in developing and marketing the destinations. At the same time, the Ounasselkä landscape is diverse: the visual, cultural, ecological and geological diversities give rise to many opportunities to produce unique tourism products for nature experiences. The local nature and culture can also be valued and husbanded for the benefit of tourism industry. The Levi, Ylläs and Olos tourist destinations could differentiate even more through finding their unique but homogenous and tradition-bound architectonic style for construction and by producing special activities for tourists on the grounds of their local landscape features. Consequently, this could create a broader supply of tourism products and reduce their competition within the landscape region.

Finally, various interest groups should be motivated to participate in discussions about the features, values and management of landscape. The growth rate and expansion strategies of tourism, their impacts on nature, landscape and culture as well as the limits of acceptable changes should be openly discussed. In this way, it would be possible to attain broad approval for solutions, promote sustainable tourism and carry out the European Landscape Convention (2000). The methods described in the article can also be applied in the European Union, where all tourist destinations are aiming for sustainable development.

Acknowledgements

This study is a part of the EU LIFE Environment project *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB).

References

Alanen, A. 1997: Perinnemaisemat. -Maaseudun kulttuurimaisemat (eds. Luostarinen, M. & Yli-Viikari, A): 71-78. Finnraklama Oy, Sulkava.

Arktes Oy 2006: A survey of the external surfacing materials used at tourist resorts –ecological durability and suitability for the local cultural environment and traditional landscape at the Levi and Ylläs fells. -Available from: http://www.arcticcentre.org/includes/file_download.asp?deptid=21742&fileid=9207&file=20060919130214.pdf&pdf=1 [5.10.2007].

Bell, S. 1999: Landscape pattern, perception and process. -E&FN Spon, London.

EEA 2003: Europe's Environment: The Third Assessment. -State of Environment report No 1/2003.

European Landscape Convention CETS No. 176. 2000: -Available from: http://conventions.coe.int/Treaty/Commun/QueVoulezVous.asp?NT=176&CM=1&CL=ENG. [10.9.2007].

Forsious-Nummela, J. 1997: Maaseutumaisema ja sen kulttuurihistorialliset arvot. Maaseudun kulttuurimaisemat (eds. Luostarinen, M. & Yli-Viikari, A.): 64-70. -Suomen ympäristö 87.

Hankonen, J. 1994: Lähiöt ja tehokkuuden yhteiskunta. -Otatieto, Tampere.

Hautajärvi, H. 1995: Lapin läänin matkailuarkkitehtuurin historia. -Oulun yliopisto, Arkkitehtuurin osaston julkaisu AO A/20.

Huusko, H., Kauppinen, T., Tölli, E. & Tormilainen, H. 2006: Soundscape measuring in Levi, Olos and Ylläs tourist resorts. -Rovaniemen ammattikorkeakoulun julkaisusarja C 11 (in Finnish with English abstract).

IPK International 2007: Countryside holidays in Finland: part 1-3. -MEK A 152. Finnish Tourist Board, Helsinki.

Johansson, P., Lehtinen, K., Pietilä, R., Räisänen, J., Sarala, P. & Väisänen, U. 2006a: Ylläksen geologia ja vesitalous. Elävä matkailumaisema – Ounasselän tunturiseudun sekä Ylläksen ja Levin maisemaselvitys (eds. Uusitalo, M., Sarala, P. & Tuulentie, S.): 56-70. -Metlan työraportteja/ Working Papers of the Finnish Forest Research Institute 33. [29.5.2007].

Johansson, P., Lehtinen, K., Pietilä, R., Räisänen, J., Sarala, P. & Väisänen, U. 2006b: Levin geologia ja vesitalous. Elävä matkailumaisema – Ounasselän tunturiseudun sekä Ylläksen ja Levin maisemaselvitys (eds. Uusitalo, M., Sarala, P. & Tuulentie, S.): 108-122. -Metlan työraportteja/ Working Papers of the Finnish Forest Research Institute 33. [29.5.2007].

Järviluoma, J. 2006: Nature for tourist. Survey of the role of nature as a tourist attraction attribute in four tourist centres in Lapland. -Acta Universitatis Lapponiensis 96 (in Finnish with English abstract).

Kalpio, S. & Bergman, T. 1999: Lapin perinnemaisemat. -Alueelliset ympäristöjulkaisut 116.

Kananen, S. 2006a: Ylläksen kulttuuriympäristöt. Elävä matkailumaisema – Ounasselän tunturiseudun sekä Ylläksen ja Levin maisemaselvitys (eds. Uusitalo, M., Sarala, P. & Tuulentie, S.): 83-88. -Metlan työraportteja/ Working Papers of the Finnish Forest Research Institute 33.

Kananen, S. 2006b: Levin kulttuuriympäristöt. Elävä matkailumaisema – Ounasselän tunturiseudun sekä Ylläksen ja Levin maisemaselvitys (eds. Uusitalo, M., Sarala, P. & Tuulentie, S.): 132-135. -Metlan työraportteja/ Working Papers of the Finnish Forest Research Institute 33.

Karjalainen, P. T. & Raivo, P. 1999: Maantieteen maisemia: Johdatusta kulttuurimaantieteelliseen maisematutkimukseen. -Maantieteen laitoksen opetusmoniste no. 27.

Kauppila, P. 2004: Development process of resorts and their role in regional development at the local level: case studies of Levi, Ruka, Saariselkä and Ylläs. -Nordia geographical publications, vol. 33, 1 (in Finnish with English abstract).

Lehtola, T. 1996: Lapinmaan vuosituhannet. Saamelaisten ja Lapin historia kivikaudelta 1930-luvulle. -Gummerus, Jyväskylä.

Lynch, K. 1975: The image of the city. 13. vol. -The M.I.T Press, Cambridge.

Massa, I. 1983: Ihminen ja Lapin luonto. Lapin luonnonkäytön historiaa. -Suomen antropologisen seuran toimituksia 12.

Mettiäinen, I. 2007: Growing tourist centers nearby fell side villages –challenges to social sustainability. – LANDSCAPE LAB –hanke, Arktinen keskus, Lapin yliopisto. Lapin yliopistopaino, Rovaniemi (in Finnish with English summary).

Mähönen, O. (ed.) 2002: AMAP II –State of the environment and human health in Finnish Lapland. -Suomen ympäristö 581 (in Finnish with English abstract).

Nissinen, O. 1996: Analyses of climatic factors affecting snow mould injury in first-year timothy (Phleum pratence L.) with special reference to Sclerotina borealis. -Acta Universitatis Ouluensis A 289.

Panu, J. 1998: Maisemarakenteen ja taajamarakenteen yhteensovittaminen. -Suomen ympäristö 264 (in Finnish with English abstract).

Poutanen, V. & Tormilainen, H. 2003: Metsän hiljainen humina. Silent hum of the forest. Soundscape classification for leisure time nature environment. -Rovaniemen ammattikorkeakoulun julkaisusarja B (in Finnish with English abstract).

Rantala, O. 2006: Wilderness forests and built paths: A frame analytical interpretation of tourists' forest landscape experiences in Lapland. -Lapin yliopisto, Kauppatieteiden ja matkailun tiedekunta, Matkailututkimus/luontomatkailun suuntautumisvaihtoehto (in Finnish with English abstract). -Available from:http://www.arcticcentre.org/includes/file_download.as?deptid=21742&fileid=7746&file=20060130111249.pdf&pdf=1 [29.5.2007].

Rautamäki, M. 1997: Maisemarakenne – Maisemakuva. Maan päällä – taivaan alla. (ed. Ylimaula, A-M.): 99-113. -Acta Universitatis Ouluensis C 97.

Regional Council of Lapland 2003: Lapland tourism strategy 2003-2006. –Rovaniemi. Available from: http://www.lapinliitto.fi/englanti/matstraeg.pdf [20.8.2007].

Regional Council of Lapland 2007: Lapland toursism strategy 2007-2010. Available from: http://www.lapinliitto.fi/paatoksenteko/lh221007/liite8.pdf [20.10.2007].

Saarinen, J. 2001: The transformation of a tourist destination. Theory and case studies on the production of local geographies in tourism in Finnish Lapland. -Nordia geographical publications, vol. 30, 1.

Schafer, R. M. 1980: The tuning of the world. Toward a theory of soundscape design. -University of Pennsylvania Press, Philadelphia.

Sievänen, T. (ed.) 2001: Outdoor recreation 2000. -Metsäntutkimuslaitoksen tiedonantoja 802 (in Finnish with English abstract).

Suunnittelukeskus Oy 2006: Maankäyttö ja yhdyskuntatekniikka. -LANDSCAPE LAB- hanke, Arktinen keskus, Lapin yliopisto (in Finnish with English abstract). -Available from:http://www.arcticcentre.org/includes/file_download.asp?deptid=21742&fileid=9179&file=20060914180108.pdf&pdf=1 [29.5.2007].

Uusitalo, M. 2006a: Ylläksen maisemakuva. Elävä matkailumaisema – Ounasselän tunturiseudun sekä Ylläksen ja Levin maisemaselvitys (eds. Uusitalo, M., Sarala, P. & Tuulentie, S.): 77-83. -Metlan työraportteja/Working Papers of the Finnish Forest Research Institute 33. [29.5.2007].

Uusitalo, M. 2006b: Levin maisemakuva. Elävä matkailumaisema – Ounasselän tunturiseudun sekä Ylläksen ja Levin maisemaselvitys (eds. Uusitalo, M., Sarala, P. & Tuulentie, S.): 127-132. -Metlan työraportteja/Working Papers of the Finnish Forest Research Institute 33. [29.5.2007].

Uusitalo, M. & Rantala, O. 2006a: Ylläksen matkailijoiden maisemamielikuvat. Elävä matkailumaisema – Ounasselän tunturiseudun sekä Ylläksen ja Levin maisemaselvitys (eds. Uusitalo, M., Sarala, P. & Tuulentie, S.): 101-106. -Metlan

työraportteja/Working Papers of the Finnish Forest Research Institute 33. [29.5.2007].

Uusitalo, M. & Rantala, O. 2006b: Levin matkailijoiden maisemamielikuvat. Elävä matkailumaisema – Ounasselän tunturiseudun sekä Ylläksen ja Levin maisemaselvitys (eds. Uusitalo, M., Sarala, P. & Tuulentie, S.): 148-150. -Metlan työraportteja/Working Papers of the Finnish Forest Research Institute 33. [29.5.2007].

Uusitalo, M. & Sarala, P. 2006a: Ylläksen maisemarakenne. Elävä matkailumaisema – Ounasselän tunturiseudun sekä Ylläksen ja Levin maisemaselvitys (eds. Uusitalo, M., Sarala, P. & Tuulentie, S.): 71-73. -Metlan työraportteja/ Working Papers of the Finnish Forest Research Institute 33. [29.5.2007].

Uusitalo, M. & Sarala, P. 2006b: Levin maisemarakenne. Elävä matkailumaisema – Ounasselän tunturiseudun sekä Ylläksen ja Levin maisemaselvitys (eds. Uusitalo, M., Sarala, P. & Tuulentie, S.): 122-125. -Metlan työraportteja/ Working Papers of the Finnish Forest Research Institute 33. [29.5.2007].

Uusitalo, M., Sarala, P. & Tuulentie, S. (eds.). 2006: Elävä matkailumaisema – Ounasselän tunturiseudun sekä Ylläksen ja Levin maisemaselvitys. -Metlan työraportteja/ Working Papers of the Finnish Forest Research Institute 33 (in Finnish with English summary). [Internet document] The Finnish Forest Research Institute. Available from: http://www.metla.fi/julkaisut/workingpapers/2006/mwp033.htm [29.5.2007].

Viitala, L. & Räinä, P. (eds.) 1997: Ympäristön tila Lapissa. - Lapin ympäristökeskus, Rovaniemi.

Restoration ecology as a management tool in the development of sustainable tourism in arctic and alpine regions

Dagmar Hagen

Norwegian Institute for Nature Research (NINA),
NO-7485 Trondheim, NORWAY
dagmar.hagen@nina.no

Abstract

Natural values like biodiversity, geodiversity and landscapes, are important basis for sustainable and nature related tourism. Protection of these values should be a common goal for the management authorities, tourist-industry, the tourists, environmental organisations, local people and other user groups. In traditional nature conservation severely disturbed areas are considered as *lost*. By restoration these areas can retain values as recreation sites and nature areas. Disturbed sites can be created into areas of ecological, aesthetical, cultural, or landscape qualities for the environment, for people and for sustainable tourism. Ranges of restoration methods for establishment of a vegetation cover following disturbance exist. Some are closely related and others are very different both related to scientific approach, management strategy, cost, practical experience, and site-relevance. One relevant way of grouping the different methods is: seeding or planting of introduced species, the use of native species, nutrient and soil treatments, and landscaping. In many situations natural regeneration is the best strategy for establishment of a new vegetation cover. Successful restoration requires an expanded and integrated approach including technological, social, political, economical and aesthetical aspects. An integrated approach is essential to the application of scientific knowledge into practical restoration enterprises with a time frame, cost and scale that is relevant for the management of each specific area.

Key-words: alpine, goal, management, restoration, tourism, values

1. Introduction

Development of tourism in vulnerable nature areas raises the question whether this activity will be a threat to natural values. Natural values (biodiversity, geodiversity and landscapes including species and habitats) in arctic and alpine areas are today under more extensive human influence than any time in history. This pressure implies new challenges for the management of nature, including the connection between conservation and development of economic activity. Sustainable and nature-related tourism depends on these values, as they are the basis for the economic product for this business. Deteriorated environmental values can imply lost economic values. Protection of values is thus a common goal for the management authorities, tourist-industry, the tourists, environmental organisations, and other users.

To improve the relationship between use and protection of values the negative effects of use must be recorded and examined and the potential to prevent these to occur must be outlined. The next challenge is the development of tools to restore the negative effects and impacts. Restoration ecology is a relevant approach to both these challenges, with a focus on preventing/ averting and on the assisted recovery if negative impact occurs. This paper has a focus on disturbance and restoration of vegetation, soils and landscapes, and mainly uses examples from alpine nature areas in Norway.

2. Disturbance and ecological effects

Human activity like technical installation, infrastructure development, and traffic (by vehicle or by foot) causes effects on vegetation, soils and landscapes in arctic and alpine areas. There is a common agreement that large, visual disturbance is an unwanted consequence of tourism in vulnerable areas. In a further discussion of management strategies this has to be considered in a broader sense. Different type and scale of activity causes a variety of effects, different types of vegetation and landscapes have different tolerance, and what are the environmental impacts of the measured effects? These topics have to be discussed in relation to the site-specific management challenges.

Tourism in arctic and alpine areas is of diverse categories, causing very different direct and indirect ecological effects. In this paper we focus on the direct effects on the surface terrain, and do not discuss topics like pollution, littering or changes in grazing pressure caused by disturbance of wildlife.

Most visible direct effects of tourism are the establishment of large technical installations, including earth

moving and permanent influence on the landscapes. Other direct surface disturbance, like trampling and vehicle traffic, also causes effect on soil and vegetation. Within these types there are a range of activities and they occur on different geographical and temporal scale.

The relationship between disturbance (influence) and the measured effect depends on a range of conditions. Some conditions are related to the actual disturbance and others are related to the environmental conditions at the disturbed site.

- Characteristics of the actual disturbance; type of activity, at what frequency and intensity the activity occur. Also scale, both geographical and temporal scale, and time of the year or weather conditions are determined for the consequences of e.g. vehicles and snow mobiles.
- The effects of disturbance is closely linked to site characteristics, like where the disturbance or activity is situated (climatic and geographical region), soil conditions, water regime, vegetation type, terrain and landscape type. Erosion rate can be calculated based on the relationship between these factors (Gray & Sotir 1996). Water content and the soil structure are the factors with highest influence on carrying capacity of the terrain surface.

Resistance and resilience are useful concepts to describe the relationship between disturbance and effect. Resistance is the ability of a site to remain unaffected to external changes, while resilience is the ability to recover after disturbance. Both resistance and recovery is relevant at different scales, and in a management situation the specification of scale is highly relevant. Relevant levels of scale for disturbance and restoration of vegetation can be the vegetation type or habitat, single species, or even a restricted landscape unit. A vegetation type or a species with high resistance will tolerate high intensity of disturbance before any effect can be recorded, and the effect is less at a given disturbance level than in a vegetation type with low resistance. Different vegetation types have different resistance to external changes. Resilience is defined by the degree e, manner and pace of recovery of a system following disturbance, and ecosystems or vegetation types with low resilience have slow natural recovery. In a management situation evaluation of resistance and resilience will be of high relevance when formulating management strategies, e.g. formulation of restoration goals, in order to prevent and limit negative effects of human activity in vulnerable ecosystems.

In general wet vegetation types on fine-grained soil have low resistance, like fens and bogs, swampy woodland and rich grassland (Strandberg 1997, Tømmervik *et al*. 2005). Dry vegetation types like alpine ridges and lichen woodland in general have low resilience, meaning that natural regeneration in these vegetation types is can be hardly recordable within the range of several decades following a disturbance. Arctic and alpine areas are particularly vulnerable to physical disturbances as they have a combination of low resilience and slow recovery. Areas with permafrost have further increased vulnerability, as changes in vegetation cover have effects on the surface temperature and water balance and causes erosion (Råheim 1992). Lichen, heath species and herbs have low tolerance to trampling or vehicle traffic. Grass species have very high trampling tolerance and high recovery rate, and several pioneer moss species also have high recovery rate (Tømmervik *et al*. 2005).

3. Ecological effects and environmental impacts of disturbance

Ecological effects of disturbance can be measured quantitatively as changes in species abundance, species composition, or coverage. Even moderate disturbance can cause long-lasting changes in vegetation composition. Studies of vehicle tracks shows increased temperature and available nutrients, fewer species in the tracks compared to the surrounding areas and changes in surface hydrology (Chapin & Shaver 1981, Bazzaz 1996). This facilitates fast-growing species with a preference and tolerance for nutrients, like grass, sedges and some moss species, and this situation is frequently observed in mountain areas. Effects of disturbance on the landscape level are in several cases experienced as the most outspoken, in particular in open alpine areas. These can be related to ecological effects, but in some situations the visual effect is more outspoken.

Level of acceptable change or effect must be related to site and in a temporal and geographical scale. A small or moderate effect can develop into a large-scale effect during time, and somewhere during this time the level of acceptance is exceeded. The level of acceptance is not a quantitative state. The normative concept of environmental

matter to society, evaluated against some value norm (Emmelin 1996, Hagen *et al*. 2002). In order to discuss and formulate a level of acceptable change, and to formulate a need for restoration, it is necessary to look into the values and considerations of affected groups and stakeholders. The involvement of affected groups and the defining of *who are the affected* is not an obvious task. The list of relevant groups will include management authorities at different level, local people, indigenous residents, economic interests, Non-Governmental Organisations (NGO's), and other depending on the situation, The different groups have different preferences, power, and traditions of obtain influence, and their relative influence will probably affect the outcome of a process. At this state management and planning is turned into a value question.

4. Restoration ecology

Restoration ecology arose from the need to rehabilitate disturbed ecosystems. A wealth of definitions and terms are used to describe different approaches to restoration, from pure scientific approaches to the technical and practical rehabilitation.

Successful restoration requires an expanded and integrated approach including technological, social, political, economical and aesthetical aspects (e.g. Edwards *et al*. 1997, Higgs 1997, Hagen 2003). An integrated approach is essential to the application of scientific knowledge into practical restoration enterprises with a time frame, cost and scale that is relevant for the management of each specific area (Fig. 1).

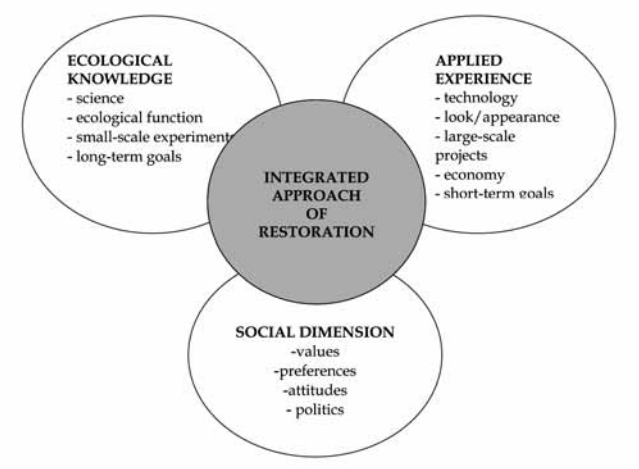

Figure 1.
For the application of restoration in management of arctic and alpine areas, the ecological knowledge must be integrated with experiences from practical enterprises, and also focus on the social dimensions of management, such as values and preferences of involved users and stakeholders.

The site specific restoration is an obvious consequence of the integrated approach. The status of the site, in a broad sense, must be the basis for formulation of restoration goals, and include a precise description of: 1) disturbance type, 2) site characteristics, 3) present status and use, 4) future use and preferences, 5) spatial and temporal scale for the planned project and 6) scoping for expected ecological and social effects from restoration (positive and negative).

What is good restoration? The formulation of realistic and site-specific goals is a premise to success in restoration projects, both for ecological and social reasons. Two questions are essential for the formulation of goals in the initial phase of a restoration project: "What is possible?" mainly related to the ecological and technical limitations and the normative "What is wanted?" related to preferences and priorities (including economy), and actors and stakeholders attitudes.

Ecology as a science is crucial in describing the effects of any restoration enterprise, and success evaluation has traditionally focused on technical solutions or pure scientific results (Higgs 1997). In order to extend the view on success evaluation, the distinction between ecological effect and environmental impact can be useful. In the planning and in the evaluation of restoration projects the relationship between ecological effects and environmental impacts is of particular relevance, as the resource allocation for restoration in a management situation will be related to the actual and normative impact of an enterprise.

Development of sustainable tourism must relate to the environment and environmental effect. Measured effects of tourist activity on scientific parameters (like surface erosion or wildlife stress) are likely to be the input in management models. But in the development of sustainable tourism these effects must be put into a social and normative frame, as some of the measured effects are more relevant (and *important*) than others in the formulation of management strategies. A hypothetical example: Along one footpath in dry vegetation an increased cover of grass

species is recorded while the total cover of common heather species is reduced. Along another footpath an increased level of naked soil and erosion is recorded in a fen. Only the second situation will call for a management effort (like channelling or using mats for erosion control) as this effect can be valuated as cumulative negative to the ecosystem and will have influence on the use of, and experience of, the area for visitors.

4.1. Restoration methods in arctic and alpine areas

When dealing with restoration of vegetation on disturbed sites the two terms *natural regeneration* and *assisted recovery* are of particular relevance. Natural regeneration is the establishment of vegetation through succession in the disturbed site. Assisted recovery refers to the use of practical efforts set up in order to speed up or control the establishment of a new vegetation cover into a more or less defined desired state.

The ecological limitations for natural regeneration are the basis for artificial restoration methods, and in arctic and alpine regions these are quite outspoken. Low temperatures, limited water availability during part of the year, and low levels of soil nutrients contribute to aggravate the conditions for plant establishment (e.g. Chapin & Shaver 1985, Urbanska & Chambers 2002). Under these circumstances the need for assisted recovery can be the only way a vegetation cover can be established following severe disturbance within a time frame of decades.

The aim of assisted recovery can be the artificial establishment of a new plant cover, or to prepare for increased natural regeneration of a vegetation cover, or a combination of these when a restoration is needed. The knowledge and concepts from restoration ecology can also be useful in planning and management to reduce the risk of future disturbance or prevent negative impact from new development projects.

A lot of methods for restoration exist, some of these are closely related and others are very different in relation to scientific approach, management strategy, cost, practical experience, and site-relevance. For pedagogical reasons it is useful to group the methods and one way to do this is presented below. In restoration projects combination of different methods is often used.

4.1.1 Seeding or planting of introduced species

Seeding of cultivated and commercially available seeds from grass species is an established method reported to result in rapid development of a plant cover, and is used both in small and large-scale projects (Fig. 2). The intention of using introduced seeds can in some situations be to establish a new vegetation cover in a long time scale, where the seeded species persist as a part of the new vegetation. In other situations the seeded species are used as *nurse-species* (Jordan *et al*. 1987), used to prepare for further natural regeneration, however not a part of the future vegetation cover at the site. The long-term effect of grass on local vegetation development often unpredictable and disputed (Densmore 1992, McKendrick 1997, Forbes & McKendrick 2002,). By using introduced species the new vegetation will differ from the original and the surrounding vegetation both ecologically, physiognomic and visually. There is a concern that introduced species can displace original vegetation or breed with locally adapted taxa (Parker & Reichard 1998).

Figure 2.
Hydroseeding application of commercial seed mixture at an alpine site in Norway.

Most projects using introduced species are poorly documented. In large-scale development projects this has traditionally been considered a low-cost method for quick establishment of a plant cover. This method has been recommended under specific conditions, like when a plant cover is needed within limited time to prevent erosion or because this is the only solution for any establishment of an organic layer.

4.1.2 The use of native species

The use of native species becomes more feasible as restoration methods are improved, and as ecological and ideological arguments against introduced species become more outspoken (Lessica & Allendorf 1999). Poor availability of plant material and limited applied experiences has traditionally prevented the use of native species in restoration (Forbes & McKendrick 2002), and in general this type of methods are still of limited applicability in large scale restoration projects.

Reproduction by seed occurs frequently in arctic and alpine vegetation (Molau & Larsson 2000, Cooper *et al*. 2004). The slow natural recovery in these ecosystems indicates that establishment of a vegetation cover is limited by seedling survival and availability of safe micro-sites rather than the presence of viable seeds. Use of native species transplants in restoration is expected to be favourable compared to seeding under extreme environmental conditions, as the most vulnerable stages of germination and recruitment are circumvented (Fattorini 2001, Davy 2002).

Greenhouse propagation and cultivation from seeds or cuttings of several common arctic and alpine species has been suggested and tried (Fig. 3). Plants from seeds and cuttings can be produced during the period between two growing seasons (Hagen 2002). Greenhouse cultivation is a resource demanding technique, but holds good prospects for producing numerous plants for restoration purposes. Production of seeds based on a local pool of hand-collected material also show interesting prospects for large-scale restoration (Faye-Schøll & Martinsen 2002, Forbes & McKendrick 2002), and so is the collecting and direct outdoor planting of cuttings (Jorgenson *et al*. 1999, Svavarsdottir 2006, Hagen 2007).

Figure 3.
Cuttings of Salix phylicifolia *collected at a disturbed site and propagated in greenhouse. The native new plants are used for restoration of the site the subsequent summer.*

Established transplants or turfs can contribute further to natural regeneration of a vegetation cover by creating safe sites for plant establishment, by influencing soil nutrient concentration and soil activity, and by physical stabilisation of the soil and surface environment (Urbanska 1997, Onipchenko *et al*. 2001). Collecting turfs adjacent to the disturbed site suffers from the problem of inflicting damage at new sites and careful and site-specific procedures must be developed to use this method, and this contributes to the high cost of this methods. However some large-scale experiences from alpine road restoration, like the restoration of a military training area in Norway, indicate that this method has a future potential (personal observation).

Native species in restoration has received more interest during the last years, and the use of the methods is expected to increase as more practical and large-scale experiences are gained. More experience and monitoring is needed to predict long-term effects of the restoration efforts and for further development of these methods (Hagen 2006).

4.1.3 Nutrient and soil treatments

Due to slow microbiological processes the level of available nutrients (mainly nitrogen and phosphorus) is low, and application of nitrogen is known to cause immediate effect on alpine vegetation (e.g. Forbes & Jefferies 1999). Plant species in these ecosystems are adapted to a permanent lack of phosphorus and nitrogen (Chapin & Shaver 1985, Urbanska & Chambers 2002). Application of nutrients in arctic and alpine ecosystem is reported to cause immediate influence on biomass production, fertility, and vegetation composition, and promotes the growth of grasses and mosses (Forbes & Jefferies 1999, Gough *et al*. 2002).

A range of nutrient applicants is available for restoration purposes, including fertilizer, dung, mulch, alginate and organic waste. Mulch and organic mats are also used to

stabilize the surface and to prevent erosion. These methods can be a useful strategy to increase vegetation cover in moderately disturbed sites.

Organic soil is a limiting factor, and must be handled with care. Storage and re-use of soil is developed as a method for large scale restoration of vegetation cover following technical development projects (Skrindo 2005). Native organic soil contains seeds and vegetative unit and is the basis for establishment of new plant individuals and further vegetation development. This method is of particular interest in new development projects, where organic soil is removed before the construction is built, then added to cover the disturbed site. The soil can be used separately, or in combination with other methods, like fertilizer or seeding and planting of native species. The utilisation of top soil requires good planning during the entire project. Application of native soil will also have an immediate aesthetical effect on the site as the colour of organic soil better reflects the surrounding undisturbed surface compared to mineral soil. In a road development project in southern Norway the road authorities and researchers together concluded that this treatment can be both ecological and economical favourable (Skrindo 2005).

4.1.4 Landscaping

In some situations the recovery of a terrain or landscape surface will be the initial basis of the restoration of a vegetation cover. The vegetation cover reflects topography, hydrology, soil composition and shape of the terrain, and all these attributes must be considered in site-specific restoration. The mutual relationship between landscape and vegetation must get special attention in the formulation of realistic goal regarding the future of a site. Landscaping can be the basis for establishment of vegetation cover without assisted recovery, or be used in combination with other restoration methods.

Landscape has two main approaches, and both are highly relevant in the interaction with restoration (Anon 2000). The *physical appearance* is a quantitative description of geological, hydrological and climatic attributes used to illustrate a landscape. The normative *meaning of landscape* describes attitudes, preferences and visual expression of landscape. There are examples of conflict between these, as the recreation of an *original* terrain surface contributes to cover ongoing geological processes and structures in the landscape. By some groups restoration can be considered a way of hiding the natural and/or cultural history of a landscape. In the restoration of a military area in Norway, situated in the low-alpine region, a debate has been raised about whether some military installations should be kept for the future or if all should be removed (Faye-Schøll & Martinsen 2002). The same area holds important geological values, and some of these have been exploited as gravel pit. Alternative restoration goals are to restore a surface landscape to give an impression or look of intact landscape, or alternatively to keep the remnants of geological structures exposed without any re-allocation of gravel for educational purposes.

4.2. Natural regeneration as a restoration strategy

In many disturbed sites natural regeneration is a good solution for establishment of a new vegetation cover, provided that the disturbing activity has terminated (e.g. by fencing or restriction of use). The main advantage of natural regeneration as a strategy is to avoid any unwanted consequences of other, artificial methods (like introduced species, promotion of some species at the sacrifice of other, long-term consequence). Natural regeneration is in general less resource-draining than other methods, and is also sometimes considered as more sustainable as it leaves nature *to itself* (Hagen *et al*. 2002).

The disadvantages are that in some ecosystem natural regeneration is slow, and is under some ecological conditions virtually absent within the range of decades. Available water seems to be a key-factor for natural regeneration in these areas. Lack of vegetation might cause erosion and secondary disturbance. The disturbance will in most cases imply changes in physical and ecological conditions at the site (Fig. 4), recovered vegetation will be different from the original and surrounding cover, both in plant composition and function. A normative complication of this *no action* strategy is the impression by users or visitors that nothing is being done, and the developers might get a reputation as running away from their responsibility.

Figure 4.
Disturbance implies changes in physical and ecological conditions at the site, and lack of vegetation might cause erosion and secondary disturbance.

4.3 How to find the best method?

The main reason to apply assisted recovery efforts is to get over the disadvantages from natural regeneration. Any decision concerning assisted recovery must be site specific, and include a description of physical and biological site qualities, disturbance characteristics, and social and political considerations. Formulation of goals and the economic priorities within the project are essential to the selection of a *best* method.

One general strategy is to use the less intrusive method needed to achieve the site-specific goal. In an ecological sense this implies methods of less influence on natural processes and ecosystem function. By this strategy any unpredictable negative effects of restoration will be minimized. The least implicative method is natural regeneration, and if this strategy is in accordance to the goal this should be the priority solution. Potential negative effects and impacts of the efforts must be considered. The use of commercial seed mixtures is probably the type of methods having potentially most unexpected negative effects to ecology and genetics (see 4.1.1), and results from ecological monitoring of assisted recovery is not clear about the long-term effects of using introduced seeds for restoration. Further development and documentation of methods will improve the implementation of site-specific solutions.

5. Application of restoration in relation to sustainable tourism

Most companies engaged in commercial activity related to tourism and travelling in or next to protected areas in Norway reported that their activity could have an influence of the protected values in the area (Ås *et al*. 2006). However, a large majority thinks this influence is positive, as it will contribute to the knowledge about values and the vulnerability of the environment (80%, n = 214). Only very few (2%, n = 214) think that their activity have negative influence on the protected values. This result is interesting as it might indicate a limited consciousness from the companies on a need for active preventing or restoring efforts related to the activity.

Today we see increased attraction for tourism and related economic activity in nature areas, like hotels and Farm tourism, guiding, safari, hunting and fishing (Page & Dowling 2002, Ås *et al*. 2003). The ecological effects and environmental impact of the economic activity is related to how the business is organised and carried out (Hammitt & Cole 1987, Forbes *et al.* 2004). How is the transport organised and by what means? What is the level of infrastructure, constructions and how are these used? How is the concern for environmental values, like vegetation and wildlife, expressed? Are there any routines for handling of waste, etc? The answers to these questions are vital to describe any negative impact from a given number of visitors.

In Norway the management efforts, including outline the need for restoration, related to mountains in general and protected areas in particular is very low, and this priority has met criticism from the Norwegian Public Accounts Committee (Riksrevisjonen 2006). The high activity level calls for a larger focus and priority on management efforts, to secure an integrated planning and prevent negative environmental effects related to the economic development. A review of management efforts in protected areas indicate a need for considering restoration, however today this is conducted as isolated actions and not as a part of a management strategy (Heiberg *et al*. 2006).

Restoration project are can either be instructed from management authorities or initiated from the tourist industry. The intention, scale (economic and geographical), and ecological and economic approach can be very different for different situations. The motivation for doing

restoration related to tourist facilities can be: 1) to prepare for increased total volume of visitors (which in the next step might cause increased negative impact), 2) to improve the quality of the experience for the users/tourists, 3) to reduce the negative effects of present use and 4) to protect values (ecological, aesthetical, cultural history, landscape).

The most common management action in alpine areas with a pressure from tourism in Norway is regulation, mainly channelling the traffic along marked paths or routes, to concentrate the activity in established sites, regulate the use of vehicles to defined areas, time of year and volume. There are overall only a very few examples of active restoration efforts related to tourism in nature areas in Norway, and those reported are in general very technical and poorly documented (Heiberg *et al*. 2006). Consequently positive result can hardly be repeated, as the technical procedure and the ecological effects are difficult to reproduce and so the long-term development is difficult to monitor. A lack of data from long-term restoration efforts is a general problem in restoration, not only related to tourism. This makes it difficult to predict the effect on different restoration methods in different sites. Management programs are essential to: 1) measure effects and impacts of the tourist related activities, 2) suggest management strategies (including site specific restoration) and evaluate effects of restoration efforts or management efforts in general.

If restoration should be developed as a strategy in the management of nature values in areas under pressure from tourism the tourist industry must be involved in the formulation of realistic restoration goals, based on their first-hand knowledge of the type, range and intensity of activities at the sites.

6. Conclusion

In traditional nature conservation severely disturbed areas can easily be considered as *lost*. Tourism activities in nature areas are diverse, and a variety of preferences and types of use is present. In a situation of strongly expanded or intensified use the negative effects from activity is expressed. The increased pressure on nature areas and multiple use mountain areas has raised the question of using restoration as a management strategy.

By restoration areas can retain values as recreation area, and nature area and occurrence of rare species can be restored. In this way disturbed sites or objects can be created into areas of ecological, aesthetical, cultural, or landscape qualities for the environment and for people. An integrated approach to restoration can be the key to find management solutions within the relationship between use and protection of values. A good basis is the formulation of realistic goals based on ecological qualities at the site, present disturbance situation and expected future use. The preferences and know-how from relevant user groups, including local people, economic interest, NGO and management authorities is essential to make restoration a useful management tool.

Further development of methods for assisted recovery is important for the use of restoration as a management strategy. Methods for large-scale restoration and methods based on the use of native species should get the main attention.

Acknowledements

Two anonymous reviewers kindly commented the first version of the manuscript.

References

Anon. 2000: European Landscape Convention. -Council of Europe.

Bazzaz, F. A. 1996: Plants in Changing Environment. Linking physiological, population, and community ecology. - Cambridge University Press, Cambridge.

Chapin, F. S. I. & Shaver, G. R. 1981: Changes in soil properties and vegetation following disturbance of Alaskan arctic tundra. - Journal of Applied Ecology 18: 605-617.

Chapin, F. S. I. & Shaver, G. R. 1985: Arctic - Physiological ecology of North American plant communities eds. Chabot, B. F. & Mooney, H. A.): 16-40. Chapman and Hall, London.

Cooper, E. J., Alsos, I. G., Hagen, D., Smith, F. M., Coulson, S. J. & Hodkinson, I. D. 2004: Reproduction by seed in Svalbard: seedling emergence in the field and in soil sample studies in laboratory trials. - Journal of Vegetation Science 15: 115-124.

Davy, A. I. 2002: Establishment and manipulation of plant populations and communities in terrestrial systems. - Handbook of ecological restoration. Volume 1. Principles of Restoration. (eds. Perrow, M. R. & Davy, A. I.): 223-241. Cambridge University Press, Cambridge.

Densmore, R. V. 1992: Succession on an Alaskan Tundra disturbance with and without assisted revegetation with grass. - Arctic and Alpine Research 24: 238-243.

Edwards, P. J., Webb, N. R., Urbanska, K. M. & Bornkamm, R. 1997: Restoration ecology: science, technology and society. - Restoration ecology and sustainable development. (eds. Urbanska, K. M., Webb, N. R. & Edwards, P. J.): 381-390. Cambridge University Press, Cambridge.

Emmelin, L. 1996: Landscape impact analysis: a systematic approach to landscape impacts of policy. - Landscape Research 21: 13-35.

Fattorini, M. 2001: Establishment of Transplants on Mashine-Graded Ski Runs Above Timberline in the Swiss Alps. - Restoration Ecology 9: 119-126.

Faye-Schøll, T. & Martinsen, O. E. 2002: Restoration of Hjerkinn Firing Range to National Park status. - Kart og Plan: 161-165.

Forbes, B. C. & Jefferies, R. L. 1999: Revegetation of disturbed arctic sites: constraints and applications. - Biological Conservation 88: 15-24.

Forbes, B. C. & McKendrick, J. D. 2002: Polar tundra. - Handbook of Ecological Restoration. 2 (eds. Perrow, M. R. & Davy, A. J.): 355-375. Cambridge University Press, Cambridge.

Forbes, B. C., Monz, C. & Tolvanen, A. 2004: Tourism ecological impacts in terrestrial ecosystems -Environmental impacts of ecotourism (ed. Buckley, R.): 155-170. CABI Publsihing, Wallingford.

Gough, L., Wookey, P. A. & Shaver, G. R. 2002: Dry Heath Arctic Tundra Responses to Long-term Nutrient and Light Manipulation. - Arctic, Antarctic and Alpine Research 34: 211-218.

Gray, D. H. & Sotir, R. B. 1996: Biotechnical and soil bioengineering slope stabilization: a practical guide for erosion control. - Wiley, New York.

Hagen, D. 2002: Propagation of native arctic and alpine species with a restoration potential. - Polar Research 21: 37-47.

Hagen, D. 2003: Assisted recovery of disturbed arctic and alpine vegetation - an integrated approach. Dr. scient. thesis. - Department of Biology, Faculty of Natural Sciences and Technology, NTNU, Trondheim.

Hagen, D. 2006: Restoration of severely disturbed alpine and arctic vegetation in Norway using native species - an integrated approach. . -Conference Soil-Bioengineering – Ecological Restoration with Site-specific Seed- and Plant Materials. Austria. 5.-9. September 2006 (eds. Kreutzer, B. & Hacker, E.): 63-70.

Hagen, D. 2007: Native willows (Salix spp.) in restoration – a technical solution with ecological and social fidelity. - Effects of afforestation on ecosystems, landsape and rural development. AFFORNORD conference June 18-22. TemaNord 2007:508. Reykholt , Iceland (eds. Halldorsson, G., Oddsdottir, E. S. & Eggertsson, O.): 139-146.

Hagen, D., Åsetre, J. & Emmelin, L. 2002: Communicative approaches to restoration ecology: a case study from Dovre Mountain and Svalbard, Norway. - Landscape Research 27: 359-380.

Hammitt, W. E. & Cole, D. N. 1987: Wildland Recreation: Ecology and Management. - John Wiley & sons, New York.

Heiberg, M. M., Hagen, D. & Christensen, H. M. 2006: Rammebetingelser og handlingsrom for næringsutvikling i verneområder - formelle styringsverktøy, grunneieres oppfatninger av handlingsrom og bruk av avbøtende og restaurerende tiltak. -NINA Rapport 143. NINA, Lillehammer.

Higgs, E. S. 1997: What is good ecological restoration? - Conservation Biology 11: 338-348.

Jordan, W. R. I., Gilpin, M. E. & J.D, A. 1987: Restoration ecology. A synthetic approach to ecological research. - Cambridge University Press, Cambridge.

Jorgenson, M. T., Cater, T. C. & Roth, J. E. 1999: Revegetation for erosion control on the alpine development project, 1998, 1st annual report prepared for ARCO Alaska Inc. -Fairbanks, AK: Alaska Biological Research Station.

Lessica, P. & Allendorf, F. W. 1999: Ecological Genetics and the Restoration of Plant Communities: Mix or Match? - Restoration Ecology 7: 47-50.

McKendrick, J. D. 1997: Long-term tundra recovery in northern Alaska. - Disturbance and recovery in Arctic lands (eds. Crawford, R. M. M.): 503-518. Kluwer Academic Publishers, Dordrecht.

Molau, U. & Larsson, E.-L. 2000: Seed rain and seed bank along an alpine altitudinal gradient in Swedish Lapland. - Canadian Journal of Botany 78: 728-747.

Onipchenko, V. G., Makarov, M. I. & Van der Marel, E. 2001: Influence of alpine plants on soil nutrient concentrations in a monoculture experiment. - Folia Geobotanica 36: 225-241.

Page, S. & Dowling, R. K. 2002: Ecotourism. - Prentice & Hall, Harlow.

Parker, I. M. & Reichard, S. H. 1998: Critical issues in invasion biology for conservation science. - Conservation biology for the coming decade (eds. Fiedler, P. G. & Kareiva, P. M.): 283-305. Chapman & Hall, New York.

Riksrevisjonen. 2006: Riksrevisjonens undersøkelse av myndighetenes arbeid med kartlegging og overvåking av biologisk mangfold og forvaltning av verneområder. Dokument nr. 3 - serien. - Riksrevisjonen (Norwegian Public Accounts Committee), Oslo.

Råheim, E. 1992: Registration of vehicular tracks on the Svalbard archipelago. Norsk polarinstitutt meddelelser nr. 22. - Norsk polarinstitutt, Oslo.

Skrindo, A. 2005: Natural revegetation from indigenous soil. Dr. Scientiarum. - Department of Plant and Environmental Sciences, Norwegian University of Life Sciences, Ås.

Strandberg, B. 1997: Vegetation recovery following anthropogenic disturbances in Greenland. - Disturbance and recovery in Arctic lands: an ecological perspective (ed. Crawford, R. M. M.): 381-390. Kluwer Academic Publishers, Dordrecht.

Svavarsdottir, K. (ed.) 2006: Native willows in Iceland: Biology and potential use for reclamation. - Soil Conservation Service, Gunnarsholt, Hella, Iceland. (In Icelandic with an Extended English Abstract).

Tømmervik, H. A., Erikstad, L., Jacobsen, K.-O., Strann, K.-B., Bakkestuen, V., Aarrestad, P. A., Yoccoz, N. G., Hagen, D., Johnsen, T. V., Johansen, B., Høgda, K. A., Ahmned, S. H., Dahl, R., Bargel, T. H. & Olsen, L. 2005: Langtidsvirkninger på naturmiljøet av Forsvarets virksomhet i Troms. NINA Rapport 49. -NINA, Trondheim.

Urbanska, K. M. 1997: Safe sites - interface of plant population ecology and restoration ecology. - Restoration ecology and sustainable development (eds. Urbanska, K. M., Webb, N. R. & Edwards, P. J.): 81-110. Cambridge University Press, Cambridge.

Urbanska, K. M. & Chambers, J. C. 2002: High-elevation ecosystems. Restoration in practice. - Handbook of ecological restoration. 2 (eds. Perry, M. R. & Davy, A. J.): 376-400. Cambridge University Press, Cambridge.

Ås, Ø., Heiberg, M. M., Haaland, H., Hagen, D. & Christensen, H. M. 2006: Turistbedrifter i og rundt norske verneområder – Aktiviteter, utviklingstrekk, naturbruk, miljøtiltak, muligheter og utfordringer sett fra turistbedriftenes synspunkt. NINA rapport 141. -NINA og NORSKOG, Lillehammer/Oslo.

Ås, Ø., Vistad, O. I., Dervo, B. K., Eide, N. E., Kaltenborn, B. P., Haaland, H., Andersen, O., Svarstad, H., Skår, M. & Nellemann, C. 2003: Bruk og forvaltning av nasjonalparker i fjellet. - Internasjonale erfaringer med forvaltning av menneskelig virksomhet i nasjonalparker. - Kartlegging av næringsaktivitet i Dovrefjell-Sunndalsfjella, Femundsmarka og Reisa nasjonalparker. - Litteraturstudie av økologiske, kulturfaglige og sosiale effekter av turisme i verneområder. NINA Fagrapport 72. -NINA, Lillehammer.

Hardy plants for landscaping and restoration in northern Finland

Henna Pihlajaniemi[1)], Mirja Siuruainen[1)], Salla Kananen[2)], Kari Laine[3)], Sirkka-Liisa Peteri[2)] & Satu Huttunen[4)]*

[1)]Botanical Gardens
P.O. Box 3000, FI-90014 University of Oulu, FINLAND
[2)]Department of Natural Resources and the Environment,
Lapland Vocational College,
Metsäruusuntie 18, 96400 Rovaniemi, FINLAND
[3)]Thule Institute,
P.O. Box 7300, FI-90014 University of Oulu, FINLAND
[4)]Department of Biology
P.O. Box 3000, FI-90014 University of Oulu, FINLAND
[*]corresponding author: henna.pihlajaniemi@oulu.fi

Abstract

The need for knowledge on how to sustain environmental values increases along with the rising rate of tourism at the northern tourist destinations. Based on the expertise of the Botanical Gardens of the University of Oulu and the Department of Natural Resources and Environment at Lapland Vocational College, the LABPLANT -task of *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB) has concentrated on finding and producing hardy plants that meet the needs of sustainable landscaping and restoration in northern tourism areas. The subproject concentrates on the problems that the lack of 'green knowledge' generates at tourist destinations. Species-specific plant propagation methods have been developed, and over 100 hardy plant species have been propagated that can withstand the northern winter. The species were planted in the LANDSCAPE LAB demonstration areas. The demonstration areas in the Pallas-Yllästunturi National Park and at the Ylläs and Levi tourist destinations in the fell area of Finnish Lapland serve as examples of sustainable landscaping and restoration in northern tourism areas in vivo. They are also valuable sites for future studies. The demonstration areas and plant collections at the Botanical Gardens and Lapland Vocational College also serve as gene banks. LABPLANT – task has produced a manual on hardy northern plants. The manual recommends and lists the plant species for the growing conditions in the North and provides examples of their use in different habitats.

Keywords: hardy plants, landscaping, restoration, northern Finland, tourist destinations

1. Introduction

The growing conditions for plants in the North and at high altitudes are harsh. Northern Finland belongs to the northern boreal vegetation zone, where winter is the longest thermal season, the growing season is short (around 130 days) and the annual thermal sum is low (approximately 800°C) (Finnish Meteorological Institute 2005). The soil is poor in nutrients and acidity. Precipitation exceeds evaporation and consequently, mires are typical to the landscape. In northern fell areas as well as in the Alps of Central Europe, the mean annual temperature falls steadily (app. 0.55°C/ 100 m) with increasing height (Ozenda 1983). The light climate of northern areas has strong annual variation. At high northern latitudes, the polar day of the summer turns into a polar night during the winter.

Several ecological and physiological factors, such as slow growth and reproduction and an excellent adaptation mechanism to the cold and annual variation in the length of the day, have enabled northern and arctic plant species to adjust to the harsh conditions (CAFF 2001). As in the harsh alpine environments, the plants have a high degree of structural and functional specialization to the growing conditions (Körner 2003). Winter hardiness is one of the most important characteristics for ornamental perennial plants grown in the North. For successful growth, cultivated plants must be capable of adapting to the prevailing conditions. For wild plants, the limit of distribution is often the limit of reproduction. The limit for foreign ornamental plants is largely manmade in that ornamental perennials do not necessary have to reproduce in the North, but besides good ornamental value, they must also have good winter hardiness; in addition, these plants need to be available from nurseries (Stushnoff *et al*. 1983, Pihlajaniemi *et al*. 2005a,b).

Tourism has been on the rise in the northern areas of Finland (MEK 2007). Traditionally, tourism, especially in the fell areas of the Finnish Lapland, has concentrated on winter recreational activities. In recent years, local tourist entrepreneurs have focused on planning summer recreational activities in order to attract more tourists (Honkakumpu 2004). The manifestation of many tourist centres during the growing season is unappealing, the built up environment is disordered and erosion is apparent in the natural environment. Beautiful landscapes and nature

are among the most important attributes that influence the choice of a tourist resort in Lapland (Järviluoma 2006), which means that more attention must be paid to the built up and natural green environments at the tourist resorts.

Plants, particularly trees and shrubs, have many functions both in the natural and designed landscape. At tourist destinations, plants can be used as visual connectors that link the built up areas to the natural environment. Trees and shrubs filter noise, dust particles, protect from rain and sun and at the same time, they provide a nesting space for birds (Forrest 2006). Ground vegetation protects soil from erosion. With carefully set out plantations, it is possible to organize the space (Forrest 2006) such as at tourist areas. Thus, we can conclude that plants and plant ecosystems play an important role in making tourism areas enjoyable. Currently, there is a lack of suitable plants, growth substrate and knowledge for sustainable landscaping and restoration at the northern tourist destinations.

LABPLANT –task (*Production of Plant Material for Landscape Planning, Greening and* Restoration) was launched in Finland by the Botanical Gardens of the University of Oulu and the Department of Natural Resources and Environment of the Lapland Vocational College in Rovaniemi in order to find, select and produce hardy plants for landscaping in the northern parts of Europe. LABPLANT is one of the four tasks of the EU LIFE Environment project *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB). The project will develop and demonstrate methods for assessing the sustainability of the regional impacts of tourism. The primary goals of LANDSCAPE LAB are to prevent the negative impacts of tourism on nature and to improve the environment at the tourist destinations (Jokimäki & Kaisanlahti-Jokimäki 2005). The common names for the plant species detailed in this paper are taken from Polunin 1959, 1969 and Clapham 1962.

2. Aims and implementation of LABPLANT - task

2.1. Hardy plants for sustainable landscaping and restoration in northern areas

The selection of the hardy plants to be used in landscaping and restoration in the northern tourism areas was based on the expertise and scientific knowledge of plant ecology, landscape planning and restoration at the Botanical Gardens and Lapland Vocational College. A hardy plant is a plant that grows well under the prevailing climatic conditions, has value in cultivation and is resistant to disease and pests. Landscaping refers to the planting of perennial herbs, trees and shrubs in a certain area. Restoration is an act in which a habitat etc. is restored to a former state or to an unimpaired condition (Bradshaw 1997).

In plant selection the results from previous projects, which focused on producing a register of woody plants and herbaceous perennials adapted to northern climatic conditions and on the improvement of northern nursery production in the 1980s and 1990s, were utilized (Pihlajaniemi *et al*. 2005a,b, 2007). The plant collections and databases of the participating institutes were valuable sources of hardy plants. Lapland Vocational College is an expert in northern landscaping and horticulture, and it has practical skills and local knowledge. The college has participated in such things as the Klimariktige Planter project of the Nordic countries in the Arctic region (Pasanen *et al*. 1991). As a northern scientific garden, the Botanical Gardens of the University of Oulu has a long tradition in the acquisition and experimental cultivation of plants of different origin, especially trees and shrubs, in order to test their suitability for ornamental use in northern Finland; plants currently under cultivation include *Prunus maackii* (Manchurian cherry), *Picea mariana* (black spruce), Syringa 'Veera' (lilac), Rosa 'Sipi' (Rugosa rose) and Ligularia 'Hietala' (leopard plant). Expeditions to similar climatic conditions such as Siberia and the Far East have collected interesting plants that may be of value in northern landscaping. These plants include *Aquilegia sibirica* (Siberian columbine), *Dracocephalum grandiflorum* (dragonhead) and *Weigela middendorfiana* (yellow weigela) (Siuruainen *et al*. 2004). Seeds and cuttings originating from the Central European mountains (the Alps in particular) have been received from the international seed exchange and plants were collected during excursions especially during the 1980s and early 1990s.

2.2. Propagation of plants

In LABPLANT -task, plants were propagated from seeds, softwood and hardwood cuttings and in vitro through micro-propagation. Seed propagation was used for the fast growing herbaceous plants, which included

Astragalus frigidus (yellow alpine milk-vetch), *Gnaphalium norvegicum* (highland cudweed) and *Hieracium alpinum* (alpine hawkweed). Cutting propagation was used for species that produced an easily obtainable large amount of propagation material, and vegetative propagation is known to be successful. For example, all of the Salix (willow) species were propagated from cuttings. Cutting propagation maintains and clones the specific characteristics of the mother plant (Dirr & Heuser 1987).

Micro-propagation was used for several plant species. One advantage of micro-propagation is that it can be done all year around, even during the long winter months in Finland. For some species, there was limited amount of propagation material available and therefore in vitro propagation, in which cells or tissues are grown in culture, was used. The Botanical Gardens has long expertise in developing in vitro propagation methods for various types of plants. Probably the most famous example of in vitro propagation is the Betula pubescens f. rubra (red-leaved downy birch), which was propagated by the explants taken from the only wild specimen in North Finland (Kauppi & Ulvinen 1989); nowadays, it is a popular tree used in northern horticulture.

For some species that were difficult or slow to propagate, more than one different type of propagation method or different treatment within the same method was used in order to find the optimal propagation method. For instance, seeds from Trollius europaeus (globeflower) (Fig. 1) were collected at two different points and sowed differently; a better germination rate was obtained when fresh seeds were left out for winter in comparison to greenhouse cultivation. The slow growth of dwarf shrubs and conifers has to be considered when drawing up the time schedule for plant propagation. Similarly, the seeds of some perennial herbs, such as Rhodiola rosea (roseroot), can take more than one year to germinate. The correct timing of seed collection and sowing is essential for the propagation of many northern species. The seeds of some species need special handling, such as rubbing in acid sand before they are sown. There is also annual variation in seed germination, which does not necessarily correlate with flowering and fruiting intensity (Laine *et al*. 1995).

Over 100 species were propagated during the subproject: some 35 woody species, 54 herbaceous species and 14 dwarf shrubs. These included *Betula nana* (dwarf birch), *Rosa majalis 'Tornedal'* (cinnamon rose), *Dryas octopetala* (mountain avens), *Viola biflora* (yellow wood violet), *Campanula rotundifolia* (harebell) and *Melica nutans* (mountain melic).

Figure 1.
The symbol of the northern summer, Trollius europaeus, globeflower.

2.3. Demonstration areas

The LABPLANT -task established six demonstration areas in the Pallas-Yllästunturi National Park and in the Ylläs and Levi tourist areas located above the Arctic Circle in the fell region of northwest Finnish Lapland (Fig. 2). In the demonstration areas the hardy plants and their use is presented for the public in vivo. The areas are examples of sustainable landscaping and restoration in northern areas.

The demonstration areas represent the different habitats that can be identified in the northern tourism areas: 1) the built up *urban* area where traditional, ornamental plants were used, 2) the *transition zone* between the urban and natural landscape with a mixed composition of ornamental and native plant species and 3), the *natural* landscape where only native plants, that were propagated from local wild plants, were used. The use of the plants in the transition zone was carefully planned. Invasive species, such as *Sorbaria sorbifolia* (false spiraea), could not be used in this type of habitat because there is a risk that they spread in the environment and change the natural species composition of the habitat. Similar risk is in the use of cultivated plant species that hybridize with wild plants.

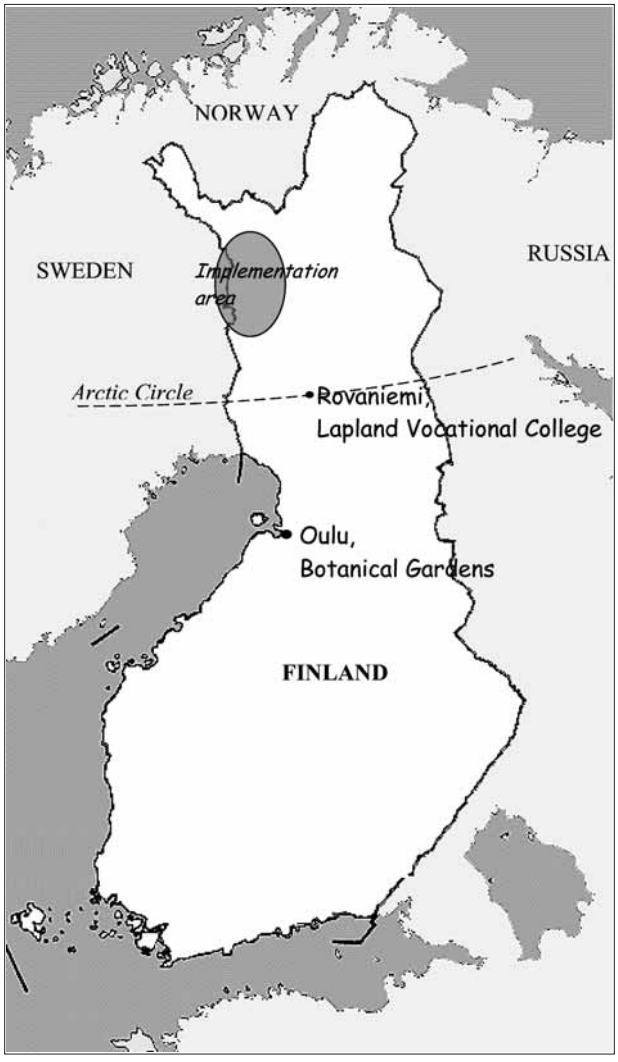

Figure 2.
Map of Finland showing the implementation area (grey) of the LANDSCAPE LAB-project where the demonstration areas of the LABPLANT-task are located.

Two different types of demonstration areas established in autumn 2006 are presented in more detail. At the Pallas-Yllästunturi National Park, the border between the managed and natural environment of the 'Porokaarre' environmental artwork was strict and clearly visible. The edge was restored by using plant species that were native to the area. These species included *Vaccinium myrtillus* (bilberry), *Vaccinium uliginosum* (bog bilberry) and *Juncus trifidus* (three-leaved rush). The introduction of these species accelerates natural succession. At Levi, one demonstration area was established at the start of the recreational outdoor track in the busy tourist centre. Natural landscaping was used because the demonstration area is located at the point where the built up area ends and the outdoor track leads into the natural environment. The choice of plant species included mainly wild plants and some ornamental plants that are traditionally used in landscaping in northern Finland, including *Angelica archangelica* (angelica), *Astragalus alpinus* (alpine milk-vetch), *Trollius europaeus* and *Bergenia crassifolia* (bergenia).

The plantations are weeded over the first few years after the areas were established. Once the transplanted material is in full growth and well adapted, the demonstration areas are left untouched for natural succession.

Future monitoring will be needed to see how the demonstration areas will function in the tourism areas. The demonstration areas and plant collections at the Botanical Gardens and Lapland Vocational College will also as gene banks of the mother plants.

2.4. Manual of hardy northern plants

The participants in the LABPLANT -task have written a manual of hardy northern plants for landscaping and restoration at the northern tourism areas (Laine *et al.* 2007). The manual is intended for professional and hobby use. The manual provides guidance on how to use hardy northern plant species and cultivars in landscaping and restoration. It introduces a list of plant species, the results of plant selection, that are suitable for these purposes. The list includes almost 300 wild and ornamental plant species and cultivars. The manual is in Finnish, with an English summary, figure texts and table texts.

3. Conclusions and results from LABPLANT -task

The nature around tourism areas located in harsh environments, like in the northern fell areas and Alpine mountains, is fragile. This, together with the increasing number of tourists, makes landscaping and restoration projects especially challenging. The landscaping and restoration of the plant environment should be carefully planned before construction gets underway. Already

existing built up areas should be acclimated to the nearby environments, with the aim of creating an ecologically, economically and culturally sustainable environment that is in harmony with the surrounding nature.

The choice of plants constitutes an essential aspect of restoration projects (Urbanska 1995) and landscaping in harsh areas. Traditional landscaping should favour local plant producers and local plant sources. These local producers have local knowledge of the hardy plants suitable for the area, i.e. of the ornamental plants that can be successfully cultivated in the area. In the natural environment, only wild plants native to the habitat should be used for restoration and rehabilitation. The seeds, cuttings etc. used for the propagation of the plants to be transplanted to the damaged area, should be collected by an expert from the nearest area possible without damaging the environment.

Urbanska (1995) concluded that the supply of indigenous or native cultivated material for ecological restoration presents a complex problem in Europe. The complex problem is still a reality in northern Finland; there is also lack of native plants for use in landscaping. The production of native plants should be controlled and concentrated at local plant nurseries. People that plan and implement landscaping and restoration in the northern areas should be aware of this so that there is also call for these plants.

Due to the lack of green knowledge, there should be more education and training focusing on the local aspect. In many cases, the methods and plants used in southern Finland cannot be applied to the conditions in northern Finland. The difference between regions is also a fact in other parts of European countries. Local governments and municipalities should be interested in issuing directions and recommendations for good practises in landscaping, gardening and restoration in order to create the characteristic environments of the different resorts. For example, a dry, nutrient poor site should be vegetated with local dwarf shrubs and built up areas, roadsides and parking areas should be lined with specific species such as rowan and cinnamon roses together with willows etc.

The results, manual and demonstration areas, of the LABPLANT -task provide new tools for improving the northern resort environment and restoring damaged areas. The manual of hardy and useful plants for northern environments provides guidance for further plantation by introducing the types of plants that should be used at different habitats in the North. The demonstration areas constitute valuable places for conducting studies and research. They are practical examples of plant use in different types of tourism areas that can be utilized to observe the success of plants in different biotopes. Moreover, the gene banks serve future landscaping and restoration and can provide the propagation material for hardy plants species.

This study proposes establishing annual competitions between tourist centres to improve their local environments and encourages users to enquire about the green environment at the tourism destinations. The positive results of these actions would generate added marketing value.

Acknowledgements

This study is a part of the EU LIFE Environment project *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB).

References

Bradshaw, A. 1997: What do we mean by restoration? -Restoration ecology and sustainable development (eds. Urbanska, K., Webb, N. & Edwards, P.): 3-7. Cambridge University Press, Gambridge.

CAFF 2001: Conservation of Arctic Flora and Fauna: Status and conservation. -Edita. Helsinki.

Clapham, A., Tutin, T. & Warburg, E. 1962: Flora of the British Isles 2nd edition. -Cambridge University Press, Gambridge.

Dirr, M. & Heuser, C. 1987: The reference manual of woody plant propagation: From seed to tissue culture. -Varsity Press Inc., Athens.

Finnish Meteorological Institute 2005: Ilmastokatsaus Joulukuu 12/05. -Ilmatieteen laitos, Helsinki.

Forrest, M. 2006: Landscape Trees and Shrubs: Selection, Use and Management -[Ebrary: Electronic books]. CABI Publishing, Wallingford.

Honkakumpu, I. 2004: Kesän vetovoima ei parane hintakilpailulla. -Vitriini 2004/1: 26-28 2004.

Jokimäki, J. & Kaisanlahti-Jokimäki, M.-L. 2005: Kestävän matkailun edistäminen: LANDSCAPE LAB -hankkeen sisältö ja tavoitteet. - Kestävät käytännöt matkailun suunnittelussa ja kehittämisessä (eds. Tuulentie, S. & Saarinen, J.): 114-118. Metlan työraportteja/Working Papers of the Finnish Forest Research Institute 20. Available from: http://www.metla.fi/julkaisut/workingpapers/2006/mwp033.htm

Järviluoma, J. 2006: Turistin luonto. Tutkimus luonnon merkityksestä matkailun vetovoimatekijänä neljässä Lapin matkailukeskuksessa. -Acta Universitatis Lapponiensis 96. Rovaniemi, Lapin yliopisto.

Kauppi A. & Ulvinen T. 1989: Two new forms of Betula pubescens from Finland. -Memoranda Society Fauna Flora Fennica 65: 133-136.

Körner, C. 2003: Alpine Plant Life. Functional plant ecology of high mountain ecosystems. 2nd edition. -Springer-Verlag, Berlin, Heidelberg, New York.

Laine, K., Malila, E. & Siuruainen, M. 1995: How is annual climatic variation reflected in the production of germinable seeds of arctic and alpine plants in the Northern Scandes? - Global change and Arctic terrestrial ecosystems. Ecosystems research report 10: 89 – 95. European Commission EUR 15519 EN.

Laine, K., Pihlajaniemi, H., Kananen, S., Siuruainen, M., Hämäläinen, A., Kauppila, T. & Peteri, S.-L. 2007: Pohjoisen matkailuympäristön kestävät kasvit. -Oulun yliopiston kasvitieteellinen puutarha, Lapin ammattiopisto Luonto- ja ympäristöala &Thule-instituutti. Kalevaprint Oy, Oulu (In Finnish with English summary).

MEK 2007: Matkailun kehitys Kesäkuu 2007. – Available from: http://www.mek.fi/web/stats/publish.nsf/c7d25333c6dcef4ec2256942002 06da5/e9dc22cd4eb75823c2256e7e0023d617/$FILE/06_%202007_%20Matkailun_%20kehitys.pdf

Ozenda, P. 1983: The vegetation of the Alps. European Committee for the conservation of nature and natural resources. -Council of Europe, Strasbourg.

Pasanen, P., Peteri, S.-L. & Riipi, M. 1991: Ei vain vaivaiskoivu. Lappilaisen taimen tie tuottajalta kuluttajalle. –Moniste, Rovaniemen maatalous- ja puutarhaoppilaitos, Rovaniemi.

Pihlajaniemi, H., Siuruainen, M., Rautio, P., Laine, K., Peteri, S.-L. & Huttunen, S. 2005a: Field evaluation of phenology and success of hardy, micro-propagated old shrub roses in northern Finland. -Acta Agriculturae Scandinavica Section B-Soil and Plant Science 55: 275-286.

Pihlajaniemi, H., Siuruainen, M., Rautio, P., Laine, K., Peteri, S-L. & Huttunen, S., 2005b: Success of hardy micropropagated ornamental shrubs in Northern Finland. -Journal of Applied Botany and Food Quality 79: 107-116

Pihlajaniemi, H., Siuruainen, M., Rautio, P., Laine, K., Peteri, S.-L. & Huttunen, S. 2007: Successful growth of micro-propagated ornamental tree forms in northern Finland. - Dendrobiology 57: 61-71.

Polunin, N. 1959: Circumpolar Arctic Flora. -Clarendon Press, Oxford.

Polunin, O. 1969: Flowers of Europe: a field guide. -Oxford University Press, London.

Siuruainen, M., Alanko, P., Laine, K. & Pihlajaniemi, H. 2004: Tieteellisten puutarhojen kokoelmat viherrakentamisen käyttökasvivalikoiman monipuolistajina. -MaataloustieteenPäivät 2004 [verkkojulkaisu](Eds. Hopponen, A. & Rinne, M.). Suomen Maataloustieteellisen Seuran tiedote no 19. Published 05.01.2004. Available from: http://www.agronet.fi/maataloustieteellinenseura/julkaisut/.

Stushnoff, C., Junttila, O. & Kaurin, Å., 1983: Genetics and breeding for cold hardiness in woody plants. - Proceedings from 'Plant Adaptation workshop' Tromso, Norway (eds. Kaurin, Å., Junttila, O. & Nilsen, J.): 141-156. Norwegian University Press.

Urbanska, K. 1995: Ecological restoration above timberland and its demographic assessment. - Restoration ecology in Europe (eds. Urbanska, K. & Grodzinska, K.): 15-36. Geobotanical Institute SFIT Zürich, Switzerland.

The problematique and opportunities of the relationship between tourism, community and the environment

Andrew Holden

Centre for Research into Environment and Sustainable Tourism (CREST), University of Bedfordshire,
Park Square, Luton, Bedfordshire, LU1 3JU, ENGLAND
andrew.holden@beds.ac.uk

Abstract

This paper explores the relationship between tourism, communities and the natural environment. It suggests that whilst tourism offers real opportunities for natural resource protection and sustainable development, the relationship between tourism, communities and environment can also be problematic and not necessarily a blueprint for a harmonious relationship. Whilst community involvement is often advocated as a positive principle for sustainable tourism development, it cannot necessarily be a taken assumption that communities will act as stewards of the environment. Indeed the notion of community is also complex in the context of tourism, involving a variety of different stakeholders across spatial areas. Hardin's (1968) parable of the Tragedy of the Commons holds many relevance's for tourism and it is argued that a shared environmental philosophy between tourism stakeholders is essential for nature conservation.

The type of environmental ethic that is held will influence community relationships with nature. Thus whether communities use natural resources in an instrumental fashion or act as stewards of nature is likely to be an outcome of a mix of different factors. Yet, as Boulding's (1973) concept of 'spaceship earth' suggests, we know that the planet does not have unlimited natural resources. Tourism offers an opportunity to build a model of sustainable development that incorporates both resource conservation and long-term livelihood benefits. Nevertheless, we are also aware that tourism can be a destructive force upon the environment.

It is advocated that central to developing a model of community based tourism (CBT), is the need to ensure the active inclusion of local people through the creation of meaningful economic opportunities centred upon nature based tourism, that offers more meaningful livelihoods. Subsequently, nature is transformed into a resources in a conserved state, providing eco-system and individual species protection, rather than a transformed state that may necessitate bio-diversity loss.

Keywords: conservation, environment, local communities, sustainable deelopment, tourism

1. Introduction

The first decade of the 21st century is marked by global inter-connectivity and processes of change. Key changes with global significance include: mobility of population and capital; global warming; development; poverty and competition for natural resources. Many of these themes are relevant to tourism. For example, mobility and global interconnectivity can be displayed through the growth in the recorded number of international tourism arrivals.

In 2006, over 800 million international tourist arrivals were recorded, compared to 25 million in 1950, and the figure is expected to reach 1.6 billion by 2020 (United Nations World Tourism Organisation 2006). The increasing mobility of a growing percentage of the world's population, supported by a propensity for the desire to travel and the integration of tourism into lifestyle patterns, influences other key themes of change, i.e. global warming, development, and natural resource usage. Tourism can thus be viewed as presenting a range of opportunities and challenges for destination communities. However, no community involved in tourism exists outside a complex system linking the places tourists come from with the ones they go to.

2. The reciprocity of tourism

2.1. Problematique

Increasing global mobility is a consequence of changing economic and social conditions in the societies tourists come from. It is fuelled by factors of economic development, urbanization, market competition including budget airlines, and in certain cases the easing of political restrictions. As tourism extends its spatial boundaries, more communities will have involvement with tourism. Tourism will also have more interaction with the natural environment, meaning that nature will be increasingly transformed into a resource for development, with a subsequent range of positive and negative effects upon it. Thus, whilst tourism can instigate changes in the natural environment it also acted upon by

changes in nature. Tourism cannot exist in a vacuum that separates it from the wider context of social and environmental change. This is exemplified by climate change, which tourism contributes to but will also be increasingly influenced by in the future. These influences will not only extend to where people travel to but will also influence the prosperity of communities that are dependent upon tourism.

At a global level the most significant effect of tourism upon climate is associated with air transport and the burning of fossil fuels for transport. The release of carbon dioxide (CO_2) is widely thought to be a major cause of global warming, and the emission of sulphur dioxide (SO_2) contributes to problems of acid rain which destroys forests and historic monuments such as the Parthenon in Athens. Per passenger kilometre, aviation produces more CO_2 than any other form of transport, as is shown in Table 1. These results are based upon a compilation of various reports investigating CO_2 emissions for different modes of transport (Dubois & Ceron 2006). The figure for car transport is given per vehicle, as the emission level per passenger will be determined by the number of people travelling in the car.

The uncertainty of the science of climate change prediction means there is no absolute certainty about how tourism will be affected by it. However, melting ice caps, rising sea levels, reduced snow fall, loss of bio-diversity and changing ecosystems will inevitably have implications for tourism. Owing to the importance of weather and natural environments to tourism, it is one of the sectors of the economy along with agriculture, most likely to be affected. According to the World Tourism Organisation (2003) specific threats include: that sea-levels will rise threaten many coastal areas and small islands; temperature rises will change precipitation patterns, water supply problems will be exacerbated; and the magnitude, frequency and risk of extreme climatic events such as storms and sea surges will increase. More specifically it is probable that as the sea-level rises there will be increased beach and coast erosion; a higher likelihood of coastal flooding; loss of coastal ecosystems and a total submersion of some low-lying islands and coastal plains.

The possible effects of climate change on a typical small island developing state (SID) are exemplified through Barbados in the Caribbean. Based on a study of the south and west coasts of the island to estimate the effects of a 1 metre rise in sea-level and a storm surge generated by a

Table 1.
Emission factors for comparative modes of transport.

Type of transport	Emission factor (kg CO_2 – equivalent per passenger km)
Plane- Mid haul	0.432
Plane- Long haul	0.378
Train	0.026
Bus	0.019
Car	0.18 (per vehicle km)

Source: Dubois and Ceron (2006)

Category 3 hurricane, the Caribbean Planning for Adaptation to Climate Change (CPACC) agency, cited in Belle and Bramwell (2005), commented that the: 'result is astonishing since most of the present day development, including the tourism infrastructure, is located within this inundation zone' (CPACC 1999). A further potential consequence of a rise in sea-level is the intrusion of saline water into the fresh water aquifers that Barbados is dependent upon for water. Potential rises in sea-levels also pose real threats to the tourism industries of low-lying islands such as the Maldives and Seychelles.

Alongside the threats climate change poses for small islands and coastal tourism, the continuation of winter sports will also be threatened by less reliable and infrequent snowfalls, especially in ski resorts at lower level altitudes. There may be a subsequent displacement of demand to higher altitude resorts, potentially placing them under increased environmental pressure. It is estimated that for every one degree centigrade increase in temperature the snowline will rise 150 metres. In the case of the European Alps, the Organisation for Economic Co-operation and Development (OECD) predict that within 20 years in the European Alps, ski resorts below 1,050 metres will not be viable, and that by the end of the 21st century only the highest over 2,000 metres will be able to offer guaranteed snow (Smith 2007). Similarly, scientists from the University of Zurich predict that by 2030, fifty of Switzerland's 230 ski resorts will not have enough regular snow to sustain skiing. Lower altitude mountain villages in the central and eastern parts of Austria are also under threat.

Alongside the loss of enjoyment by the skier, the

economic and social impacts upon these resorts would be dramatic. Given that many of them have limited economic diversity and are highly dependent upon tourism, of which winter sports playing a major part, many livelihoods would be threatened. Businesses would face bankruptcy unless markets based upon alternative types of tourism could be found. The linkages of tourism businesses to other parts of the economy would also be affected, threatening the livelihoods of those supplying services and goods to the tourism industry. Any displacement of demand to higher altitude ski resorts would also increase the environmental pressures upon the surrounding ecosystems. The loss of ski destinations would also have social effects, as a reduced supply of downhill ski resorts coupled with an existing high demand for the activity, activity would be likely to lead to a dramatic rise in prices, returning it to the elitist activity it once was.

The prediction of changes to the ski industry as a consequence of climate change illustrates the vulnerability of communities that are economically reliant upon tourism to external change. Reduced demand will not only directly affect the livelihoods of those employed in tourism but also has implications for industries that have linkages to tourism e.g. agriculture, fisheries, construction and handicrafts. Primary economic sectors such as agriculture and fishing will themselves also be affected by climate change.

However, whilst climate change may present threats to demand to some areas, for others it will present opportunities. For example, climate change may result in northern Europe becoming more attractive for summer vacations as the weather becomes consistently warmer and drier, whilst the Mediterranean may loose its appeal as temperatures become too hot, the landscape becomes more arid, and there is an increased frequency of natural disasters such as flash floods and forest fires (World Tourism Organisation 2003).

In the case of tourism from North America to the Caribbean, a similar pattern of influences may affect travel. Similar to the Mediterranean, tourism in the Caribbean is dependent upon climate and the beach, with its main market from North America escaping the cold winter climate. However, parts of the USA may become warmer making them more attractive to vacation in, whilst rising sea levels may threaten some of the Caribbean islands, damaging beaches and causing infrastructure damage (World Tourism Organisation 2003). A predicted increased need for air-conditioning will also place pressure on the island's water and energy resources.

The impact of climate change may also be felt on special activity tourism beside more mainstream winter and summer tourism. For example, coral reefs, the second most bio-diverse ecosystem on the planet are very susceptible to an increase in sea temperature as a consequence of global warming, resulting in coral bleaching and the death of the reef. They are also vulnerable to increased hurricane and storm activity. The biodiversity of the reefs in many areas of the world attracts a lucrative diving niche market. The death of the reefs would place this under threat. Other types of tourism, also dependent on a stable climatic and eco-systems, e.g. wildlife tourism, could also be threatened by eco-system change and the loss of bio-diversity.

2.2. Opportunities

Yet, whilst tourism may instigate climatic change, mobility presents economic, human development and livelihood opportunities for destination communities. These effects may be maximised if a model of tourism is developed that minimises economic leakages, strengthens inter-sectoral linkages, balances intra and inter generational equity, and conserves nature at a local level. Thus, if it is possible to construct the political economy to operationalise such a model of tourism, it can be viewed as making a contribution to sustainable development, at least at a local level.

The ability of tourism to conserve nature is centred upon its ability to give an economic value to nature. The willingness-to-pay of tourists to visit 'unspoilt' natural areas of countries, offers a strong incentive for governments to act to conserve nature, as it can provide economic benefits at national and local levels. This may be particularly important for nature conservation in the face of other economic development pressures, e.g. logging and mining, that may threaten ecosystems and bio-diversity. Although studies to gauge the full economic value of nature-based tourism are limited, one study that tried to estimate the economic value of the lion was conducted in the Amboseli National Park in Kenya. It found that each lion was worth US $27,000 per annum in 1980s values, expressed in terms of visitor pulling power. The study also demonstrated that wildlife tourism was economically preferential to the other main development

option of agriculture. The parks net earnings from tourism were found to be US $40 per hectare per year, fifty times higher than the most optimistic projection for agricultural use (Boo 1990).

However, even when tourism is presented to a local community as a less environmentally damaging development option than other forms of economic activity it may not be favoured by the local community. Burns and Holden (1995) comment upon the case of tourism development in the St Lucia Wetlands in Natal, South Africa, an area containing coral reefs, turtle beaches, high-afforested dunes, freshwater swamps, grasslands and estuaries Rio Tinto Zinc (RTZ), the giant transnational mining corporation, wanted to mine the dunes for titanium dioxide slag. Despite assurances from RTZ over redressive environmental restoration of the area when the mining had ceased, central government was opposed to the use of the area for this purpose on environmental grounds, and instead favoured the development of ecotourism. However, local people, mainly Zulus, favoured the development of mining on the basis that RTZ had a good track record of paying comparatively high wages and investing in schools, clinics and other facilities. The Natal Parks Board, who run the surrounding game parks, were perceived by the local community as paying low wages, and having displaced local people from their lands to establish game reserves in the 1960s and 1970s.

Similarly, at Cairn Gorm, in the Scottish Highlands of Britain during the 1990s, a high level of controversy existed over the planned development of a funicular railway up the mountainside for the purposes of downhill skiing. Opposition to the scheme from major non-governmental organisations, such as the World Wildlife Fund (WWF) and the Royal Society for the Protection of Birds (RSPB), was based upon the possible environmental impacts on the arctic-alpine environment, which is unique within the British Isles. However, instead of receiving the support of the majority of local people, the two non-governmental organisations were largely seen as outsiders attempting to stop economic development to protect birdlife and flora, thereby denying local people employment and other economic opportunities.

Thus whilst tourism has the potential to achieve 'Community Based Conservation' (CBC) through 'Community Based Tourism' (CBT), economic benefits from tourism for local people will typically be a pre-requisite for community support. The notion of CBT also fulfils wider objectives associated with sustainable development, being explained as: 'Visitor-host interaction that has a meaningful participation by both, and generates economic and conservation benefits for local communities and environments' (Mountain Institute 2000). The rationale for CBT is that policies based on strict conservation and enforcements have not always been successful, especially when wildlife conservation has been at the expense of the exclusion of local people from areas that they had inhabited, or used as resources to gain their livelihoods from. There is also a strong economic rationale for CBT on the basis that the provision of economic opportunity is essential for the dispersion of economic benefits amongst communities.

However, although CBT has a local focus, it is part of a tourism system that operates on a global scale and incorporates a variety of stakeholders with interests in tourism. These include the government, industry, non-governmental organisations and tourists, besides the local community. Subsequently, to achieve CBT is reliant upon partnerships between these different stakeholders. Thus when we talk of 'community' there is a need to think of a wider community than purely a destination based community.

3. Environmental philosophy

In the context of nature conservation through tourism, alongside reliance upon *techno-centric* fixes i.e. management and technical solutions, and/or dependency upon reforms to the existing market system to incorporate environmental externalities, the achievement of CBT will be reliant upon a shared environmental philosophy and values between the stakeholders. Observing international reaction to problems of global warming and the willingness of multi-national corporations to publicise their green credentials, combined with a growth in green consumerism, it would seem that global society is re-orientating its environmental ethic away from one of *instrumentalism* to *conservation*. Even if this change may rest primarily upon anthropocentric concerns centred upon on our own welfare, rather than a wider concern for the rights of animals and other non-animate species, it nevertheless will have practical implications for how we interact with nature.

In the view of Nash (1989), *environmental rights* have the potential for fundamental and far-reaching changes in

both thought and behaviour, as did human rights and justice at the time of the 18th century revolutions. Over the last hundred years, the ethical debate concerning our position relative to and the rights of nature has shifted, notably in recent decades, which is reflected in tourism. For example the common manifestation of the safari is now based upon the *viewing* of wildlife, vis-à-vis its *shooting*, as it was at the beginning of the last century. The biggest attraction of travel to *British East Africa* at the beginning of the twentieth century was big game shooting. The growth in the popularity of hunting in East Africa being associated with the arrival of white settlers in the nineteenth century. In Europe, hunting was an activity exclusive to the aristocracy, helping to differentiate them from other classes. The settlers now had an enormous shooting estate of their own and the guns proclaimed them as the new aristocrats. Within a few decades of the Europeans arriving the blaubok and quagga were eliminated, both of whom had survived 3 million years of contact with the indigenous people, and men boasted of killing 200 elephants on safari. One notable example of the carnage caused through hunting was an expedition led by Theodore Roosevelt and his son, in which 5,000 animals of 70 different species were killed; including nine of East Africa's remaining white rhinos (Monbiot 1995).

Significant, in the debate over the dangers of over-use of resources combined with the rights of nature, was the work of Lynn White Junior in the seminal paper 'The Historic Roots of Our Ecologic Crisis'. White (1967), attacked the Christian belief system as being the root cause of environmental problems. According to White, Christianity emphasised the dominion of man over nature and the use of the environment for his benefit and enjoyment. Although White's work has subsequently been criticised for being too generalised and simplistic, it raised the issue of how belief systems influenced our relationship with nature. Even within religions there may be contradictions, for example within Christianity, there are two opposed traditions: the first is that humankind is unique in being made in the 'image of God and therefore has the right to behave in a god-like manner to the rest of the cosmos'; and the second that 'humans are part of God's Creation just like the rocks and the trees and that no one part of this is inherently superior to another' (Simmons 1993). Subsequently, whilst some Christians would support the former position of *dominion* of humans over nature on the premise of being created in God's image, others would adopt the latter view of *stewardship* of nature.

In 1968, perceptions of the world as having unlimited and abundant resources were also challenged by the first widely broadcast television images of the earth shot from the American spacecraft Apollo 8, showing the earth as a sphere floating in space. The concept of a *spaceship earth* was the subject of a famous essay in environmental studies by Boulding (1973), questioning the *cowboy economy* associated with the reckless and exploitative use of nature, which he believed typified the western approach to development. In place he argued that we should begin to conceptualise the earth as having a *spaceman economy*, in which the earth like a spaceship doesn't have unlimited reserves of anything, and in which humans must find their place without threatening its cyclical ecological system.

Debate over the selfish use of common resources was also raised in Hardin's (1968) essay Tragedy of the Commons. Using the analogy of an area of common land termed *the commons* on which farmers in a village are at liberty to freely graze their cattle, Hardin suggests that an existing state of equilibrium between the numbers of cows grazing on it and its ability to regenerate itself, can be threatened by the self-interest of the farmers. Specifically, one farmer may decide he wants to increase his herd's milk production and profits by the addition of an extra cow to his herd. Whilst this one extra cow may not directly threaten the commons long-term stability, the other farmers witness this action and decide that they too would like to increase the size of their herds and their profits.

The farmer may also reason that the cost of the use of the resources for the extra cow will be externalised, and spread amongst all the other farmers. In this situation there are now costs being experienced by other farmers, both short-term, for example maybe a slight reduction in the quality of the milk because the cows have difficulty getting access to enough grazing, and in the long-term because overgrazing could lead to the loss of the commons as a resource altogether. If all the farmers subsequently decide to adopt the same position, introducing one extra cow to the commons with the aim of maximising their profits whilst externalising their costs to other producers, the commons would become ultimately overgrazed. This would threaten not only the economic viability of the existing farmers but also the ability of the next generation to use the commons for milk production. In this situation, the true costs of production of the milk are reflected in neither the production costs nor consumer costs, because of a failure to incorporate the longer term costs of the loss of the

resource. The market failure to reflect the total costs of production means that both the producer and consumer are benefiting in the short term, from not having to pay for the long-term environmental costs of production. The overuse of the commons could subsequently lead to the loss of the resource altogether to the detriment of society.

Some critics of Hardin's (1968) work question his assumption of a finite carrying capacity. They place their faith in new technology and environmental design to extend its capacity. Others dispute Hardin's view of public attitudes to the use of the commons, arguing that common users were never oblivious to the common good (Pepper 1993). For example in England, herdsmen used to consult each other over the possible expansion of herds to ensure that no threat was posed to the sustainability of the commons, because it was in their interest to do so. Ultimately, finding a solution of how to deal with the overuse of the earth's resources is highly complex. Not least because it relies upon an acknowledgment those environmental problems exist, that any attempts to mitigate them will not harm a nation's own interests, and a necessity for international co-operation for resource management and protection.

Yet, the parallel between tourism development and the scenario portrayed by Hardin is a strong one. Probably no other type of development activity is as incremental as tourism in terms of its usage of resources for development. An additional hotel here, an additional flight there, all provide extra benefits for the suppliers and consumers of tourism through increasing profits and consumer choice. However, extra supply and choice places increased pressure upon the commons, e.g. the growth of air travel and its effects upon the atmosphere.

Conclusions

This paper is based upon the problems and opportunities that exist within the relationship between tourism, community and environment. It has highlighted that no community involved in tourism can be separate from a wider tourism system that incorporates a range of different stakeholders. It has also suggested that tourism's relationship with nature will offer opportunities for conservation but only if certain conditions are fulfilled. Notably, it is essential for communities to have active inclusion and economic opportunity through nature based tourism, offersing them meaningful livelihood and development opportunities than other development options that may be more environmentally harmful. Subsequently, nature is transformed into resources in a conserved state that offers eco-system and individual species protection, rather than a transformed state that may necessitate bio-diversity loss. However, it is also suggested that a true model of conservation based tourism needs to extends beyond an economic rationale and recognises the worth of nature in its own right. Thus there is a need for stakeholders to have a shared environmental philosophy that places a value on nature beyond the financial, and places humans as an integral part of the ecosystem, rather than being separate from it.

The relationship between tourism, community and the environment is an important one. It is likely to become more important as tourism numbers grow and development expands spatially, incorporating more geographical locations, eco-systems and cultures, and placing increased pressures upon nature in existing destinations. The natural environment represents the resources and life-support systems for many communities and it is therefore essential from an anthropocentric viewpoint that its well-being is maintained. The migration of people in the form of tourism presents challenges to this well-being. However, it also offers opportunities for destination communities if tourism is developed and managed in a sustainable way, supported by a philosophy of environmental stewardship.

References

Belle, N. & Bramwell, B. 2005: Climate Change and Small Island Tourism: Policy Maker and Industry Perspectives in Barbados. -Journal of Travel Research 44: 32-41.

Boo, E. 1990: Ecotourism: the Potentials and Pitfalls, Vol. 1. Washington: -World Wide Fund for Nature.

Boulding, K. E. 1973: The Economics of the Coming Spaceship Earth. -Toward a Steady-state Economy (ed. Daly, H. E.): 253-263. W.H. Freeman and Company, San Francisco.

Burns, P. & Holden, A. 1995: Tourism: a new perspective. -Prentice-Hall, Hemel-Hempstead.

CPACC 1999: Caribbean Planning for Adaptation to Global Climate Change, Component 6: Coastal Vulnerability and Risk Assessment. -Regional Workshop Report, Grenada, March-April 1999. St. Michael, Barbados.

Dubois, G. & Ceron, J. P. 2006: Tourism/Leisure Greenhouse Gas Emission forecasts for 2050: Factors for change in France. - Journal of Sustainable Tourism 14: 171-191

Hardin, G. 1968: The Tragedy of the Commons. – Science 162: 1243–1248.

Monbiot, G. 1995: No man's land. - Tourism in Focus, 15: 10–11.

Mountain Institute 2000: Community Based Tourism for Conservation and Development: A Resource Kit. – Washington.

Nash, R.F. 1989: The Rights of Nature: a History of Environmental Ethics. -The University of Wisconsin Press, Wisconsis.

Pepper, D. 1993: Eco-socialism: From Deep Ecology to Social Justice. -Routledge, London.

Simmons, I.G. 1993: Interpreting Nature: Cultural Constructions of the Environment. -Routledge, London.

Smith, A.D. 2007: Melting glaciers will destroy Alpine resorts within 45 years. -The Observer, London, 14th January, p5.

United Nations World Tourism Organisation 2006: Tourism Highlights 2006. -UNWTO, Madrid.

White, L. 1967: The Historical Roots of Our Ecologic Crisis. –Science 155: 1203-1207.

World Tourism Organisation 2003: Climate Change and Tourism. –WTO, Madrid.

Local participation as a prerequisite for socially sustainable tourism: Case studies from the Ylläs and Levi ski resorts in northern Finland

Seija Tuulentie

Rovaniemi Research Unit,
Finnish Forest Research Institute,
P.O. Box 16, FI-96301 Rovaniemi, FINLAND
seija.tuulentie@metla.fi

Abstract

One of the corner stones of socially and culturally sustainable development in the context of tourist resorts is that the local population is able to participate to the development of the resort. Planning legislation also recognises the importance of participation. However, it is not easy to define the relevant parties who should be involved. This is especially the case in such unique and new entities as tourist resorts are in their rural environments. This study focused through group discussions on the points-of-view of different parties at the tourist resorts of Ylläs and Levi in Finnish Lapland. These discussions revealed that *lay citizens* have a strong desire to participate in the planning processes, and they have huge expectations for the Land-use and Building Act 2000, which demands the hearing of all parties involved. The permanent residents at the ski resorts are concerned about the sustainability issues, but such groups as second homeowners and seasonal workers are also interested in participating. New channels and new modes for participation are needed, and face-to-face interaction seems to be more popular than communicating opinions through the Internet.

Keywords: focus groups, local community, participatory planning, rural development, tourist resorts

1. Introduction

Tourist resorts are specific entities situated in remote rural areas. Their nature as enclaves in otherwise rural areas has made them especially interesting for geographers. Tourism geography has studied tourist resorts for a long time (Butler 2006, see also Kauppila 2006) by focussing especially on the changing functions of resorts in time and space. However, they are not only specific as spatial and temporal geographical entities but also social and cultural formations from the sociological point of view.

People live their lives in concrete places, which is also true in the current global world despite virtual reality. However, the way in which we define 'places' and the particular character of an individual place can be important in issues varying from disputes over development and conservation to questions over where different social groups have the right to live (Massey 1995) and to the activities that can take place in those places. A concrete example of the description of Finnish Lapland is in the tourism strategy, which does not mention *forests* at all but describes the area with the concept of *wilderness* (Regional Council of Lapland 2007). Wilderness can be considered as referring to untouched nature whereas the concept of forest would make such activity as forestry possible.

The issue of different social groups settling in a place is also a crucial issue in the field of tourism. Tourism inevitably brings new entrepreneurs and a workforce to small places (Macleod 2004). In addition, second homes with their place-attached visitors or even part-time residents become part of the community during the development of the resorts (Tuulentie 2006). Tourism also connects rural places closely to the life styles and consumer demand of more urban areas and foreign countries (e.g. Baldacchino 1997, Van der Duim 2005).

Socially and culturally sustainable development has been subordinate to the ecological and economic dimensions of sustainability. However, interest in social and cultural sustainability has risen to the fore and many criteria and proposals for indicators already exist (Rosenström & Palosaari 2000, Sarkki 2006, Mettiäinen 2007, Rantala 2007). In relation to the local situation in northernmost Lapland, Rantala (2007) has suggested that the criteria for social sustainability should include three criteria: equality and justice, employment and local benefit. With respect to the cultural dimension, Rantala includes such issues as how activities fit into local values, how the local culture is maintained, aesthetic effects as well as the effects on the locals' use of nature. The many indicators that can be used to measure these criteria include the need to ask the locals for their opinions and to negotiate with local groups.

Thus, one of the most important issues in relation to the ideal of socially sustainable tourism development is that the local communities should be heard and their opinion should be taken into account when altering the locality to meet the demands of tourists. As Swarbrooke (2002) puts it, one of the most widely accepted principles of sustainable tourism appears to be the idea that tourism can only be sustainable if the local community is involved in tourism planning and management. This aspect is regarded the most important within the context of this paper: if different things are measured and then the experts have the view that a tourist resort works in a socially and culturally sustainable way, it will not be enough if the locals do not agree.

Tourism is inevitably both global and local. It has been considered an important element of the globalisation process, but the term globalisation works only as a means of describing the process; it does not offer any explanations (Macleod 2004). The tourist product and image that intermediaries package and sell is a destination experience and as such, the tourism industry is highly dependent on the goodwill and cooperation of the host communities (Murphy 1985). Local communities' views are important both the economics and ethics of the tourism industry. From the economic point of view, the attractiveness of a destination is related to the locality's environmental and cultural qualities. However, although such importance has long been given to the role of local communities, it does not automatically take into account all local stakeholders. It is often the business sector that is used to represent the local community (Aas *et al*. 2005).

A host community's benevolence can be best obtained by involving it in tourism planning. From the planning paradigm viewpoint, public participation is about deliberation on the pressing issues of concern to those affected by decisions (Fischer 2002). One of the most influential theoretical frameworks for the idea of participatory planning is Habermas' (1984) theory of communicative action. Habermas has been criticized for many reasons: it has been claimed that his theory is unequal from the beginning as it separates the cultural and social (lifeworld) from political and economic (system) interests. Secondly, it has been argued that it overlooks those views and interests that are difficult to express as reasoned arguments. In addition, it looks for consensus in all conditions. (Mäntysalo 2005). However, the Habermasian framework works well in understanding that people do not have fixed interests, but participants arrive at an agreement on action that expresses mutual interests. In the communicative theory, the planner's primary function is to listen to people's stories and assist in forging a consensus among differing viewpoints (Fainstein 2000).

However, some researchers (e.g. Li 2006) argue that especially in the developing countries, the involvement of local residents in tourism planning is not possible or necessary whereas others (e.g. Hampton 2005, Tosun 2000) point out the varying social contexts and practical hindrances of public participation but still consider local participation to be extremely important. In more industrialised countries, the need for local decision-making is neither a thing to be taken for granted. Some issues or destinations are regarded nationally or globally too valuable for the locals to manage; For example, national parks are mainly managed by national organisations. Domestic tourism in particular can be regarded as part of a nationalistic project. Sites of significance help to create common identity and are thus important for national identity building (Pretes 2003). This is also the case with national parks and other places of outstanding natural beauty: such *high nature* (cf. high culture) is regarded as common property and not the property of those living in the particular locality.

In any case, the ideal of local participation must be taken seriously when thinking of social sustainability in the long run (as sustainability should be thought of by definition). There are several reasons backing this argument. Among the most important advantages are the facts that the public participatory process can prevent conflicts between stakeholders and that it is politically more legitimate and equitable. Collaboration also brings added value by building on the store of knowledge, insight, and capabilities of the stakeholders (Bramwell & Sharman 1999, Aas *et al*. 2005, Cole 2006). However, from the stakeholders' point of view, one of the disadvantages in the use of the participatory process is that participation may be used to legitimatise decisions that have already been made by the authorities. This may weaken the credibility of the system of participation.

In peripheral regions, the lack of trust towards national decision-making also makes participatory planning challenging. The earlier experiences of those living in the peripheral regions of the industrialised world often consisted of remarks such as that it was the outsiders, i.e.

the economic or political forces from population centres, who made the decisions on how to develop the peripheral regions. For example, Bomberg (1994) argues that while the natural environment has diminished in the industrialized core areas, valuable natural environments still exist in peripheral areas. Thus, the economic growth of peripheral areas is in contradiction with the nature conservation aims of the European Union. This has led to frustration in people and given an impression that the peripheries are left outside the development process that is underway at the centres. However, it is believed the situation will improve with the rise of new planning paradigms such as collaborative and participatory planning.

Citizen participation has been more an issue in relation to urban communities than to rural ones although in Finland, the village committees established since the late 1970s can be viewed as pioneering organizations of participatory planning (Jauhiainen & Niemenmaa 2006). The construction and land-use laws from the 1950s relied on experts and did not acknowledge the need for public participation. The communicative planning paradigm arose properly in the 1980s and 1990s, and collaborative planning can be seen as being the dominant trend since the 1990s (Wallenius 2001). The impacts of the European Union's directives, e.g. environmental impact assessment and other international agreements, among them Agenda 21, have been powerful. In the case of Finland, the new Land Use and Building Act implemented in 2000 has particularly had the effect of elevating public participation to a prominent role. The basic requirement is that *every party involved* should be heard in land-use decisions (Bäcklund *et al*. 2002). However, it has been argued that while the new law added rights to be heard, it did not add the rights of those involved to have their opinions implemented in the plans (Leino 1999).

If we argue that the locals really should have a say in tourism development, then we have to ask who the locals that should be heard are. The Land Use and Building Act states that *"*plans must be prepared in interaction with such persons and bodies on whose circumstances or benefits the plan may have substantial impact and that the authority preparing plans must publicize planning information so that those concerned are able to follow and influence the planning process*"* (Land Use and Building Act 1999). However, the idea of involving the *locals* is more complicated to implement. Who represents the locals and can all those *concerned* be reached?

Being a local often implies the idea of being a part of a geographically outlined community, but the concept of community is a difficult one. A community has often been used as the symbol of a past and better and simpler age (Elias 1974) and this is still often the case, especially in the context of tourism. The authenticity of a local community is one of the attractions used in tourism marketing all over the world, and one that often suffers as a result of tourism (e.g. UNEP 2002). In an era of globalisation, local communities consist of a variety of groups and individuals with different conceptions of the place. Even in small villages, there are different action spaces, meaning the networks, connections and actions, and different ways of taking part in local life (Massey 1995). In the villages around Lapland's ski resorts, for example, such growing groups as second-home owners and seasonal workers are becoming increasingly more important.

In this paper, I ask whether the locals have as many opportunities to participate in the planning of ski resorts, as they would wish. What are the expectations towards the planning experts and systems? I also question what would be the best forms of arranging the interaction between planning experts, local residents and the other groups involved. The basic assumption is that *localities* are not simple entities – especially not in tourism enclaves. The variety of parties involved is large and often difficult to reach, with seasonal workers and second-home owners being the most difficult groups.

Firstly, this paper presents the characteristics of the ski resorts studied, i.e. Levi and Ylläs. Secondly, it introduces the data and the methods of analysis. Thirdly, the paper presents the results of the content analysis of the focus group interviews and briefly compares the analysis with the results of the telephone survey.

2. Characteristics of the study areas

The study was conducted at two ski resorts, Levi and Ylläs, located in northern Finland. In general, the largest Finnish ski resorts are in the North, in Lapland and in Kuusamo. They have undergone rapid growth, which is expected to continue. For example, in one of the biggest resorts, Levi in the Kittilä municipality, the income from tourism in 2002/03 was almost five times higher than it was in 1988. In 2002/03, the income amounted to 100 million euros, and the aim is to increase it to 300 million euros by

2020 (Suunnittelukeskus 2004). This means many investments and the construction of new accommodation and other infrastructure (Suunnittelukeskus 2004). This, in turn, affects the sense of place, demographic composition and the lives of the people living in the region. Levi and Ylläs are examples of strange urban settlements: each village has fewer than one-thousand permanent inhabitants but facilities suitable for up to 50,000 people (Outila & Tiensuu 2007).

Focus group interviews and a survey were conducted in the ski resorts of Levi and Ylläs. Both centres have grown around old villages. Levi is part of the village of Sirkka, and the villages of Äkäslompolo and Ylläsjärvi are located on the opposite sides of the Ylläs fell. Each tourist resort has beds for around 20,000 tourists, although Levi is slightly bigger and provides more activities and services. Ylläs has a reputation for being a quieter and more wilderness-like place. The villages in the area have undergone demographic development that differs from the other villages in the local districts: the population in the villages adjoining the tourist resorts has been growing, and it is expected continue growing whereas the other villages in the local districts of Kittilä and Kolari have been suffering from dramatic migration out of the area (Hakkarainen 2005). The high tourism season is winter, especially from February until late April, for both of the centres. The main tourist products are downhill and cross-country skiing and snowmobile, husky and reindeer safaris and other winter activities. December has become especially popular among British tourists because of the Santa Claus package tours. November is becoming increasingly popular because of early skiing possibilities.

The centres can be seen as comprising three basic elements: an old rural village, an urbanising tourist centre and the surrounding wilderness area (Mettiäinen 2007, Tuulentie & Mettiäinen 2007). In the current situation of growing tourism, the elements of rural village and wilderness may be threatened because the tourist centre element is growing as a result of building new routes and cottage areas. However, these two elements should also be maintained because they constitute important resources, and they may even be considered prerequisites, for the tourism industry at the resorts. The wilderness plays a crucial role in the images of Lapland and its tourism marketing and therefore, tourists expect to see natural landscapes and to be in the middle of or have immediate access to the wilderness. This crucial role is acknowledged in the development plan of Levi, which strongly emphasises the role of nature, landscape and local culture (Suunnittelukeskus 2006). However, these plans deal with issues that mainly fall within the realm of tourism supply and demand, and not much from the point of view of the local residents' daily life.

The three elements overlap and are combined in different ways at each centre. According to the interviews conducted among the locals, at Ylläsjärvi and Äkäslompolo the old village seems to be more important than it is at Levi. Moreover, the surrounding wilderness is more emphasised at Ylläs; this especially so because of the Pallas-Ylläs National Park, which safeguards the nature values of the area. The urban tourist centre is more important and dominating for Levi's image.

3. Data and methods

The analysis in this paper is based on the focus group interviews conducted in the villages of Sirkka (adjoining Levi), Äkäslompolo (Ylläs) and Ylläsjärvi (Ylläs). A total of 10 focus group interviews were conducted between October 2005 and May 2006 (Table 1; see also Mettiäinen 2007). The focus groups represented villagers from Sirkka, Äkäslompolo and Ylläsjärvi, second-home owners at Levi and Ylläs, seasonal workers at Ylläs and Levi, officials from the municipalities of Kittilä and Kolari and officials and other experts from some regional organisations. The largest focus groups consisted of participants from the village committees in the three villages. Most of the villagers (23 out of 34) were either tourism workers or tourism entrepreneurs. All of these groups included both native-born villagers and villagers who had moved to the area (22/12). The interviews were taped and transcribed.

The focus group interviews started with the introduction of the participants. Following this, the discussions were stimulated with some basic questions about the development of tourism in the villages and the local views of the current situation and future prospects. During the development topic, the interviewees were asked to evaluate the degree to which the locals could affect the development during different periods. Placing the issues on a map stimulated the discussion of the current situation. The mappings included the locations that the interviewees regarded as positive places with good planning solutions and places they regard as negative or somehow threatened.

After the mapping, the group held a discussion about their findings. The mapping provided concrete geographical research data.

A focus group interview can be defined as a research technique that is used to collect data through group interaction on a topic determined by the researcher (Morgan 2002). This means that the situation is not a naturally occurring one but arranged by the researcher. The collective issue, focus, and communication within the group are of vital importance (Viken 2006). The composition of the group is also important: a group of

Table 1.
Composition of the focus groups. The interviews are referred to later in the text by their ordeal number as Interview 1, 2 etc.

Focus group	Date	Interviewers	Duration	Number of participants	Female/ male
1 Villagers of Äkäslompolo	26.10.2005	Seija Tuulentie and Ilona Mettiäinen	2,5 h	10	3 / 7
2 Villagers of Sirkka	03.11.2005	Seija Tuulentie and Ilona Mettiäinen	3 h	10	4 / 6
3 Villagers of Ylläsjärvi	21.11.2005	Seija Tuulentie and Ilona Mettiäinen	2,5 h	14	7 / 7
4 Second home owners in Levi	13.02.2006	Ilona Mettiäinen and Anna Alamattila	2,5 h	7	4 / 3
5 Seasonal tourism workers in Levi	01.03.2006	Ilona Mettiäinen and Anna Alamattila	1,5 h	4	2 / 2
6 Officials of the municipality of Kittilä	02.03.2006	Ilona Mettiäinen and Anna Alamattila	2 h	6	1 / 5
7 Officials of the municipality of Kolari	05.04.2006	Ilona Mettiäinen and Anna Alamattila	1,75 h	6	2 / 4
8 Seasonal tourism workers in Ylläs	05.04.2006	Ilona Mettiäinen and Anna Alamattila	1,5 h	2	2 / 0
9 Second home owners in Ylläs / Association "Friends of Ylläs"	12.04.2006	Ilona Mettiäinen and Anna Alamattila	2 h	4	2 / 2
10 Officials and other experts from some regional organizations	08.05.2006	Ilona Mettiäinen	2,5 h	3	2 / 1

friends or family members is different from that of strangers or people linked by official relationships.

To collect the views of those who were indisputably locals, the most important focus group interviews were those conducted among the members of the village committees of Sirkka, Äkäslompolo and Ylläsjärvi. These people do voluntary work in the interests of the development of the village and they could thus be expected to be active participants in planning, have opinions, be willing to express their views and subscribe to the positive attitudes regarding the study issue (cf. Viken 2006). These groups were fairly heterogeneous as regards age, sex, and occupation, but many of the participants were native villagers and most of them had some connections with the tourism business. The recruitment was made at random in that all villagers were asked to participate, but the invitations were left to the chairpersons of the committees, and they gathered the group through their own personal contacts. There was no system in effect to ensure that everyone in the village actually received information concerning the meeting.

The most interesting aspect of focus group interviews is the negotiation possibility between the participants. The themes of the interviews are planned by the researcher, but the emphasis placed on the various issues is determined by the interviewees. The interviewees can discuss and even debate the issues they feel to be especially important, and totally new issues can also arise during the discussions. The data obtained are based on group interaction (Valtonen 2005) and therefore, the data can vary from one group to another even though the interview themes remain the same. The objectives of the interview do not include achieving consensus on the various questions; the objectives are to study different understandings, attitudes, and opinions (Ahola *et al.* 2002). However, the issues are negotiated within the group, and it seems that people are mainly willing to listen each other's arguments and at least to try to evaluate the issue from the various points of view in order to create some kind of consensus. Thus, although consensus is not an objective, collaborative learning does take place during the interviews. An important prerequisite for the researcher is to create a congenial atmosphere in order to promote the free expression of opinions.

Although the focus groups in this study were homogenous in that everyone had personal experience of the development of the tourist centre, the fact was that people took different positions concerning official planning processes, and the tourism business had a particularly enriching effect on the data. A feature of one of the interview situations was that there was a person representing the local people on the municipal council, and there were villagers owning land at important tourism sites, there were women who had moved to the locality from elsewhere in the country and had married local men and there was a person who had returned to her native village after many years of living elsewhere in Finland and abroad. This heterogeneity in the participants' backgrounds made the negotiation process fruitful.

The advantages of focus group interviews are many, but the method also has its limitations. The artificial nature of the research setting, the influence of the peer group and/or dominant individuals, and the influence of the researcher as a moderator are among the most important (Thomas 2004). From the positivist tradition's perspective, an important limitation is that the small non-representative sample limits the ability to generalise the results to apply to a wider population. Thus, statistical generalisations are not possible, and it cannot be argued that the views expressed in focus groups represent the opinions of the whole populations in the three villages. However, in this case a survey study was conducted in the same villages in order to make generalisations (Jokinen & Sippola 2007), and these results proved to be similar to the ones from the focus group interviews. The results also have validity for other cases in the sense of transferability, which means that the use of purposive sampling and thick description of the case gives other researchers the opportunity to appraise the findings and the extent to which they could be transferred to other settings (Decrop 2004).

The focus group discussion themes provided the structure for the qualitative content analysis in this paper. Qualitative content analysis refers to a technique by which the textual material is coded and arranged anew to create a coherent and logical description of the theoretically defined issue (Tuomi & Sarajärvi 2002). The method of content analysis mainly focuses on the issue of *what* people say, but in some cases attention has also been drawn to the more discourse analysis type of question of *how* people speak about things. Moreover, studying the issues that have been raised and debated during relatively free-form discussions reveals the hegemonic discourses used when speaking of tourism development in the area.

The results of a telephone survey by Sippola and Jokinen (2007; see also Sippola 2007) are commented on from the point of view of this paper. Sippola and Jokinen continued the research of the local people's opinions and experiences regarding tourism development in the villages of Ylläsjärvi, Äkäslompolo, and Sirkka. Their survey was connected to the focus group interviews in order to evaluate the results of the focus groups and to be able to generalize the findings to larger populations.

The data were gathered through telephone interviews in the autumn 2006. The potential interviewees were randomly selected (Bernard 1995) from a total population that constituted the people living in the villages of Ylläsjärvi, Äkäslompolo, and Sirkka aged between 18 and 70. The total size of the population in the three villages was 928, and 120 people (40 per village) were sampled from the population. In total, 57 people were involved in the telephone interviews, representing 6.1% of the population (Jokinen & Sippola 2007). From this paper's point of view, one important question asked in the survey concerned how the residents would like to participate.

4. Results and discussion

4.1. Willingness and possibilities for local participation in Ylläs and Levi

The formal possibilities for the participation of lay citizens increased along with the implementation of the new Land Use and Building Act in 2000. The change has not been drastic because there was earlier demand to hear groups such as landowners, reindeer herders etc but now everyone who regards himself as an interested party can have a say. Since the processes for the local master plan are underway in both Ylläs and Levi, many hearings and public meetings are being arranged.

Do the *lay citizens* really want to participate in the planning and development of their home villages? The focus group interviews among the villagers (focus group interviews 1, 2, 3; the numbers refer to Table 1.) showed that local, democratic decision-making is strongly required. Naturally, those people participating in the focus group discussions in the villages can be defined as active villagers, and it can be assumed that they have an exceptionally strong desire to participate. However, village committees are important unofficial organs for channelling local opinion.

In Äkäslompolo (Interview 1), the participants stated that although one development plan is not bad as such, it would have been important to ask for the villagers' opinion. Moreover, their collective memory is long: they still remembered how the villagers were *not* consulted in the local master planning process 20 years ago. However, along with the change in the law and the rising awareness of the officials, the villagers now expect a better opportunity to have their voice heard.

The village committees of Sirkka (Interview 2) and Ylläsjärvi (Interview 3) expressed similar experiences of tourism development. However, the villagers of Ylläsjärvi felt that they had more to say on the development of their village. The residents of Sirkka gave strong support to the current tourism development but they believed they had poor opportunities to change the plans of developers and large tourism entrepreneurs; for example, snowmobiles are such an important issue in the tourism business that the planners do not listen to the wish to change the routes out of the centre of Levi.

The will to participate in decision-making and planning is lower in other semi-local groups of seasonal workers and second-home owners. The seasonal workers in Levi (Interview 5) said that they had been thinking of the planning processes and other development issues but had not participated to any official meetings. The Ylläs group of seasonal workers (Interview 8) consisted of only of two young women who did not think much of their own possibilities to participate, but they did feel that those who lived in the village year round should have more to say to the development. They also felt that they would express their opinion if they were asked and they thought that an *outsider* would see the place with different eyes. They believed a person's young age contributed to the lack of interest and one of the interviewees believed that older people handled such issues.

The second-home owners in Ylläs (Interview 9) talked a lot about the relations between the permanent residents and second-home owners who may spend a large part of the year in the village. They felt that since they now have an association, they have been listened to much better in different meetings and seminars. They also said that they wanted to influence decision-making but as with seasonal

workers, they considered the permanent residents' opinion as the most important. In Levi, where the second-home owners have no common organ, the interviewees felt that they had no opportunities to influence decisions but they were quite content with the current ways to develop the centre (Interview 4).

Municipal officials and others who speak more from an expert position were also interviewed. Their point of view on the issue of participation differed greatly from that of the locals and semi-locals. The officials of the municipality of Kittilä (Interview 6) expressed a strong opinion against the Land Use and Building Act. One interviewee stated that the legislation was still very basic: the problem from his point of view was that there were hundreds of private landowners involved and he felt that they only looked after their own interests, which made the process long and expensive. This interviewee believed that everything possible had been done for interactive planning: "local interaction is so comprehensive that it is over-democratised". The officials in Kolari expressed the same view on the adequacy of the interaction and communication (Interview 7).

The participants expressed the view that in participatory planning two groups should be identified (Interview 6): those who have economic interests should be dealt differently from those who are interested in from more general reasons regarding the living environment and such issues. This may reflect the fact that the landownership is much hotter issue in Levi than in Ylläs.

The third viewpoint, besides that of the locals, semi-locals and the municipal official, came from the regional officials (Interview 10) who expressed general critique of the overall planning of tourist resorts. They felt that there was insufficient knowledge of the specific characteristics of the resorts to conduct a good, interactive planning process. They also expressed the view that there is no culture of common planning, although the situation is getting better.

The focus group interviews and telephone survey gave similar results with respect to the opportunities for participation experienced in different villages. Both research methods showed that the villagers of Ylläsjärvi felt that they have had more influence on the development of tourism in the village than had the villagers of the other two villages. In Ylläsjärvi, 50% of the respondents felt that they have had the possibility to participate in the development of tourism whereas 33% of the villagers of Äkäslompolo and 25% of the villagers of Sirkka had the same opinion (Sippola 2007, see also Jokinen & Sippola 2007).

In the survey, 53% of the villagers were interested in influencing the development and participating in development and planning (Sippola 2007). Landowners and those involved in the tourism industry were more eager to participate than others were. It seems that these groups were also well represented in the villager focus groups. The most important reasons why the respondents had not participated were the lack of energy (35%) and lack of information on how to have a say (35%).

4.2. Forms of participation

The focus group interviews identified many forms of participation. Most of the groups mentioned the role of the media and personal communication as well as communication with planners and officials (Mettiäinen 2007). In addition, willingness to participate in public meetings was expressed in the village committee groups as well as in the interview with the second-home owners' association in Ylläs (Interviews 1, 2, 3 and 9). Emphasis was also placed on the role of village committees (Interviews 1, 2, 3, 4, 8 and 9), which was especially case in Ylläsjärvi where the current committee is strong and active. In Äkäslompolo, the committee consists mainly of small tourist entrepreneurs, and there was a desire to enlarge and diversify the composition of the group (Interview 1).

The second-home owners in Ylläs (Interview 9) were content with the meeting that was arranged in autumn 2005. Their suggestion that there should be an open forum for discussion, a village parliament, at least once per year comes quite close to the idea of a village council.

The municipal officials of Kittilä (Interview 6) believed that enough information was provided and that the locals had good facilities, such as the Internet, but still more training concerning the planning processes and the other functions of administration and planning was needed.

It was not hard to find examples of good participation and practices. One example is the planning of a road from Ylläsjärvi to Äkäslompolo through Ylläs fell, which was

described as a democratic process in which hearings were not only arranged but the local people's voice was truly heard and taken into account (Interview 1). Another good example also comes from Ylläs: the villagers of Äkäslompolo (Interview 1) described the situation during the recession of the 1990s as a good period for interactive planning. At that time, a series of round-table discussions were arranged in the villages. The villagers said that when the economic situation was bad and the problems were so large they called for common effort.

One characteristic to these situations and solutions is that they were considered especially democratic. The feeling of democracy mainly seemed to stem from face-to-face interaction. For example, the Internet was seldom mentioned as a possible channel of influence. The telephone survey confirmed that the most popular ways of participating in the development of tourism were those involving face-to- face contact. The most popular of the options was to create a kind of regularly assembling council with representation from every relevant stakeholder. Surveys and village committees were also regarded as good channels. (Sippola 2007)

4.3. Mental maps

One of the methods employed during the focus group interviews was to concretise the discussions by putting the issues on a map and thus making mental maps that could be defined as an individual's personal perception of his/her world (Fig. 1; see also Kyttä & Kaaja 2001). The mental maps served as concrete mappings of the landscapes the locals considered important –as either good or bad examples of planning or places that have future possibilities or that are threatened. In addition, the participants were asked to give examples of those places which they had influenced on the planning. Besides concrete map-making, the action of mapping served as a stimulus for concretising the discussions and negotiations within the focus group.

The issues raised during the mapping process in the villages can be classified under three themes: 1) relations between the local municipal authorities and the tourist village, 2) issues concerning nature conservation, and 3) the disputes between tourism and other nature-based industries.

The relations between local district authorities and local villagers differed from village to village. Äkäslompolo and Sirkka have their representatives on local councils or boards. However, the people in both of these villages were more critical of local district decision-making than the people of Ylläsjärvi were. The criticism at the local level was primarily targeted at people outside the village not knowing the places and spatial practices of the village in question (Interviews 1 and 2). Thus, for example, the planning of trails and building locations could have been easily improved if the local villagers had been consulted. In Äkäslompolo, those who tried to defend the authorities faced difficulties in having their voice heard. Excessive and misdirected tourism construction was seen as the foremost problem (Interview 1). In Sirkka, the greatest problem was related to the use of Kätkätunturi fell, which consists mainly of privately owned forest but its use for forestry or construction is prohibited, at least until further notice. Consequently, the landowners on Kätkätunturi felt that other people gained economic benefit from tourism whilst they had to keep their land as recreation areas for the free use of tourists based on everyman's rights (Interview 2). In a way, the dispute over Kätkätunturi can be interpreted as a clash between the needs of the growing tourist resort and the threatened and endangered rural village because local inhabitants own the Kätkätunturi forests and forestry in the area has stopped due to tourism and the recreational value of the area.

A common understanding among the people from the three villages (Interviews 1, 2 and 3) was that those making decisions at the local municipal office did not understand the specific situations prevailing in the tourist villages. For example, the need for bigger schools in the villages was difficult to understand since other villages have had to close their schools because of the lack of pupils (Interview 2).

There was discussion over the second issue, the role of Metsähallitus (the Finnish Forest and Park Service). It manages the national parks, but it also has forestry and real estate departments. The people in Äkäslompolo were particularly critical over the fact that when more land was set aside from forestry in the national parks in the area, Metsähallitus' Forestry Department attempted to extract more profit from the remaining forestry land (Interview 1). In the village of Ylläs, the Pallas-Yllästunturi National Park was believed to guarantee the nature values of the area

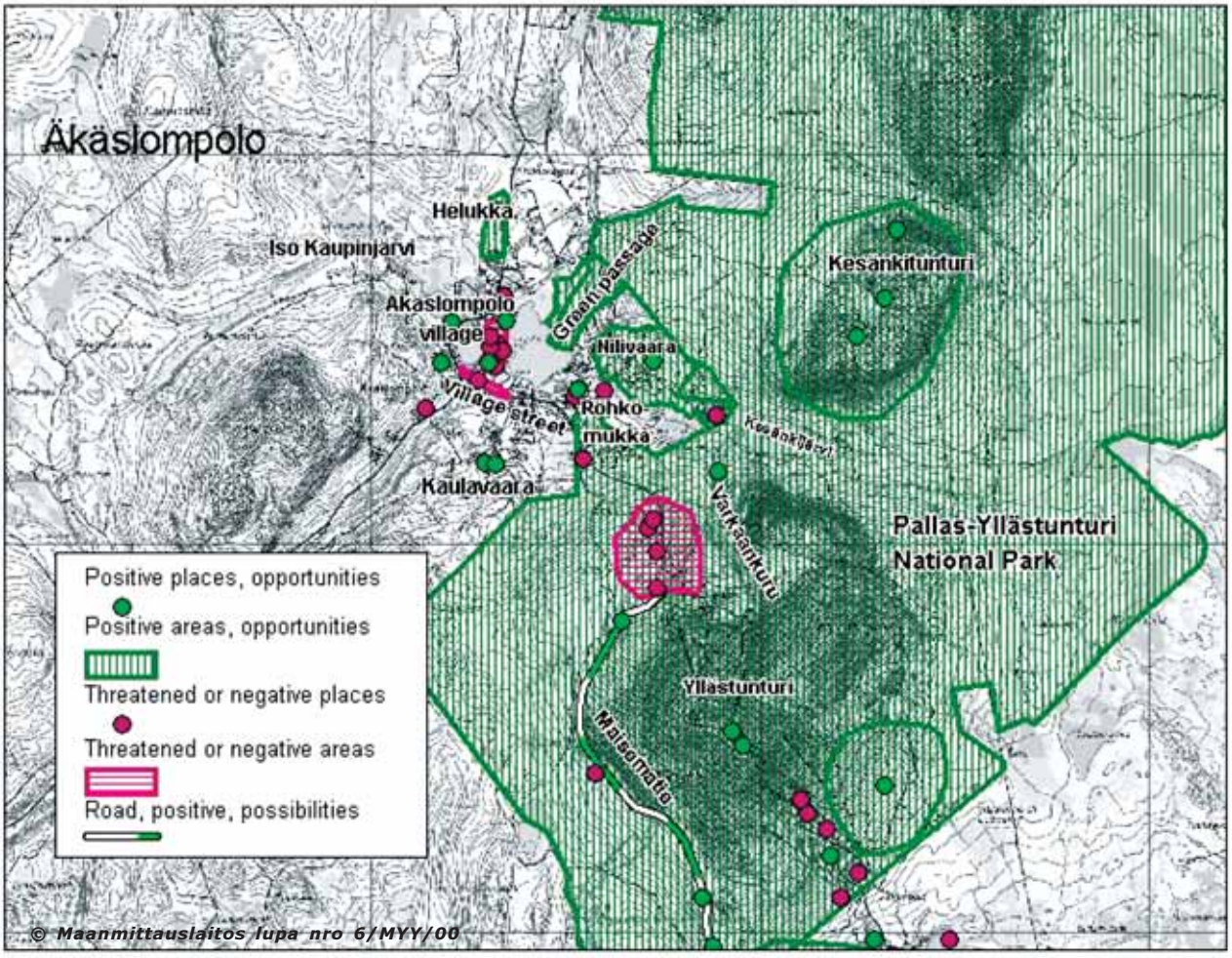

Figure 1.
An example of the outcome of mapping the issues in Äkäslompolo. © Maanmittauslaitos lupa nro 6/MYY/00.

(Interviews 1 and 3). The villagers of Äkäslompolo claimed that they supported the enlargement of Pallas-Ounas National Park as far back as the 1970s but the municipality did not support it then. Later, the municipality did favour the enlargement (Interview 1). In Sirkka, the conservation issue was more problematic because of the Kätkätunturi situation: nature values were considered important, but the landowners wanted to economic benefit from their land (Interview 2). One theme of discussion related to the possibility of putting a price on scenic values and paying the landowners for preserving their lands as they are.

The third important issue raised during the mappings dealt with the relations between different nature-based livelihoods. Disputes between traditional rural livelihoods, such as reindeer herding, forestry, and agriculture, and the more recent tourism industry have arisen especially in relation to land-use issues. The main criticism was directed at state-owned forestry, but also reindeer herders' common forests got their share of criticism:

> "Tourists are good in that they stay on the trails, but the trail surroundings should be kept in a natural state. However, local reindeer herders have constructed a road and made large cuttings in an area where there are five Metsähallitus cabins." (Interview 1).

In most of the comments, however, reindeer herding and tourism were considered complementary. Tourism provides work for reindeer herders during their off-season,

when there is not much herding to do: in many other parts of Lapland, reindeer herders are unemployed part of the year. The use of land for agriculture has been declining whilst tourism has been on the rise, and tourism has compensated for the loss of jobs in agriculture. The participants appreciated this, but losing all traditional livelihoods and becoming fully dependent of tourism was considered a real threat. Criticism was also thrown at the dramatic changes in the traditional landscapes.

5. Conclusions

This study was mainly conducted through qualitative focus group interviews and their content analysis. The interviews were complemented with a telephone survey. The results from the qualitative interviews and survey were similar; for example, both methods gave a similar picture of the differences between the villages with respect to the possibilities to influence the development of tourism. However, the telephone survey provided more information about gender and age differences in the opinions. On the other hand, the focus group interviews deepened the issues and gave detailed information about local characteristics and issues. The questions in the survey questionnaire were formulated based on the focus group interviews but still the researchers determined the alternatives. The discussion themes in the focus groups provided many opportunities to raise issues from the locals' and other interviewees' points of view.

When discussing the development of tourist resorts from the environmental point of view, Holden (2005, 2007) states that whilst community involvement is often advocated as a positive principle for sustainable tourism development, it cannot necessarily be a taken assumption that communities will act as stewards of the environment. This is certainly true. Many reservations for the current demands of participatory planning were also expressed in the focus group interviews of the officials and experts. However, it can be stated that if tourism development that does not consider the locals' opinions then it cannot be socially sustainable. This became very clear in the focus group interviews of the local residents participating in the voluntary work of the village committees.

Democracy seems such a strong ideal that it cannot be underestimated in planning. It is not only those trained for specific tasks that should be regarded as experts but also those who have everyday life experiences of the locality and its surroundings. Democratic discussion based on expertise is also required.

Indeed, the notion of community is complex even within the context of tourism, and it involves a variety of different stakeholders across spatial areas (Holden 2007). Tourist resorts are complex entities with many different interest groups and stakeholders, which was also evident in the focus group interviews. Especially place-attached tourists, such as second-home owners, face difficulties to getting their voice heard. One solution is to establish an association, as was the case in Ylläs. In Ylläs, the members of the association have good experience of being taken as a relevant party during meetings and consultations.

Seasonal workers constitute another extremely challenging group. They are often young and not so attached to the locality they work in. However, their views would be important for the development because tourist resorts depend on a work force from outside the region. It would also be important to get new permanent residents in peripheral districts and in this respect, seasonal workers form a great potential.

The results of the telephone survey and focus group interviews show that the specificity of tourist resorts is not truly taken into account. Although legislation requires the participation of all parties, concrete practices have not yet taken shape. More research on the social and cultural dimensions of tourist resorts is needed in order to learn more about the different stakeholders and their will and possibilities to participate in the planning processes.

Acknowledgements

This study is a part of the EU LIFE Environment project *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB). I also thank MA Ilona Mettiäinen who has been responsible for much of the data collection.

References

Aas, C., Ladkin, A. & Fletcher, J. 2005: Stakeholder Collaboration and Heritage Management. -Annals of Tourism Research 32: 28-48.

Ahola, A., Godenhjelm, P. & Lehtinen, M. 2002: Kysymisen taito. Surveylaboratorio lomaketutkimusten kehittämisessä. -Statistics Finland, Helsinki.

Bäcklund, P., Häkli, J. & Schulman, H. 2002: Osallisuuden jäljillä. -Osalliset ja osaajat. Kansalaiset kaupungin suunnittelussa (eds. Bäcklund, P., Häkli, J. & Schulman, H.): 7-17. Gaudeamus, Helsinki.

Baldacchino, G. 1997: Global Tourism & Informal Labour Relations. The Small-scale Syndrome at Work. -Mansell, London.

Bernard, H. R. 1995: Research Methods in Anthropology – qualitative and quantitative approaches. -Altamira Press, Thousand Oaks.

Bomberg, E. 1994: Policy Networks on the Periphery: EU Environmental Policy and Scotland. - Protecting the Periphery. -Environmental Policy in Peripheral Regions of the European Union (eds. Baker, S., K. Milton & S. Yearley): 45-61. Frank Cass. Watkiss Studios Limited, Biggleswade.

Bramwell, B. & Sharman, A. 1999: Collaboration in local tourism policymaking. -Annals of Tourism Research 26: 392-415.

Butler, R. W. 2006: The Origins of the Tourism Area Life cycle. -The Tourism Area Life Cycle. Vol. 1. (ed. Butler, R.W): 13-26. Channel View Publications, Clevedon.

Cole, S. 2006: Information and Empowerment: The Keys to Achieving Sustainable Tourism. -Journal of Sustainable Tourism 14: 629-644.

Decrop, A. 2004: Trustworthiness in qualitative tourism research. -Qualitative research in tourism. Ontologies, epistemologies, methodologies (eds. Phillimore, J. & Goodson, L.): 156-169. Routledge, London.

Van der Duim, V.R. 2005: Tourismscapes, an actor-network perspective on sustainable tourism development. Dissertation, Wageningen University. -Available from: http://library.wur.nl/wda/dissertations/dis3787.pdf

Elias, N. 1974: Towards a Theory of Communities. -The Sociology of Communities. A Selection of Readings (eds. Bell, C. & Newby, H): ix-xli. Frank Cass and Co. Ltd., London.

Fainstein, S. S. 2000: New Directions in Planning Theory. - Urban Affairs Review 35: 451-478.

Fischer, F. 2000: Citizens, Experts and the Environment. The Politics of Local Knowledge. -Duke University Press, London.

Habermas, J. 1984: The Theory of Communicative Action. Vol. 1. -Beacon Press, Boston.

Hakkarainen, M. 2005: Ylläs ja Levi resort desctiptions. LANDSCAPE LAB -project, Arctic Centre, University of Lapland. (In Finnish with English abstract). -Available from:http://www.arcticcentre.org/includes/file_download.asp?deptid=21742&fileid=7120&file=20051110113622.pdf&pdf=1

Hampton, M.P. 2005: Heritage, Local Communities and Economic Development. -Annals of Tourism Research 32: 735-759.

Holden, A. 2005: Tourism Studies and Social Sciences. - Routledge, London.

Holden, A. 2007: The problematique and opportunities of the relationship between tourism, community and the environment. –Environment, Local society and Sustainable Tourism (eds. Jokimäki, J., Kaisanlahti-Jokimäki, M.-L., Tuulentie, S., Laine, K. & Uusitalo, M.): 68-74. –Arctic Centre Reports 50, Painatuskeskus Finland, Rovaniemi.

Jauhiainen, J. S. & Niemenmaa, V. 2006: Alueellinen suunnittelu. -Vastapaino, Tampere.

Jokinen, M. & Sippola, S. 2007: Social sustainability at tourist tourist destinations – local opinions on their development and future in northern Finland. –Environment, Local Society and Sustainable Tourism (eds. Jokimäki, J., Kaisanlahti-Jokimäki, M.-L., Tuulentie, S., Laine, K. & Uusitalo, M.): 89-99. –Arctic Centre Reports 50, Painatuskeskus Finland, Rovaniemi.

Kauppila, P. 2006: Matkailukeskusten muuttuvat toiminnot tilassa ja ajassa: teoreettinen näkökulma. – Matkailututkimus 2: 19-40.

Kyttä, M. & Kaaja, M. 2001: Vuorovaikutteisen suunnittelun ja ympäristön tutkimuksen metodipaketti. - Yhdyskuntasuunnittelun tutkimus- ja koulutuskeskus

YTK. -Available from: www.hut.fi/yksikot/YTK/koulutus/metodikortti/Metodit.html [27.9.2005].

Land Use and Building Act 1999: -Available from: http://www.finlex.fi/fi/laki/kaannokset/1999/en19990132.pdf. [29.8.2007].

Leino, H. 1999: Vuores –prosessin osallistamisen käytännöt. Tutkimus uuden maankäyttö- ja rakennuslain soveltamisesta. –Tampereen kaupunki, Tampere.

Li, W. 2006: Community Decision-making. Participation in Development. -Annals of Tourism Research 33:132-143.

Macleod, D. V. L. 2004: Tourism, Globalisation and Cultural Change. An Island Community Perspective. -Channel View Publications, Clevedon.

Massey, D. 1995: The conceptualization of place. -A Place in the World (eds. Massey, D. & Jess P): 45-86. Milton Keynes, Open University, London.

Mettiäinen, I. 2007: Growing tourist centers nearby fell side villages – challenges to social sustainability. -LANDSCAPE LAB -project, Arctic Centre, University of Lapland. Lapin yliopistopaino, Rovaniemi (in Finnish with English abstract). –Available also from: http://www.arcticcentre.org/includes/file_download.asp?deptid=21742&fileid=11339&file=20070910141519.pdf&pdf=1 [20.10.2007].

Morgan, D.L. 2002: Focus Group Interview. -Handbook of Interview Research (eds. Gubrium, J.F. & Holstein, J.A.): 141-160. Sage, London.

Murphy, P. E., 1985: Tourism. A Community Approach. -Routledge, London.

Mäntysalo, R. 2005: Approaches to Participation in Urban Planning Theories. -Rehabilitation of suburban areas – Brozzi and Le Piagge neighbourhoods (eds. Zetti, I. & Brand, S.): 23-38. Department of Technology, Architecture and Design, University of Florence.

Outila, T. & Tiensuu, V. 2007: Tourist destinations in northern Finland – Designing new types of urban densities and settlements by means of land use planning. –Nature and Tourism: Tools for Sustainability, International Conference. Arctic Centre, University of Lapland, Rovaniemi, Finland, 22-24 May 2007. Abstract Book (eds. Kaisanlahti-Jokimäki, M.-L., Jokimäki, J., Kivilahti, R. & Härkönen, J.): 23. Lapin yliopistopaino, Rovaniemi.

Pretes, M. 2003: Tourism and nationalism. -Annals of Tourism Research 30: 125-142.

Rantala, M. 2007: Sustainability criteria and indicators of forest-based livelihoods in Northern Finland. – University of Joensuu. (in Finnish with English abstract).

Regional Council of Lapland 2007: Lappi elämänvoimaa. Matkailustrategia 2007-2010. Luonnos. –Available from: http://www.lapinliitto.fi/paatoksenteko/lh221007/liite8.pdf [29.8.2007].

Rosenström, U. & Palosaari, M. (eds.) 2000: Kestävyyden mitta. Suomen kestävän kehityksen indikaattorit 2000. -Suomen ympäristö 404. Ympäristöministeriö.

Sarkki, S. 2006: Socially sustainable land-use from reindeer herders´s point of view in the Tunturi-Lappi 1995-2005. -University of Oulu. (in Finnish with English abstract). -Available from:http://www.arcticcentre.org/includes/file_download.asp?deptid=21742&fileid=7747&file=20060130111832.pdf&pdf=1 [20.10.2007].

Sippola, S. 2007: As a resident of a busy tourist centre. Questionaire for local population of Ylläs and Levei. -Jyväskylä University of Applied Sciences, School of Tourism and Services Management. (In Finnish with English abstract). -Available from:http://www. arcticcentre.org/includes/file_download.asp?deptid=21742&fileid=10055&file=20070124110948.pdf&pdf=1 [20.10.2007].

Suunnittelukeskus 2004: Levi 3. Kehittämissuunnitelman loppuraportti. – Available from: http://www.kittila.fi/web/files/levi3_raportti.pdf. [29.8.2007].

Suunnittelukeskus 2006: Levin ympäristön matkailumaiseman ja maankäytön kehittäminen. Lähtökohtaraportti. (The development of tourism landscape and land-use in Levi. A preliminary report.). Available from: http://www.levin-yleiskaava.info/tiedostot/310106_Lahtokohtaraportti.pdf. [29.8.2007].

Swarbrooke, J. 2002: Sustainable Tourism Management. -CABI Publishing, Oxon.

Tuomi, J. & Sarajärvi, A. 2002: Laadullinen tutkimus ja sisällönanalyysi. -Tammi, Helsinki.

Tuulentie, S. 2006: Tourists Making Themselves at Home: Second Homes as a Part of Tourist Careers. -Multiple Dwelling and Tourism. Negotiating Place, Home and Identity (eds. McIntyre, N., Williams, D. & McHugh, K.): 145-157. CABI, Oxfordshire.

Tuulentie, S. & Mettiäinen, I. 2007: Local participation in the evolution of ski resorts: the case of Ylläs and Levi in Finnish Lapland. -Forest, Snow and Landscape Research 81: 207-222.

UNEP 2002: About sustainable tourism. –Available from: http://www.uneptie.org/pc/tourism/sust-tourism/about.htm [20.10.2007].

Valtonen, A. 2005: Ryhmäkeskustelut – Millainen metodi? – Haastattelu (eds. Ruusuvuori, J. & Tiittula, L.): 223-241. Vastapaino, Tampere.

Viken, A. 2006: Tourism and Sámi Identity – An analysis of tourism-identity nexus in a Sámi community. -Scandinavian Journal of Hospitality and Tourism 6: 7-24.

Wallenius 2001: Osallistava strateginen suunnittelu julkisten luonnonvarojen hoidossa. -Metsähallitus Forestry Publications 41. Metsähallitus, Vantaa.

Social sustainability at tourist destinations – local opinions on their development and future in northern Finland

Mikko Jokinen [1)] & Salla Sippola[2)]*

[1)]Finnish Forest Research Institute,
Muoniontie 21, FI-95900 Kolari, FINLAND
mikko.jokinen@metla.fi
[2)]sallasippola@hotmail.com
[*]corresponding author: mikko.jokinen@metla.fi

Abstract

Tourism industry has developed into major economy that utilises the natural resources in western Lapland, Finland. Due to its huge growth, the question of sustainability is increasingly essential. This article focuses on social sustainability from the viewpoint of the local inhabitants at the tourist destinations of Ylläs and Levi. These resorts have grown since 1970s in the surroundings of the old villages of Ylläsjärvi, Äkäslompolo and Sirkka. The study was conducted through telephone interviews. A total of 59 people from all three villages were interviewed and asked about social sustainability issues. Overall, the people were satisfied with the present situation but they were worried about excessively rapid growth in the future. The finds were similar to the results of a study in the early 1990s. One of the key notions was that Ylläsjärvi seemed to differ from Äkäslompolo and Sirkka. The people in Ylläsjärvi thought that they as villagers and individuals had had more influence on the development of tourism than the people in other studied villages had had. In Äkäslompolo, people considered non-local entrepreneurs as the primus motor in tourism development, and they more often reported contradictions between tourism and reindeer herding. The villagers in Sirkka at Levi most often felt that they had no real impact on the development of tourism. One important issue with respect to social sustainability was that local people felt they had the opportunity to affect the physical and cultural environment they lived in; the actions of local outsiders easily created contradictions and conflicts that might harm economical development. The fair allocation of the costs and benefits of tourism industry was also key issue for social sustainability.

Keywords: Lapland, Levi, nature-based tourism, social sustainability, Ylläs

1. Introduction

About 30-40 years ago, rural villages in Finnish Lapland were quiet and remote communities. Tourism was making itself felt, but the volume was low and tourists were minor seasonal phenomena. Tourism as a major industry, as well as large tourist centres with multiple ski slopes, fancy hotels and spas, were just the wild dreams of a few individuals. The construction of tourist destinations and large-scale development really started in the 1980s when the potential of the fells was discovered (Regional Council of Lapland 2007a). In the early 1990s, Finland underwent a severe recession and many entrepreneurs went bankrupt, but at present (2007) there is a huge boom in investment and construction underway in the study areas of Ylläs and Levi in northwest Lapland (Fig. 1). The limits of growth are again being discussed, but the tourist industry seems to be unworried about this issue (Regional Council of Lapland 2007b).

There is no doubt that the tourism industry is crucial for the regional economy. Tourism has created more jobs and new kinds of jobs and services, which means that local people can stay in their home district and still earn a living more often. (Kauppila 2004, Vatanen *et al*. 2006) Meanwhile, the structure of livelihoods has changed and so has the social and physical environment. People have lived through the rapid change that is still going on.

The tourist destinations Ylläs and Levi have three old villages that have met these changes: Sirkka (at Levi; www.levi.fi), Äkäslompolo, and Ylläsjärvi (both at Ylläs; www.yllas.fi, Fig. 1). The common characteristics shared by these villages are that they are old rural communities where the basis of life and the look of the villages have changed. In the sense of social sustainability, on whose terms development is planned and implemented plays a key role (Swarbrooke 2002). If local people are not involved in the progress, there is a reasonable risk that the outcome will not support local cultural practises and features, which can easily lead to the inhabitants feeling they have become outsiders with respect to the tourism economy and *vice versa*. In this study, we investigated local people's opinions and experiences regarding the development of tourism in the villages of Ylläsjärvi, Äkäslompolo, and Sirkka (Fig. 1). The primary objectives were to estimate the degree to which the local people participated or were heard in the planning processes according to their own experiences and the opportunities and threats those people saw for the future.

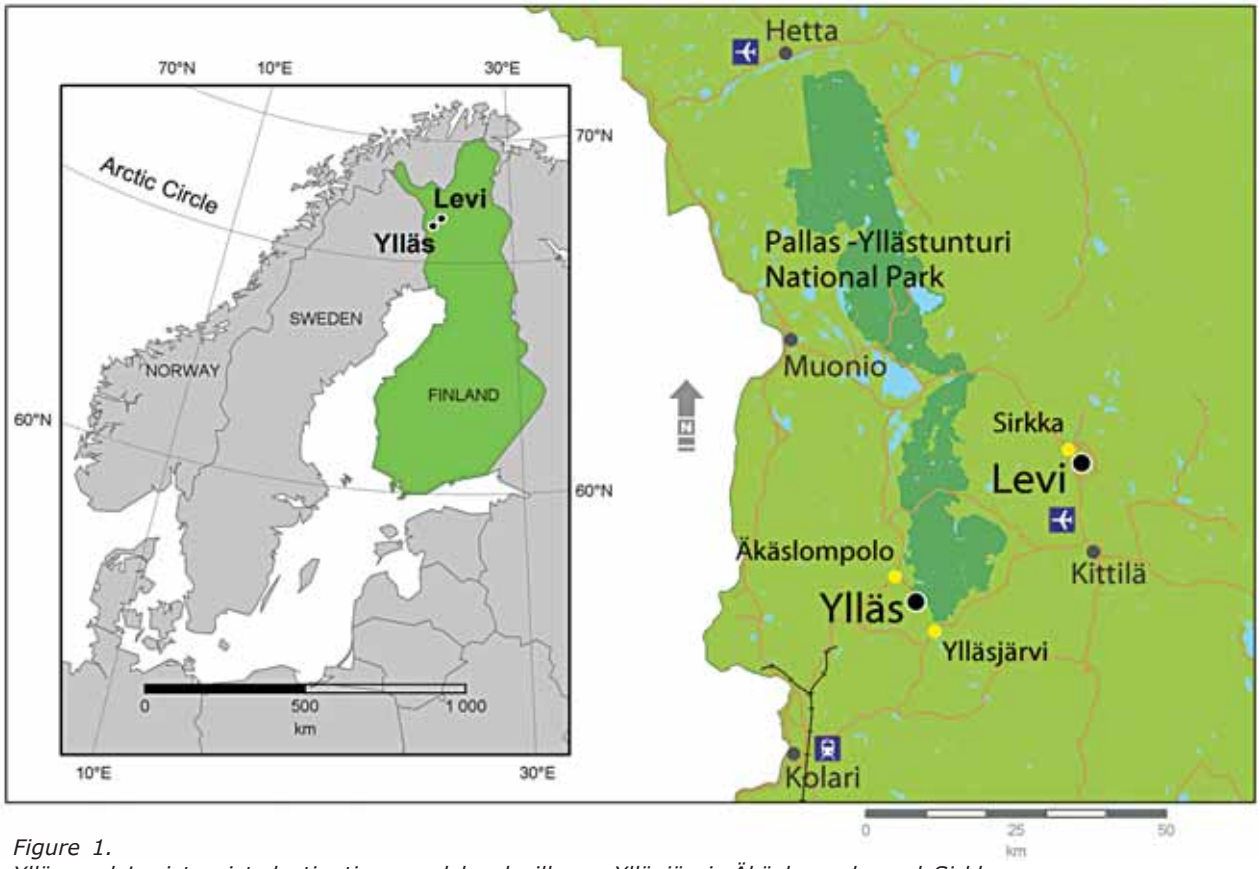

Figure 1.
Ylläs and Levi tourist destinations and local villages Ylläsjärvi, Äkäslompolo and Sirkka.

A practical task was to provide planners and administrators with information concerning the social sustainability of tourism. The study was connected to the work of Mettiäinen (2007) and Tuulentie (2007). This study also took a closer look at some of the topics based on their research and tested them by taking a larger sample. The idea was to assess whether their findings based on focus-group research could be generalized to larger populations.

2. Material and methods

The data were gathered through telephone interviews that were conducted in the autumn 2006. Questionnaire for telephone interview are given in the Appendix 1. The potential respondents were chosen using simple random sampling (Bernard 1995) from a total population that constitutes the people aged between 18 and 70 living in the villages of Ylläsjärvi, Äkäslompolo, and Sirkka. The total size of the population was 928, and 120 people (40 per village) were sampled from this population. A pre-interview questionnaire was mailed to these people a few days before the telephone calls, and thus they were able to become familiar with the questions and topics. Many of the respondents also used the form as a backup during the interview. Finally, 57 people were interviewed by telephone, representing 6.1% of the population: there were 21 people from Äkäslompolo, which is 5.3% of the whole population of the village, 20 people from Sirkka, or 4.9% of the village population, and 16 people from Ylläsjärvi, which amounted to 12.2% of the village population. The data were analyzed qualitatively and quantitatively. The qualitative data are presented here as cultural material with shared meanings and interpretations concerning sustainability and the future (D´Andrade 1995, Strauss & Quinn 1997).

3. Results

There was a positive general attitude towards this study. Only three people refused to participate in the telephone interview: in one case, the respondent was finally able to express his opinions. A few of the respondents doubted whether they were the right people to contribute to the study.

3.1. Present situation at the tourist destinations

A total of 74% of the respondents were satisfied with the present situation. Satisfaction means better job opportunities and services and bringing more life to a rural village. Around 33% of the satisfied respondents stressed that their village would be dead without tourism. With respect to Ylläsjärvi, the villagers were pleased that the village was still a very peaceful place and had retained its original characteristics. The large potential for growth and co-operation between entrepreneurs and other villagers was seen as positive. However, 32% of all respondents (though pleased) stressed that their opinion concerned the present situation, but that some dark clouds could be seen on the horizon; the excessive growth and high rate of the construction of ski-slopes, hotels and infrastructure could spoil the character and environment of the destination. Many inhabitants of Ylläs considered the development at Levi with its Swiss-style chalets (Fig. 2) and urban infrastructure (Fig. 3) as something that Ylläs should not adopt.

Figure 2.
Swiss style chalets do not represent traditional Lappish building style.

Figure 3.
Some see Levi centre too urban.

Those respondents who were unhappy with the situation were of the view that the volumes of tourism and construction are already excessive and that the needs and opinions of the local people as well as the ecological dimensions of tourism and construction have been ignored. The income from tourism was allocated to non-locals and they stressed that the quality of products and services was often replaced by increased volume.

The degree of satisfaction of the villagers varied according to the village. Everyone (16 people) was pleased with the present situation in Ylläsjärvi whereas on the other side of the fell, in Ylläs in Äkäslompolo, only every second villager shared this feeling. The difference was statistically significant (Table 1). At the Levi tourist destination in Sirkka, 75% of the respondents stated that they were satisfied with the present conditions. In Ylläsjärvi, the people stated that the village had remained alive and the genuine village image prevailed. In Äkäslompolo, the positive things included better opportunities for jobs and services while on the negative side, the villagers stressed that the municipality of Kolari (to which Ylläs belongs) was too eager in its policy of striving for limitless growth while not listening to local people's opinions. In Sirkka, the villagers pointed out the same things as in Äkäslompolo, and they were proud of the success of Levi. Nevertheless, rapid growth frightened some of the villagers, who even felt that there might not be enough room for the native population.

Table 1.
Opinions according to village as to whether the respondent was content with the development of the tourist resort.

	VILLAGE								
Content?	**Äkäslompolo**		**Ylläsjärvi**		**Sirkka**		**Total**		**χ^2-test, p-value**
	N	%	N	%	N	%	N	%	
No	10	47.6	0	0	5	8.8	15	26.3	0.005
Yes	11	52.4	16	100	15	26.3	42	73.7	
Total	21	100	16	100	20	35.1	57	100	

3.2. Changes in nature and everyday life

Every second respondent reported that he or she had observed tourism-initiated changes in local nature. Most of the changes dealt with the landscape and other negative changes were trampled undergrowth, less peace in nature, and pristine nature being more distant than earlier. People used to be able enjoy nature from their home yard but nowadays, they needed to travel some distance to experience the same thing. However, in some cases, skiing and walking tracks have made it easier to enjoy nature. The fact that the location of trails is being constantly changed due to construction was seen as a problem.

The growth and development of the tourist destinations do have impacts on the everyday life of the villagers. A total of 75% of the respondents mentioned that the growth has affected their life one way or another. The impacts were considered both positive and negative: examples of positive changes included better traffic connections and conditions and that there were more services available.

The negative changes included tourists entering people's private yards and even peeping through windows to get a glimpse of the Lappish way of life. The interviewees also mentioned that the community spirit had lessened in the modern-day situation. There were also social problems: seasonal jobs and relationships and late night shifts caused domestic problems. Motorized activities make the residential environment noisy and the people particularly complained about snowmobiles going along walking routes.

3.3. Contradictions between actors and activities

There were contradictions between the tourism industry stakeholders and other actors, which had been observed by 56% of the respondents. Most of the contradictions were between tourism and reindeer herding (25% of the respondents had made observations) or tourism and nature conservation (21% of respondents). Reindeer pastures and skiing tracks were often located in the same areas and former pastures were now cabin zones. Reindeer often wandered over ski tracks and they entered cabin yards and patios, ate flowers and left their droppings. Reindeer and tourists frequently used the same places, and herders complained that their livelihood was no longer respected. Most of the problems between reindeer herding and tourism were reported by Äkäslompolo villagers (47.6% in Äkäslompolo, 12% in Ylläsjärvi and 10% in Sirkka) and the difference between villages was statistically significant (Pearson χ^2 -test; $P < 0.01$).

A total of 21% of the respondents saw contradictions between tourism and nature conservation. Pallas-Yllästunturi National Park, which is located close to both tourist destinations of Ylläs and Levi, has regulations that some respondents considered hampered the opportunities to develop tourism in the area. One of these regulations is a ban on snowmobiling, which is only permitted for reindeer herders and authorities. Some other environmental restrictions were also seen as negative barriers whereas some respondents felt sorry about the transformation of former nature conservation areas into holiday village zones.

3.4. Actors steering development

According to the views of the local people in the studied villages, the foremost actors in the development have been non-local entrepreneurs (Table 2). Every second respondent mentioned such an actor. Opinions varied according to the village: in Ylläsjärvi, only one quarter of

Table 2.
Actors that have had an impact on the development of tourist resorts according to the villagers in Äkäslompolo, Ylläsjärvi and Sirkka. The statistically significant differences are presented in last column.

		TOURIST RESORT				
		YLLÄS		LEVI		
Actor		Äkäslompolo	Ylläsjärvi	Sirkka	N	χ^2-test p-value
Non-local entrepreneurs	have had no influence %	33.3	75.0	45.0	28	0.038
	have had influence %	66.7	25.0	55.0	29	
	Total %	100	100	100		
	N	21	16	20	57	
Municipality	have had no influence %	57.1	81.3	30.0	31	0.009
	have had influence %	42.9	18.8	70.0	26	
	Total %	100.0	100.0	100.0		
	N	21	16	20	57	
Local inhabitants	have had no influence %	47.6	37.5	65.0	29	0.243
	have had influence %	52.4	62.5	35.0	28	
	Total %	100.0	100.0	100.0		
	N	21	16	20	57	

the respondents mentioned non-local entrepreneurs whereas in Äkäslompolo, two thirds of the respondents pointed to such actors. The differences between the villages were statistically significant (χ^2-test; $P < 0.05$), and especially Äkäslompolo differed from Ylläsjärvi (χ^2-test; $P = 0.012$).

Ylläsjärvi villagers named themselves most often as actors who had influenced the development of their home district whereas in the neighbouring village of Äkäslompolo just 15 km away, the people stressed the impact of outsiders. In Sirkka, 70% of the villagers mentioned most often the municipality (Kittilä at Levi in the village of Sirkka) as the driving force behind the development: the corresponding figures were 43% in Äkäslompolo and 19% in Ylläsjärvi. The differences were statistically significant (χ^2-test, $P < 0.01$).

3.5. Local people and power

The local inhabitants in Ylläs and Levi did not feel that they had a very good chance of having any major impact on development or the operation of the tourist destinations in general. The Ylläsjärvi villagers stressed that they have had a major impact on tourism as is, but that it presumably referred to the village image and services that were available in Ylläsjärvi. Fewer opportunities were seen in Äkäslompolo and Sirkka, where some of the villagers considered that they had no influence at all.

Although there were great doubts, one third of the respondents felt that they have had at least some sort of impact on development. Again, there were differences between the villages: in Ylläsjärvi, people felt that they have had an impact (50% of the respondents) more often than the villagers of Äkäslompolo (33%) or Sirkka (25%), but the differences were not statistically significant. Men seemed to think that they have had more influence (55%) than women did (12%) which is a statistically significant difference (χ^2-test; $P < 0.01$).

Figure 4 shows the reasons why people felt that had had no impact on the development of a tourist destination. *Some other reasons* were the lack of time or the fact that municipality had already made the decisions.

Every second respondent mentioned being interested in becoming involved in the planning. The reasons for disinterest were the lack of time, age or the heavy workload without any compensation. The task is often left to professionals, especially in Sirkka.

The most popular way to participate in the development of tourism was through some regularly assembled council or similar such organ. The people stressed the importance of a broadly based council with representation from every relevant stakeholder. Surveys were also seen (27%) as good tools, especially by busy people, and 20% saw village associations as being good channels of influence.

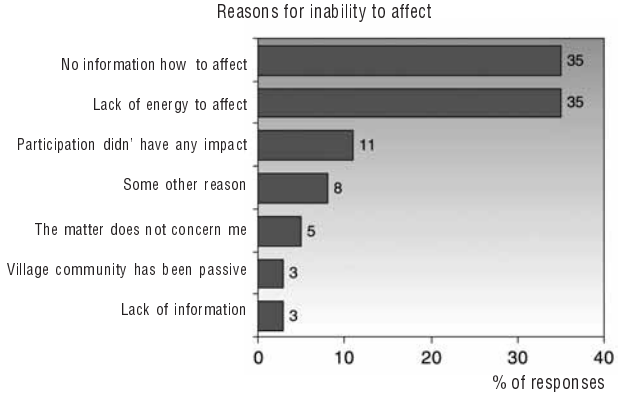

Figure 4.
Reasons for the inability to have an influence.

3.6. The future

The local people considered that the tourist centres had a very or quite positive future. Only 12% of the respondents believe the future was quite bleak; no one considered it was very bleak. The reasons for the positive outlook on the future were beautiful nature, good reputation even abroad, strong competitive position, and good possibilities for growth.

The threats were in excessive and runaway growth, which concerned almost one third of the respondents. The worries were at their peak in Ylläsjärvi and Äkäslompolo; in Sirkka, the villagers were concerned with the possibility of the village becoming a place of wild partying. Other future threats and worries were the ethos of only thinking about money, the social conditions of the employees and worldwide crises such as wars, economic recessions, climate change etc.

The local people were of the opinion that the most important way to develop the tourist centres in the future would be to create new services, better logistics facilities and more facilities related to nature and sport (Fig. 5). Investing in the quality and diversity of products and facilities instead of increasing the volume of existing services was seen as the primary guideline. One example for improving quality was to embody local expressions and content in products.

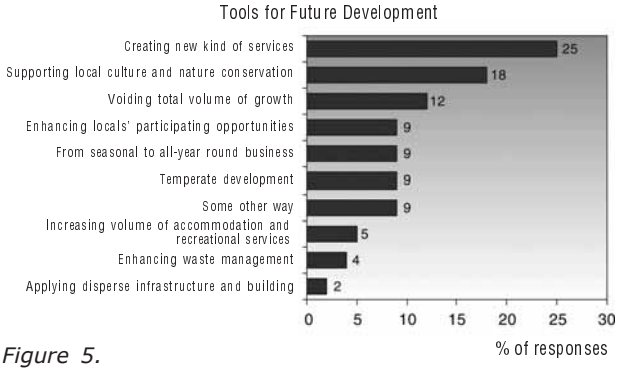

Figure 5.
Tools for future development.

When referring to better logistics, the locals meant better road connections between villages and the closest towns, more sidewalks and crosswalks, a railway line extending to the tourist centres and better coach connections during the low season. The local people expressed their wish for more facilities related to sport and nature, e.g. hiking routes. The current routes needed better interconnections. They also wanted activities to be located along these routes and they proposed a better opportunity for climbing, which was considered as one way of developing tourism from a seasonal into a year-round business.

4. Discussion

According to Järviluoma (1993), the local people in the municipality of Kolari felt particularly positive about tourism. However, they wished for a slowing down in the growth of tourism and for the number of tourists to stay at the level at that time. Among the positive impacts of tourism mentioned by the local people in 1993 were jobs, better living conditions, better logistic connections and better leisure activities. The negative aspects were damage to

the environment. Criticisms also focused on too much money being invested in tourism, which hampered other development within the municipality (Järviluoma 1993).

The results of this study are very similar to a study conducted 15 years ago. The opinions of the locals had not significantly changed. They were still satisfied with the present situation at the tourist centres even though various concerns had emerged over the growth of tourism, which had taken a huge step forward over the intervening years; for example, accommodation capacity had increased by almost 100%.

How is this possible? One slightly cynical answer might be that people are always complaining about change but in the end, they are happy with the results. People just do not know what is best for them. Another point of view is mandatory readjustment. People who do not accept changes in the social and natural environment have to move away or just learn to live with those changes. Those who decide to stay, reluctantly or with a cheerful attitude, will adapt to the new circumstances over the passage of time. The bonds to one's place of birth tend to be strong, but the longing for past days and environments is not a very sound strategy for everyday life.

Globally, the findings of this study are not new. The local people living in the vicinity of the tourist destinations seemed to be always happy with the present conditions. The problem is that the limits of acceptable change seemed to be very elusive. New inhabitants make up for those who have moved away, and they bring different meanings, experiences, and emotions to a particular area. Those who stayed have adapted and readjusted to the new conditions. All this can lead to no limiting forces against change and in the end, the tourist destinations lose the values that they once possessed (Johnson & Snepenger 2006).

Be as it may, the local people in the vicinity of the tourist destinations of Ylläs and Levi seemed to be quite satisfied. There were problems between reindeer herding and tourism, unfortunate changes in landscape, the locals have not always been taken into consideration in the planning processes, and seasonal jobs caused some social problems but in the end, more jobs and a better economy apparently compensated for the losses. Although adaptability is high in these villages, there is no doubt that the course of future development matters in terms of social sustainability. The message from the villagers is clear: "More quality, less quantity". Quality means new services and content with local culture and tradition playing important roles. The key issues are respect for nature, landscape and culture.

The three villages we studied – Ylläsjärvi, Äkäslompolo and Sirkka – all live off tourism and its accompanying phenomena. According to our results, the people in Ylläsjärvi seemed to be the most satisfied; at least they expressed fewer complaints and concerns. The villagers felt that they had been able to influence the development of tourism and that the village image had been maintained to such an extent that the original could still be seen. They did not feel outsiders. Our data are insufficient with regards a comprehensive analysis as to which way is the best way. More valuable factors and facts should be investigated. However, planning at every level can learn from the findings and good experiences should be taken into account.

The competition between the tourist destinations extends to the villages. The people in Ylläsjärvi and Äkäslompolo, which belong to Ylläs, saw Levi as a scenario that should not be repeated in their localities. By this, they meant the urban-like infrastructure and false village image (Fig. 3) that has nothing to do with the real Lappish countryside. The feeling is mutual. The people of Sirkka (in Levi) also saw the course taken in Ylläs as something to avoid; it was a sleepy tourist destination with no competitive potential. There is no doubt that these interpretations rise from cultural backgrounds where neighbours are always finding something to undervalue or to be jealous of. At best, this cultural model (Shore 1996) can sustain the diversity of tourist destinations, which was something that also our respondents felt important.

Taking care of social sustainability is a challenge when large investments and external financing is the key driving forces that determine development. Changes in the natural and cultural environment are inevitable, and it is a question of the acceptable pace of change and who and what provide the driving forces.

5. Conclusions

Local culture and locals' opinions about development should be taken into consideration more effectively because having outsiders in charge of progress creates contradictions between the actors. The allocation of costs

and benefits is a crucial question: if the locals primarily have to bear the costs (i.e. social problems, damaged nature and landscape, "new outsider bosses"), it will evoke conflict at some level or another. The studies by Tuulentie (2007) and Mettiäinen (2007) have shown similar findings and conclusions.

Another point is that local people's satisfaction affects the quality of services, which is not good for the business. Tourists will not return when they feel they are unwelcome or that they are welcome just for their money. A third point is that local people's satisfaction is also to the entrepreneur's advantage. When the local community supports the business, or at least has nothing against it, things will proceed much easier. This applies especially to land-use issues.

Finally, the fourth ethical point is in fact at the core of cultural and social sustainability. Making decisions and implementing operations that have significant impacts on local life involves the responsibility to ask about, study and assess local opinions, hopes and fears indicated through social and cultural meanings.

Acknowledgements

This study is a part of the EU LIFE Environment project *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB).

References

Bernard, H. R. 1995: Research Methods in Anthropology – qualitative and quantitative approaches. –Altamira Press, Thousand Oaks.

D'Andrade, R. 1995: The Development of Cognitive Anthropology. –Cambridge University Press, Cambridge.

Johnson, J. D. & Snepenger, D. J. 2006: Residents' Perceptions of Tourism Development over the Early Stages of the TALC. -–The Tourism Area Life Cycle Vol. 1 Applications and Modifications (ed. Butler, R. W.): 222-237. Cromwell Press, Clevedon.

Järviluoma, J. 1993: Paikallisväestön asennoituminen matkailuun ja sen seurausvaikutuksiin – esimerkkinä Kolarin kunta. –Oulun yliopisto, Oulu.

Kauppila, P. 2004: Matkailukeskusten kehitysprosessi ja rooli aluekehityksessä paikallistasolla: esimerkkeinä Levi, Ruka, Saariselkä ja Ylläs. (Development process of resorts and their role in regional development at the local level: case studies of Levi, Ruka, Saariselkä and Ylläs). –Nordia Geographical Publications 33: 1.

Mettiäinen, I. 2007: Tunturinlaidan kylästä matkailukeskukseksi - Paikallisten toimijoiden näkökulmia Ylläksen ja Levin matkailukeskusten kehittymiseen ja vuorovaikutteiseen suunnitteluun. -Arktinen keskus, Lapin yliopisto, Lapin yliopistopaino, Rovaniemi.

Regional Council of Lapland 2007a: Lapin matkailustrategia 2007-2010. Luonnos. –Available from: http://www.lapinliitto.fi/paatoksenteko/lh221007/liite8.pdf [1.10. 2007].

Regional Council of Lapland 2007b: Lapland tourism strategy 2003-2006. –Available from: http://www.lapinliitto.fi/paatoksenteko/lh221007/liite8.pdf [10.10.2007].

Shore, B. 1996: Culture in Mind – Cognition, Culture, and the Problem of Meaning. –Oxford University Press, New York.

Strauss, C. & Quinn, N. 1997: A Cognitive Theory of Cultural Meaning. –Cambridge University Press, Cambridge.

Swarbrooke, J. 2002: Sustainable tourism management. – Cabi Publishing, Oxon.

Tuulentie, S. 2007: Local participation as a prerequisite for socially sustainable tourism: Case studies form the Ylläs and Levi ski resorts in northern Finland. -Environment, Local Society and Sustainable Tourism (eds. Jokimäki, J., Kaisanlahti-Jokimäki, M.-L., Tuulentie, S., Laine, K. & Uusitalo, M.): 75-89. –Arctic Centre Reports 50, Painatuskeskus Finland, Rovaniemi.

Vatanen, E., Pirkonen, J., Ahonen, A., Hyppönen, M. & Mäenpää, I. 2006: Luonnon käyttöön perustuvien elinkeinojen paikallistaloudelliset vaikutukset Inarissa. – Metsätieteen aikakauskirja 4/2006: 435–451.

BACKGROUND INFORMATION

1. Year of birth _____ **2. Place of birth** _____

3. How long time you have lived at your present home municipality?

☐ all my life _____ years

4. Do you own land in tourist resort?

☐ no ☐ yes

5. Do you have incomes from tourist business?

☐ mainly or entirely ☐ some ☐ not at all

6. Who do you consider as local in Sirkka/Äkäslompolo/Sirkka (your home village)?

_____

DEVELOPMENT AND PRESENT STATE OF TOURIST RESORT

7. Have you been content with development of tourist resort?

☐ yes, why? _____

☐ no, why? _____

8. Have you noticed any changes in nature close to tourist resort?

☐ yes, what? _____

☐ no

9. Has the growth of tourist resort have impact on everyday life in your village?

☐ yes, how? _____

☐ no

In questions 10 – 12 there are several possibilities you can choose from

10. Have you noticed any contradictions between tourist business and other livelihoods?

☐ yes, between tourism and reindeer herding, what kind? _____
☐ yes, between tourism and forestry, what kind? _____
☐ yes, between tourism and subsistence use, what kind?_____
☐ yes, between tourism and nature conservation, what kind? _____
☐ yes, between tourism and some other use, what kind? _____
☐ no contradictions observed

11.a What services do you use?

☐ slopes
☐ skiing tracks and nature trails
☐ restaurants and night life
☐ groceries and other stores
☐ health services
☐ buses and taxis
☐ some other, what:_____
☐ nothing

11.b As a resident of Sirkka do you use also services in Ylläsjärvi and Äkäslompolo?

☐ yes ☐ no

PARTICIPATION IN THE DEVELOPMENT OF TOURIST RESORT

12. What actors have had greatest impact on developments of the region?

☐ local inhabitants
☐ non-local entrepreneurs
☐ tourists
☐ local authority
☐ provincial organisations of development (Regional Council of Lapland, Employment and Economic Development Centre, other financiers)

☐ federal authority (Metsähallitus, Finnish Environment Centre, State Provincial Office of Lapland)

☐ some other, what_____

13. Do you think you have had any impact on development of tourist resort?

☐ yes, how? _____

☐ no, why? _____

14. Would you like to take part more intensively in planning processe

☐ yes, how? _____

☐ no, why? _____

FUTURE OF TOURIST RESORT

15. How do you consider the future of tourist resort? (1=very positive, 2=fairly positive, 3=fairly negative, 4=very negative)? _____

Why, what possibilities/threats?

_____

16. How the tourist resort should primarily be developed?

_____

_____

_____

The role of forestry at tourist destinations in northern Finland: Case studies from Ylläs and Levi

Leena Suopajärvi

Regional Research Services, University of Lapland,
P.O. Box 122, FI-96101 Rovaniemi, FINLAND
leena.suopajarvi@ulapland.fi

Abstract

Forestry and tourism are both situated in the landscapes of Lapland and both utilize Lappish nature, but in competing ways. For forestry, nature is a resource of raw material whereas for tourism, nature is a place for recreation and experiences. Consequently, forestry and tourism have been in constant dispute over the right to nature and the land areas at and near tourist resorts. The disputes over the use of forests, which also rise to the fore in the national and international media, constitute a serious threat to the forest industry in Lapland and can even pose a risk the future of forestry in the North. The paper is a study into the role of forestry at tourism resorts in Lapland. The case studies come from the Ylläs and Levi tourist destinations. The study employs the frame of actor network theory and the data stems from interviews with local forest professionals on how they define their role, the alliances involved in the development of forestry at the tourist destinations and the way in which the dispute could be resolved from the viewpoint of the forest industry.

Keywords: actor framework theory, forestry, northern Finland, tourism

1. Introduction

The role of forestry in the tourist destinations in Lapland, northern Finland, received wide discussion in the Finnish national media in spring 2007. The largest media coverage was given to the dispute between forestry and tourism in the municipality of Muonio in Western Lapland, where the tourism business demanded that logging should be totally prohibited in the area that is important for tourism. These demands also received support from the inhabitants in the district. Following the public discussion, tourism entrepreneurs and Metsähallitus, the state-owned forest company, agreed at the end of February 2007 that tourism should pay compensation for saving the forests. There were demands for prohibitions against forestry at the tourist destination of Levi in Kittilä municipality as far back as the 1990s. There was even criticism against a single logging site at the Ylläs tourist resort, where forestry and tourism have lived side by side, in spring 2007.

Forestry has been on the losing side in the media discussions about its role in Finnish Lapland. For example, 77 Finnish scientists have been of the opinion that forestry in Finnish Lapland is not sustainable, and they sent an open letter to the Ministry of Agriculture and Forestry in February 2007 (Avoin kirje maa- ja metsätalousministerille 7.2.2007). In addition, environmental organizations such as Greenpeace have raised the use of the northern forests to the agenda for discussion among the customers of paper products in Central Europe. It is evident that forestry in Finnish Lapland is under threat. For example in response, almost 9,000 Laplanders, mainly from forestry sector, demanded safeguards to forestry in Lapland in June 2007. The message was directed to the environmental organizations and the international customers of the forest industry.

The purpose of this article is to report and analyse the viewpoints of the Lappish forestry industry in the light of the current situation, where its role and action is strongly criticized by environmentalists, local inhabitants and tourism in Lapland. The case studies are taken from the tourist destinations of Ylläs and Levi, and the research is a part of the project *Tourist Destinations as Landscape Laboratories – Tools for Sustainability* (LANDSCAPE LAB). The aim of LABSOC –task (*Functional and Social Structures of Local Communities*) is to study the social and cultural dimensions of environmental issues at the tourist destinations. In order to collect the data, eight interviews were conducted among professionals working in the planning and administration of forest resources and among forest owners and forest companies buying the timber. The interviews were carried out in 2006, before the forestry disputes in 2007.

In the taped theme interviews, the forestry professionals explained how tourism had changed forestry in the region, how tourism benefited or hindered forestry, how forestry benefited or caused problems for tourism, the role of forestry at the tourist destinations and the way in which

possible disputes could be resolved. Consequently, the interviewees revealed the role of forestry at the tourist resorts and they thought about the future of forestry in Lapland on a more general level. The interviews were transcribed and then analysed using Callon's idea of translation as a frame of study. Callon's theory of translation is part of theoretical orientation referred to as the actor network theory. Translation is here understood as a process, where actors are "defining their respective identities, their mutual margins of manoeuvre and the range of choices which are open to them" (Callon 1986). Thus, the interpretations and interrelationships between different actors and entities are important for analysing the situational power relations. The actor network theory stresses the actors' conscious activity in the realisation of the social processes (see Latour 1986). The data, the interviews of the forestry professionals, were organized by adapting the four moments of translation: 1) defining the role of forestry at the tourist resorts, 2) identifying important alliances and 3) their roles in the discussion and finally, 4) finding the ways to resolve the situation and the way in which forestry professionals could replace forestry in the light of the new situation (Callon 1986). Before presenting the present role of forestry, it is necessary to give a brief history of forestry in Finnish Lapland.

2. Forestry losing its hegemonic position to tourism in Lapland

Forestry has been one of the main industries in Lapland especially since the development of the sawmill industry at the end of the 19th century. The first steam sawmill opened in the city of Kemi in the southern part of Lapland in the 1860s. The industry needed raw material and large logging sites, where men lived in the woods and followed the work from one place to another, got underway in Lapland. The pulp industry began to develop in the early 20th century in the Kemi region, where it was easy to float timber along the Kemijoki river from the large areas of Lapland. Intensive forestry started after the Second World War, when Finland lost parts of its forests and wood processing industry to the Soviet Union. The Finnish state tried to use all its resources, including state-owned forests in Northern Finland, to boost industrial production and the standard of living and support the development of the pulp and paper industry in Lapland. (Massa 1994, Kerkelä 2003) In the forestry industry, this meant the more aggressive production of pine through clear cuttings, ploughing, forestation and thinning. Environmental values were not taken into account in the years of reconstruction after the war (Massa 1994).

Until the 1960s, the forestry sector was one of the most important employers in Lapland. Small-scale farming and seasonal forestry work provided maintenance for over half of the population in the first decades following the war. Due to the technical development of motor saws, tractors and harvesters, the level of employment in the sector has fallen over the past decades. For example, in 1980 the proportion of primary production (agriculture and forestry) accounted for approximately 15 per cent of the labour force in Lapland; in 2004, the proportion of the forestry was only two per cent, and the whole of primary production employed about six per cent of Laplanders (Regional Council of Lapland 2007). What happened in the forests also happened in factories; about 6,150 people worked in paper industry in Kemi in the peak years of the mid-1970s whereas there were fewer than 1,800 employees in 2006.

Despite the decline in employment in the forest sector, the annual harvest has not fallen; the annual harvest amounted to approximately 3.5 million cubic meters in the 1990s and to 3.8 million in 1998-2002. The felled volume came to approximately 4.2 million cubic meters in 2004 and 2005, when largest sustainable annual harvest was estimated at 5.1 million cubic meters (Massa 1994, Regional Council of Lapland 2005, Keskimölö & Pirkonen 2006).

The volume harvested by the forestry industry has remained high, whereas employment in the forestry sector has declined. This development is perhaps one reason for the forest disputes in Lapland, where the role of forestry has been challenged sometimes by tourism, sometimes by environmental organizations or reindeer herders. Forestry, which was the most important industry in the Lappish countryside just a few decades ago, is no longer as important to the local economy as it used to be. Other livelihoods now challenge its right to use nature in Lapland.

Forestry in Finnish Lapland has been forced to make room for tourism. From the forestry professional's point of view, the clue in the story is that tourism, especially at large tourist destinations such as Ylläs and Levi, limits the opportunities for forestry in the surrounding areas and even threatens the entire industry. They see that if there are constant disputes between tourism and forestry, it is forestry that has to back down.

The forestry professionals interviewed for this project were also concerned about the negative image of the industry in the media. The situation is similar to that at the end of the 1980s and early 1990s, when there were disputes over logging in the so-called primeval forests in Lapland and eastern Finland. Young environmentalists challenged forestry. In the media, forestry was described as a destroyer of Lappish nature (Poikela 1998, Rannikko 1996). This negative image of forestry is still alive in the media. Interestingly, tourism appears as a more environmentally friendly industry in the media, although the negative environmental impacts are recognized and discussed.

The forestry professionals interviewed for this study say that if the national and international media continue to produce a negative image of forestry in Lapland it will damage and even threaten the entire forest industry. In addition, Metsähallitus, the Finnish Forest and Park Service, has reacted to the criticism by producing a brochure in English for customers in Central Europe. The titles in the brochure (Boreal Forests in Sustainable Use, Co-operative Planning for Sustainable Use of Forests and Ecological Forestry) express the vision that is marketed to the customers (Metsähallitus 2007).

3. Forestry, tourism and the public sector as core actors in the dispute

According to Callon (1986), actors are constantly defining themselves in relation to the other actors involved in a case. Actors and allies formulate their identity and goals during the process in action. As stated earlier, the forestry professionals did see their position as weak when discussing the use of nature at the tourist resorts. Below, the network of core actors related to forestry at tourist destinations are synthesised as described by the forestry professionals interviewed for this study.

3.1. Forestry as an important industry for the local and regional economy

The forestry industry involves many actors such as private forest owners, planning and advisory organizations, forest companies such as Stora Enso and Metsä-Botnia, and forestry workers such as harvesters and lumberjacks. Forestry is based on low economics in that it produces income and employment at the local and regional level. Although forestry employs people mainly in processing and selling, the interviewees stressed that even a few jobs in the sparsely populated countryside of Lapland are important. Selling timber is also a notable source of income in the sparsely populated area, where it is actually almost the only exploitable capital. For example, in 2004 the private owners' share of the annual harvest amounted to more than 60 per cent (Regional Council of Lapland 2005). Although there are also city dwellers and women among forest owners, the discursive representative of forestry is the male forest owner who is still living on the farm. He has a personal relationship with the land he owns and he cultivates his forest heritage.

For this reason, the discursive argument on forestry in Lapland is local, which is highly typical in the discussion over the use of nature in Lapland. According to the argument, Laplanders have lived in their region for a long time and they have used nature as the basis for their lives, which is why the right to the utilization of natural resources and the environment should be theirs – today and in the future (see Suopajärvi 2001, Valkonen 2003). There is a dichotomy present in the discussion between the local and general relationship to nature. The idea is that the locals have a special, close relationship to nature that is based on the reality and experience of nature in daily life. Nature that constitutes simply scenery for tourism is just an object of a tourist's gaze. Nowadays, expanding tourism, besides the prohibitions expressed by environmentalists and administrative decisions, threatens the special northern relationship between man and nature (see Valkonen 2003).

Forestry in Lapland employs almost 1,400 Laplanders, the chemical wood-processing industry more than 2,200 and the mechanical wood-processing industry employs approximately 1,000 Laplanders (Regional Council of Lapland 2005). Therefore, forestry is still important industry for Lapland, especially if we also take into account the private forest-owners' income from selling the timber. The forestry professionals interviewed in this study stressed that forests are important capital for Laplanders; it is a legacy that has to be cultivated. They said that the forests surrounding the tourism destinations have always been used for heating and building and consequently, they are not so-called primeval forests, but forests that have been used when necessary.

3.2. The large tourism industry and cottage owners as opponents of forestry

According to the forestry professionals, the tourist spending few days at a tourist resort is not the main opponent of forestry. The snow in winter covers the marks left by forestry and so visitors from other countries in particular do not even know that the scenery on their skiing trips has been logged. The forestry professionals felt that logging and thinning strengthened the image of Lapland; tourists come to seek the open landscape of the North. A similar result has also been found in tourism studies in Lapland: thinning has enhanced tourists' enjoyment in nature or at least it has caused no harm to the sense of enjoying nature (Lovén 1997, Rantala 2006).

Cottage owners are a different thing. They move outside the ski trails and spend their summers at Ylläs or Levi. They are the ones who "have bought a small piece land (usually at a high price) built a cottage and want to enjoy the untouched landscape and surrounding forests", as one of interviewees said.

The forestry professionals thought that the most critical group against forestry was the large entrepreneurs in the tourism business. Tourism has a lot of power in the municipalities like Kittilä (Levi) and Kolari (Ylläs), which struggle with economic problems and where unemployment is high and tourism is the only growing industry worth noting (see Hakkarainen 2005). The forestry professionals said that all regional development is harnessed for the interests of tourism – at the expense of the other industries.

Finnish sociologists argue that the remote countryside in Finland has been passed over in the decision-making on the future of these regions (Rannikko 2004). Rannikko (2004) used the concept of social marginalisation to describe the situation where local peoples' opportunities to have an influence on their own lives and livelihoods have diminished. For example, decisions concerning the use of natural resources are more often made by non-local actors (Rannikko 2004). Although the tourism entrepreneurs at Levi and Ylläs are also local actors, the use of land and nature are planned and made in the interests of non-local inhabitants, namely tourists. The forests are areas of recreation and experience, which is an important prerequisite for the future of tourism. In this sense, the use of nature and natural resources at the tourist destinations in Lapland are in the hands of non-local actors and local people's interests related to nature have been marginalised.

3.3. Public sector regulating the possibilities for forestry

The third important alliance influencing local forestry is the public sector, which controls the industry through legislation and administration. The state governs forestry through the different planning systems applied by Metsähallitus, which practices forestry in Lapland and manages protected areas such as national parks. The state owns about 70 per cent of the area where forestry is carried out in Lapland and consequently, it plays a major role in using Lappish nature (Keskimölö & Pirkonen 2006). Naturally, national legislation and regulation also controls forestry on privately owned land. The state also ensures that the regulations outlined international treaties are put into practice in Lapland. Rannikko (2004) says that the duty of Finland and Sweden seems to be to protect primeval forests in the coniferous forest zone because in other European countries, these forests have been almost totally destroyed. For example, 45 per cent of the state owned land in Lapland is in protected areas (Metsähallitus 2007). Conservation limits the possibilities of forestry but creates attractions for tourism: for example, the Pallas-Yllästunturi National Park has had more than 300,000 visitors per year.

Emphasis is also placed on the role of municipalities because a municipality has the right to plan its area for land use and building. Municipal planning plays a key role at the rapidly expanding tourism centres, and the general planning process at Levi and Ylläs is underway in 2007. Although all planning involves the participation of different stakeholders, the local people have criticised the planning process. The municipalities want to make space for tourism and building new cottages. At the Levi tourist resort in particular, the forestry professionals and forest owners feel the planning process does not take the interests of forestry into consideration. In those areas where more detailed planning is underway, the municipality can prohibit forestry. This was the case at Kätkä fell, which is just beside Levi fell (Kittilän kunnan kaavoituskatsaus 2006, Lovén 1997). Kätkä is an important scenic area for tourism in Levi, and it is also an area for skiing and other types of tourism recreation in nature. The land is mainly privately owned, but the landowners have been unable to practice forestry in way they would like. This has caused a strong sense of injustice among forest owners and forestry professionals: the owners cannot utilize and profit from their forests because of tourism, but they do not get any compensation for the conservation. Finland has also developed methods for valuing scenic landscapes, but these methods were

not applied in the Levi region until summer 2007. Although someone always owns forests (private owners, companies or state), legislation and administration view forests as being for the common good, and the owners can therefore be regulated and constrained.

As stated in this article, forestry has earlier been a hegemonic actor in the Lappish countryside. Nowadays, its role is rather critical: it employs fewer and fewer people, environmentalism challenges its very existence and other industries, such as tourism and reindeer herding, compete ever more strongly with it. The forestry professionals interviewed to this study argued that no attention is paid to forestry in the decision-making for planning. Policies and regional development only take the interests of tourism seriously.

Moreover, international action, decisions and opinions have an effect on forestry in Lapland. Lappish timber is raw material for a global chain of production: the end products are sold to the markets of Central Europe, for example. Environmental organisations, particularly Greenpeace, have influenced customers in Europe to pressure forestry companies and thus prevent the use of northern forests. Globally, the forest industry does not want to buy timber from areas where there may be disputes over harvesting. Consequently, the price of timber may drop, which will have a negative impact at the local level: forest owners' income and employment in forestry is in danger.

4. Forestry redefining its mission

According to Callon (1986), the actors involved in situational networks try to create processes in favour of themselves by new definitions and interpretations. The forest industry and its representatives made these redefinitions when they understood that the industry had to protect its interests because of environmentalism and growing tourism in Lapland.

Forestry in Lapland has been practiced based on a one-sided vision of Lappish forests being just some kind of *pine field* for the production of the forest industry. The forests have really been treated as resources – just look at the large-scale harvesting that went on (until the beginning of the 1980s) (Massa 1994). The local forestry professionals admitted that old methods in forestry were rough, but they pointed out that the forest is a renewable resource; the forest grows back and the traces left by forestry disappear over the years and decades.

The forestry professionals stated that although clear cutting was still financially beneficial, forestry had changed since the 1980s. They said that nowadays, they manage the forest ecosystem; forestry protects threatened species and valuable habitats and it ensures the sustainable use of forests. In many ways, they take care of the biodiversity of the forests in Lapland, but this is not yet understood in the public discussion where the old images of forestry are still alive, as they regretfully said.

Today, forestry professionals stress that forestry is silviculture; it is forest management. Logging is reasonable at least when a forest is so old that it is no longer practically growing. The Lappish forests are growing especially in young forests and therefore, thinning is more than necessary for the wood production and for preserving the landscape: neither locals nor tourists enjoy thickets. In the opinion of the interviewed forestry professionals, a well cared-for forest is beautiful and easy to move around in. Tourists want to see the open landscape, which is why they come to Lapland: they have enough brushwood in the South. Forestry opens up the landscape for tourism by thinning the roadsides so that car drivers and passengers can see the Lappish landscape. The forest professionals said that harvesting is planned so that the silhouette of a hill remains as natural as possible.

5. Conclusions

The role of the forestry at tourist destinations in Finnish Lapland has been analysed using the frame of translation, a theoretical approach in the tradition of the actor network theory. The data came from eight interviews with forestry professionals acting in Ylläs and Levi districts, and the data were analysed using the four moments of translation. This paper described how the forestry professionals see the role of the forestry at tourist resorts, the important issues involved and the ways in which it is adjusting to a future in Lapland.

The forestry professionals believed that the role of the forestry in Lapland is critical due to pressures of other nature-based industries such as tourism and reindeer herding and demands for nature conservation. If tourism

and forestry end up in dispute in some area, it is forestry that has to make over land to tourism. The role of forestry has therefore changed considerably; it used to be a hegemonic industry in Lapland for decades after the war.

Tourism is a very strong actor in Finnish Lapland. In areas where municipalities strive to cope with economic problems and high unemployment, regional development is harnessed for the interests of tourism. According to the forestry professionals, the public sector is limiting the opportunities provided by forestry; municipalities in particular use the power of planning to meet the needs of the tourism industry.

Due to environmental consciousness and demands by other actors, forestry is redefining its role and image in the discussion. It is presenting itself as an economic and socially sustainable industry producing essential raw material for the northern wood processing and paper industries and consequently, work and income for Laplanders. The forestry industry also argues that is taking care of the landscapes needed for tourism in Lapland; it opens up the landscape and makes it possible to enjoy nature. It is also a sustainable industry in ecological terms; forests are renewable and the modern forest industry gives serious consideration to biodiversity and the diverse use of nature.

Forestry has taken into account the needs of tourism and the forestry professionals argue that nowadays, the tourism industry should also take the interests of forestry seriously. If disputes between the two industries constantly rise to the fore in the national and international media, it will damage the image of both industries – and consequently threaten the future of both forestry and tourism in Lapland.

Acknowledgements

This study is a part of the EU LIFE Environment project *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism* (LANDSCAPE LAB).

References

Avoin kirje maa- ja metsätalousministerille 7.2.2007: Available from: http://www.helsinki.fi/lehdisto/tutkijakirje/index.shtml [27.8.2007].

Callon, M. 1986: Some elements of a sociology of translation: domestication of the scallops and the fishermen of St Brieuc Bay. -Power, action and belief (ed. Law, J.): 196-233. Routledge & Kegan Paul, London.

Hakkarainen, M. 2005: Ylläs ja Levi resort desctiptions. LANDSCAPE LAB -project, Arctic Centre, University of Lapland. (In Finnish with English abstract). -Available from:http://www.arcticcentre.org/includes/file_download.asp?deptid=21742&fileid=7120&file=20051110113622.pdf&pdf=1 [27.8.2007].

Kerkelä, H. 2003: Teollistuva Lappi osana maailmantaloutta. -Lappi. Maa, kansat, kulttuuri (eds. Massa I. & Snellman H.): 129-159. Suomalaisen kirjallisuuden seura, Helsinki.

Keskimölö, A. & Pirkonen, J. 2006: Lapin metsäohjelma 2006-2010. -Lapin metsäkeskus, Rovaniemi.

Kittilän kunnan kaavoituskatsaus 2006: Available from: http:www.kittila.fi/web/index.php?id=402 [28.8.2007].

Latour, B. 1986: The powers of association. -Power, action and belief (ed. Law, J.): 196-233. Routledge & Kegan Paul, London.

Lovén, L. 1997: Metsämaiseman analyysi matkailukeskuksen kehittämisen välineenä: esimerkkitapauksena Levi. -Matkailu ja kehitys (eds. Aho S., Ilola, H. & Järviluoma, J.): 92-109. Lapin yliopiston matkailun julkaisuja B:2, Rovaniemi.

Massa, I. 1994: Pohjoinen luonnonvalloitus: suunnistus ympäristöhistoriaan Lapissa ja Suomessa. -Gaudeamus, Helsinki.

Metsähallitus. 2007: Metsähallitus' forestry in northern Finland. -Metsähallitus.

Poikela, K.-M. 1998: Leipää vai luonnonsuojelua: sanomalehtikirjoittelun näkökulma Pohjois-Suomen vanhojen metsien suojeluohjelmaan. –Lapin yliopisto, Rovaniemi.

Rannikko, P. 2004: Sosiaalinen kestävyys syrjäisen maaseudun metsätaloudessa. -Vastuun ja oikeudenmukaisuuden haasteet metsäpolitiikassa (eds. Lehtinen, A. & Rannikko, P): 127-144. Metsälehti Kustannus, Helsinki.

Rannikko, P. 2006: Local environmental conflicts and change in environmental consciousness. -Acta Socologica 39: 57-72.

Rantala, M. 2007: Sustainability criteria and indicators of forest-based livelihoods in Northern Finland. -University of Joensuu, Joensuu (in Finnish with English abstract).

Regional Council of Lapland 2005: Maa ponteva. Lapin maaseutuohjelma 2013. Viimeistelemätön versio. -Available from: http://www.lapinliitto.fi/aluekehitys/maaseutu/maaponteva.pdf [27.8.2007].

Regional Council of Lapland 2007: Työpaikat (alueella työssäkäyvät) toimialoittain Lapissa. -Availablen from: http://www.lapinliitto.fi/tilastokuvat/tp19932004.pdf [12.4.2007].

Suopajärvi, L. 2001: Vuotos- ja Ounasjoki-kamppailujen kentät ja merkitykset Lapissa. -Acta Unversitatis Lapponiensis 37. Lapin yliopisto, Rovaniemi.

Valkonen, J. 2003: Lapin luontopolitiikka. Analyysi vuosien 1946-2000 julkisesta keskustelusta. -Acta Unversitatis Tamperensis 284. Tampereen yliopisto, Tampere.

Using Action Research in Service Development to Promote Sustainability

José C. García-Rosell

Faculty of Business and Tourism, University of Lapland,
P.O. Box 122, FI-96101 Rovaniemi, FINLAND
jgarcia@ulapland.fi

Abstract

The introduction of sustainable development in 1987 brought a new perspective into the discussion on the role of business in society. Since then, firms have been expressing an increasing interest towards environmental and social causes; issues usually thought to be opposed to the idea of profit maximization. Hence, sustainability has become part of the daily business rhetoric, and an extensive body of literature has emerged on the topic. In the practice of business organizations, however, the very notion of sustainability has remained ambiguous. In fact, sustainability seems to take different meanings in different political, socioeconomic and moral contexts. I argue here that progress towards sustainability depends on the ability to engage into social processes and collaborative practices and thus negotiate the meaning of sustainability with the different stakeholders. In this paper, I present an action research approach to sustainability that allows organizations to become aware of these processes and practices, and which enables them to develop a more holistic sustainability initiative that can be introduced gradually into their organizational culture. This approach, which is elaborated in the empirical context of service development, is illustrated by presenting findings from an ongoing project carried out in the Finnish province of Lapland.

Keywords: action research, business, stakeholders, sustainable development

1. Introduction

Over the last two decades, ever since the term *sustainable development* was introduced by the Brundtland Commission and defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (World Commission on Environment and Development 1987), *sustainabilit*y has been a significant conceptual tool for assessing not only economic and social development, but also business activity more generally (Crane & Matten 2004). The Rio Declaration in 1992 and the follow-up World Summit on Sustainable Development in Johannesburg in 2002 further fostered the discussion on these topics and opened up new directions for the debate on the roles and responsibilities of business organizations in society. Thus, from the early 1990s onwards firms have been expressing their interest and commitment to environmental and social causes — issues usually thought to be opposed to the idea of profit maximization — in new ways (Rondinelli & Berry 2000, Crane & Matten 2004, Maignan & Ferrell 2004, Belz 2005, Doane 2005).

In business research, much of this discussion has revolved around corporate social responsibility (CSR), corporate citizenship (CC) and the role of business activity in sustainable development (Collier 1995, Carroll 1999, Crane 1999, Rondinelli & Berry 2000, Crane & Matten 2004, Maignan & Ferrell 2004, Collier & Wanderley 2005, Doane 2005). In this literature, CSR and CC are usually discussed in terms of four types of responsibilities: 1) the economic responsibility to be profitable; 2) the legal responsibility to conform to the laws of society; 3) the ethical responsibility to do what is right, just, and fair; and 4) the philanthropic responsibility to contribute to various kinds of social, educational, recreational, or cultural purposes (Matten & Crane 2005). All in all, sustainability is regarded as a desired situation in which humans are able to live and work in ways that can be maintained for decades and generations without depleting or causing harm to our environmental, social and economic resources (Hawken 1994, Doppelt 2003).

In the practice of business organizations, however, the very notion of sustainability has remained ambiguous (Greenfield 2004, Taipalinen & Toivo 2004). Sustainability programs are often implemented by taking onboard basic off-the-shelf management tools (see e.g. Doane 2005), such as environmental management systems and standards (e.g. ISO 14000, 26000), as well as specific codes of conduct and reporting practices offered by sustainability consultants. But as strategic goals and values, sustainability tends to remain open to multiple interpretations, taking different meanings in different

political, socioeconomic and moral contexts, which no single model has been able to capture (Cairncross 1993, Crane 2000, Crane & Matten 2004). Consequently, both academics and practitioners still seem to be struggling to understand how the principles of sustainability can be integrated in a satisfactory manner into business practice (Greenfield 2004). It appears that there is an urgent need for innovative approaches that help to grasp the phenomenon of sustainability and thus, foster its adoption into business organizations. Since the concept of sustainable development remains open to interpretation, such approaches may need to focus on defining the sustainability goals and means depending upon the particular circumstances and realities of the business organization implementing them (see e.g. Fadeeva 2003). Several scholars have indeed, expressed the relevance of approaching sustainability locally and in a discursive context (see e.g. Irwin 1995, Barry 1996).

Freeman (1984) defines a stakeholder as any group or individual who can affect or is affected by the achievement of an organization's objectives. In this paper, I take a stakeholder perspective to sustainability (Maignan *et al*. 2005) and argue that sustainability implies goals and values that can be achieved only through complex social processes and collaborative practices, where different stakeholders negotiate the meaning of sustainability in business practice. Thus, the development of business activity towards more sustainable practices requires multi-stakeholder engagement, continuous moral reflection and changes in the organizational culture. In this study, my aim is develop an action research approach to sustainability that allows organizations to become aware of these processes and practices, and which enables them to develop a more holistic sustainability initiative that can be introduced gradually into the organizational culture. In contrast to previous action research approaches in the field of sustainability, the action research approach presented in this paper has been integrated into a business activity. Indeed, this paper portrays how action research can be used within the context of service development, where the interactions between different actors form the basis of the business offering.

In the sections that follow, an insight into the discussion on sustainability from a business perspective is provided. Secondly, an action research as a methodological approach that can contribute to fostering the idea of sustainability in theory and practice is introduced. Then, the action research approach to sustainability within a service development context is introduced. The preliminary findings are presentedrom an ongoing action research project conducted in the Finnish province of Lapland in which the approach described in this paper is implemented. The general purpose of the project is to determine to which extent the use of action research in the service development process can contribute to a better understanding of sustainability and thus foster its consolidation within an organizational setting.

The data collected in this study portrays the planning stage of the first cycle of an action research process launched in a network of micro entrepreneurs. The material was collected trough convergent interviews between June and August 2006. The interviews, which were conducted with the owners of seven micro enterprises, provided their perspectives on sustainability. Finally, I draw conclusions from the current stage of this research for the study and promotion of sustainability by using action research within a service development context.

2. Theoretical framework, material and methods

2.1. Sustainability: A business perspective

While it is true that the term sustainable development was not commonly used until the end of the 1980s, the discussion of business' relation to society has been taking place for centuries (Carroll 1999). Adam Smith, for instance, wrote two hundred years ago in *The Wealth of Nations* about the lack of responsibility showed by large enterprises (see Smith 1999). He argued that the large enterprises of his day posed a threat to society because they externalised the risk inherent in their operations so that it was to be borne by stakeholders (e.g. workers, customers, investors) rather than by the enterprise itself. It seems that time has passed by, but the issue of social responsibility is as current as it was in Smith's time with the difference that nowadays enterprises have strong business reasons to demonstrate that they are responsible business players (Collier & Wanderley 2005).

However, research and formal writing on the responsibility of business in society has been mostly done since the 1950s. Especially Howard R. Bowen 1953 contributed to fostering the discussion of social

responsibility in the business field (see Carroll 1999). Indeed, after Bowen's contribution, social responsibility has been the subject of many conceptualizations originating from the management and marketing literature (Maignan & Ferrell 2004). While terms such as CSR, corporate social performance (CSP) and CC became part of the management vocabulary, marketing concepts such as societal marketing, ecological marketing, green marketing and environmental marketing appeared in the marketing literature (Kotler 1972, Henion & Kinnear 1976, Charter 1992, Peattie 1992,1995, Coddington 1993, Mintu & Lozada 1993, Carroll 1999, Matten *et al.* 2003). For example, according to Carroll (1999), CSR – a term officially adopted by the EU in the green paper 2001 – encompasses economic, legal, ethical and philanthropic responsibilities that organizations have towards society at a given point of time.

The introduction of sustainable development brought new insights into the discussion concerning the role of business in society (World Commission on Environment and Development 1987). The relationship between social responsibility and sustainability became clear when Elkington (1997) coined the term triple bottom line which states that for an organization to be sustainable, it must be financially secure, it must minimise its negative environmental impacts and it must act in conformity with societal expectations (Elkington 1997). As a matter of fact, social responsibility and sustainability concepts not only aim at integrating the interest and needs of stakeholders into business strategies but they also improve business performance. The fact that business people started to associate social responsibility with sustainable development contributed to the integration of the labels sustainable and sustainability into the business vocabulary. Indeed, terms such as sustainable marketing and corporate sustainability became part of the business jargon (see e.g. Fuller 1999).

Unfortunately, however, in the existing literature the concept of sustainability and the responsibilities that it entails are not at all clear. Both in theory and practice, sustainability means very different things to different people (Crane 2000, Crane & Matten 2004). As a result, both researchers and practitioners still seem to be struggling to understand how the principles of sustainability can be integrated successfully into business practice (Greenfield 2004). It seems that in addition to the contributions made so far, there is a need for helping organizations to redefine their business strategies, structure and organizational culture in such a way that has positive implications for the business, society and the environment (see García-Rosell 2007). After all, sustainability is a complex phenomenon, which entails political, socioeconomic and moral questions that go beyond a micro perspective. In this regard, not only the firm, but also the consumers and other stakeholders play a key role in moving towards sustainability by changing or maintaining their production and consumption patterns. Therefore, progress towards sustainability within a business setting depends mostly on the ability to engage into social processes and collaborative practices and thus negotiate the meaning of sustainability with the different stakeholders. In this context, negotiating the meaning of sustainability implies to find a balance between economic, social and environmental dimensions that is satisfactory for the organization and its stakeholders. Unless companies assume a multi-stakeholder approach, moral reflection and changes in the organizational culture, they will find it hard to identify which direction they should take in order to move toward sustainability.

2.2. Action research

The term action research was coined by the social scientist Kurt Lewin over half a century ago (Dickens & Watkins 1999, Perry & Gummesson 2004). Lewin, who wanted to formulate a method to help the practitioner, has been regarded as the *father of action research* (Heikkinen & Jyrkämä 1999, Ottosson 2003). However, other contributions such as the writing of John Collier at that time made a contribution to the development of this methodology which was seen as a way of engaging directly with real social problem while developing theoretical understanding (Masters 2000). Since the 1950s action research has become integral to the growth of theory and practice of organizational development and organizational research in management, education, community work and health care (Heikkinen & Jyrkämä 1999, Coghlan & Brannick 2001). The use of action research in Finland (toimintatutkimus in Finnish) – was prompted by the contributions of Jyrkämä and Kangas in the late 1970s (Palmu 2000). It is interesting to note that similar to sustainable development action research has been approached in different forms. Definitions and terms differ to some degree between authors. In the literature, besides the term action research, we can find the labels participatory

action research, action science, and action learning, among others (Greenwood & Levin 1998, Dickens & Watkins 1999, Coghlan & Brannick 2001, Reason & Bradbury 2001). Nevertheless, I will not clarify the nuances between the different approaches as it is not within the scope of this paper. Action research will be considered here as a general term which refers to a methodological approach that pursues action (change) and research (understanding) with the goal of fostering progress – practical and theoretical – towards greater sustainability.

There is wide agreement on the key role of using an action and reflection process to facilitate the internalisation of sustainability in organizations (see e.g. Bradbury 2001, Dunphy *et al*. 2003, Ballard 2005). Indeed, action research has been used in several studies on sustainable development due to its appropriateness, since it increases understanding through flexibility, responsiveness and participation – features that play a key role in change processes towards greater sustainability. For instance, Ballard (2005) used action research in a UK company for finding ways to respond profitably and creatively to the challenge of sustainable development. Other examples include Heiskanen and Timonen's (2003) experiment on sustainable alternatives for online grocery shopping in Finland and Nielsen's (2005) experiment to improve an integrated awareness of sustainable development in three Danish bread-producing firms. All these cases show how action research can help organizations move towards more sustainable practices. They also confirm that the success of a sustainable initiative depends mainly on the ability to include knowledge, needs, and values from different stakeholders into the endeavour.

The reflective nature of action research, which encourages participants to challenge their own assumptions as well as look outwards, makes this methodological approach well suited to situations that are not fully understood (Marshall 2001). In this regard, action research can help not only to clarify the relationship between business, society and the environment but also to find a suitable way for maintaining such relationship in harmony. Moreover, the process of action and understanding launched in an organization does not necessarily have to be an internal process. In fact, it has the potential of becoming also an external process influencing the behaviour of consumers, enterprises and other actors in society to adopt more sustainable practices (Heiskanen 2005).

While action research is usually associated with an emancipating and democratic process, business researchers and practitioners also see in action research an opportunity for fostering creativity and finding new ways of thinking that can bring benefits to the organization and their main stakeholders (Perry & Gummesson 2004). As Coghlan and Brannick (2001) point out action research is more than every day problem solving; it is learning about learning. And in this particular case, action research can help organizations learn about learning how to become more sustainable. Generally the significance of such attempts is not weather a change process aiming at internalising sustainability was successful or not, but rather how this particular change was managed and to what extent it provides useful and interesting insights about how progress towards sustainability might be achieved (Coghlan & Brannick 2001).

All in all, an action research approach seems to be useful for activating and fostering progress towards more sustainable practices within organizational contexts (Ballard 2005). Indeed, the iterative cycles of planning, acting, observing and reflecting – typical of action research – invite the researcher and the participants (co-researchers) into a joint process of learning that aims at increasing understanding by introducing gradual change toward greater sustainability. The action research process can help them identify suitable ways for moving the organization from its current situation to a situation that is not only more sustainable but also accepted and recognized by the whole organization and its main stakeholders. Instead of taking a form of top-down learning about environmental management systems with emphasis in experts and standards, action research offers the possibility for using a bottom-up approach to sustainability (Nielsen 2005).

Although most contributions have highlighted the appropriateness of action research as a methodological approach for managing theory and practice in a way that practitioners integrate sustainability into their organizations and researchers draw theoretical conclusions from their field experience, few contributions have shown how this methodological approach could be integrated into the daily business processes of an organization. Incorporating action research thinking into business activities may help to create a more reflective and participative organizational culture and thus to guarantee the continuity of the process of change and understanding (García-Rosell 2007). Next, I introduce a new way of using

AR to foster sustainability in business practices. The approach is implemented in a service development context – a crucial business process – as an opportunity not only for developing sustainable services but also internalising sustainability into business organizations.

2.2.1. An action research approach to sustainability

The theoretical frame of reference proposed in this paper is mainly a combination of action research and stakeholder thinking. The action research model introduced by Zuber-Skerritt (2001) has particularly served as the main structure for elaborating this approach (Fig. 1). The Action research contributions by Ballard (2005), Nielsen (2005) and Heiskanen and Timonen (2003) have especially inspired the conceptual ideas and the approach presented in this paper. The systematic and cycle nature embedded in this action research approach should contribute to a more reflective implementation of sustainability (Stahl 2005).

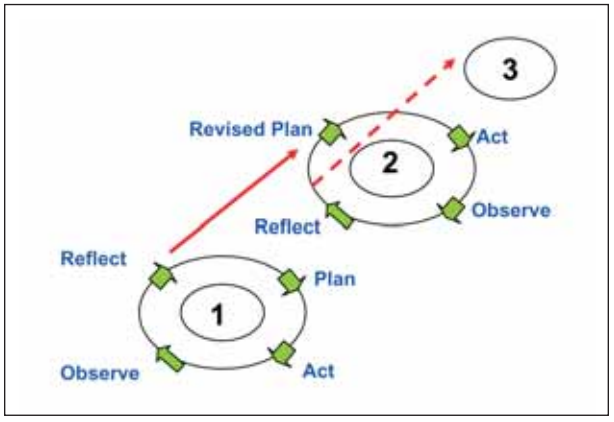

Figure 1.
The action research process (see Zuber-Skerritt 2001).

Since the approach to sustainability illustrated below is based on action research methodology, it is recommended that an action researcher – or someone who is familiarized with the methodology – introduces it into the organization. The first task of the action researcher would be to create an action research team formed by members of the organization. The team should not only consist of people interested in sustainability but also include people who have a certain degree of authority within the organization. However, while the action researcher is indispensable at the beginning of the process, his/her role may decrease as the co-researchers become more and more confident with the practice of action and reflection.

The theoretical and methodological approach presented in this section outlines the steps to be adopted by organizations seeking to become more sustainable market players. Especially, the approach is designed to help organizations to become aware of the complex processes and practices surrounding sustainability and thus to introduce it gradually into the organizational culture. Next, the action research approach to sustainability is illustrated stage by stage.

2.2.1.1. Planning stage

The first step in the planning stage is to define sustainability within the business organization. Indeed, in order to achieve commitment toward sustainability within an organization, it is necessary to identify the values, norms and expectations of its members. Furthermore, it is important to find out what they understand by sustainability and how they relate their organization to the principles of sustainable development. They should be able to identify environmental and social issues that are regarded as most relevant by the whole organization. However, while individual opinions are relevant, it is more important to arrive at a construct of sustainability that is shared and accepted by all members (see Stahl 2005). Reaching such a construct contribute to delineating the nature and scope of the societal obligations of the organization of interest. As a result, the members of the organization are able to agree on which directions their efforts should be channelled.

This initial step is necessary in order to identify the main stakeholders. Indeed, the common construct of sustainability, which provides an overview of the relationships between the organization and its social and natural environment, contributes to identifying which stakeholder issues are deemed as most important. However, the organization still needs to grasp the nature of these stakeholder issues. In this regard, it would be vital to find out what these stakeholders understand by sustainability in general and what is more important, how these stakeholders associate the organization with their view of sustainability. Here, methods such as interviews and focus

groups can be implemented. This information can also be obtained through employees (e.g. sales representatives, delivery personal) and secondary documents published by stakeholder organizations such as government agencies, non-governmental organizations or competitors. After clarifying the meaning of sustainability within the organization and among their main stakeholders, the action research team begins to evaluate the service development process by using the construct of sustainability as a point of reference. The evaluation should help to identify services which may need to be redefined. On the other hand, new service ideas can also be introduced. Stakeholders' views on sustainability may also be considered when conducting the evaluation in the first cycle of the action research process. At the end of the planning stage, the action research team is able to restructure the service development process and draw up a plan for redefining existent services and/or creating new ones.

2.2.1.2. Acting stage

Once the planning stage has been concluded, the organization is ready to implement the services created or modified during the first stage of the action research approach. The purpose of the action stage is to test the actions planned in the previous stage. Depending on the organization type and the business sector, new/modified services may be tested in single interventions or a daily basis.

2.2.1.3. Observing stage

After the new/modified services have been put into practice it is important to observe how internal and external stakeholders react to them. It is very important to share these observations with other members of the organization. For this purpose, participant and non-participant observation supported by techniques such as note-taking, videotaping and photographing (if allowed) are very useful. During this step the action research team plays a key role in overseeing the implementation of these practices. This, as a result, helps to ensure the consistency of the practices with the organizational construct of sustainability.

2.2.1.4. Reflecting stage

The services tested during the action stage help stimulate a dialogue with stakeholders (internal and external). Gaining stakeholder feedback is crucial not only for improving the services but also for increasing understanding on sustainability. This allows the organization to keep with this phenomenon which is everything but static. The reflecting stage can be divided in two parts. Whereas the first part focuses on collecting feedback by using techniques such as surveys, interviews and focus groups, the second part consists essentially in internal meetings for reflecting on the feedback collected. This helps to merge the perspectives of external stakeholders regarding sustainability with the sustainability construct of the organization.

2.2.1.5. Further cycles

The four stages described above are repeated in each of the following cycles. However, after the first action research cycle the first stage is called re-planning stage. In other words, at the beginning of a new cycle the construct of sustainability is redefined, stakeholder issues and the different practices in the business process are revised. In that way, the idea of sustainability moves into a new level; becoming step by step more holistic in relation to the organization and its surrounding environment.

2.3. Case study

The empirical case that it used to illustrate the multi-perspective approach to social sustainability is based on an ongoing action research project that is carried out within a business network of micro entrepreneurs. The network was created in May 2006 for the purposes of a business development project funded by the European Social Fund and co-ordinated by the University of Lapland, Finland. The business development project was designed with the idea of promoting female entrepreneurship through a co-operative sustainable service development process implemented in micro enterprises.

The aim of the study was to investigate to which extent

the use of action research in the service development process can contribute to increasing theoretical and practical understanding on sustainability. While a better theoretical understanding contributes to advancements in the research field of sustainability, practical understanding may foster its consolidation within an organizational setting. The objective is also to empirically elaborate on the processes and practices surrounding the idea of sustainability.

The business network, called *Authentic Lapland*, is formed by eight micro businesses in the Finnish province of Lapland. They operate in the service sector and their services include hospitality, natural health care, tourist tours, gastronomy, photography and interior decoration. Despite the variety of services that the members of this network offer, the members all share a common interest in positioning their services in the tourism market. Before joining the network these micro-businesses all operated individually in the market, selling their services directly to the final customer or through resellers and other intermediaries. Now, they have begun to move toward more collective practices that strengthen their business relationships and thus add value to their market offerings.

The service development process was chosen as the empirical context of the study because it offers an ideal setting for learning how an understanding *partly shared, partly contested and continuously negotiated* of sustainability enfolds continuously through the interactions and dialogues between the internal and external stakeholders of an organization. Moreover, the central role of service development as a link between production and consumption offers an exceptional opportunity for the implementation of such an action research approach which aims at integrating sustainability. People working in service development are, indeed, in constant interaction with internal and external stakeholders and thus able to understand their needs and expectations. These individuals are the first who detect changes in the environment and help the organization adapt its services to the new expectations of the market. From a sustainability perspective, this means that changes initiated in the service development process may have a deep impact on the whole organization as long as the process is participative, flexible and responsive – key features of action research. As a result, integrating action research thinking into service development contributes to launching a bottom-up approach to sustainability which strengthens commitment to environmental and social objectives.

The action research process has been conducted within the network since June 2006. So far seven convergent interviews, one focus group and continuous observation have been carried out. The data used in this study consists primarily of ethnographic material obtained through interviews and observation (interview transcripts, fieldnotes, videotapes and photographs). Especially, the planning stage of the action research process relies heavily on convergent interviews with respondents in seven of the business entities in the network. Convergent interviewing is especially recommended to identify the main issues and represent the reality of a particular situation (Dick 1990, Rao & Perry 2003, Williams & Lewis 2005). The aim of these interviews was to build a shared understanding of sustainability that is accepted and supported by the entrepreneurs in the network. The idea is that sustainability evolves continuously as the perspectives of key stakeholders regarding the services of the network are integrated into the construct of sustainability shared by all the members.

Each convergent interview was taped and later summarized into a two-page document. All interviews were carried face-to-face at the respondent's place of work. The duration of the interviews varied from forty-five minutes to two hours approximately. Since the main question and the probe questions were open and the interview semi-structured, the respondents had the opportunity to respond without restraints expanding and elaborating their responses (Dick 1990). The focus group and documentary material (e.g. business web sites, press articles, project reports, brochures) was used mainly as supplementary data in the study. While observation was carried out continuously both by the action researcher and the co-researchers (entrepreneurs), interviews and focus groups were implemented exclusively by the action researcher.

3. Results and discussion

3.1. Sustainability within the network: empirical evidence from the planning stage

In the case *Authentic Lapland* seven convergent interviews were conducted to elicit entrepreneurs' attitudes and perceptions to sustainability. As a main question I

used "can you tell me something about sustainability from a business perspective?" Nevertheless, the question needed to be refined, as the interviewers found sustainability to be an unfamiliar term. It is noteworthy to point out that despite being interested in developing sustainable services and even conducting their business in a way that cultural, social and environmental dimensions are taken into account, the participants were not familiarized with the sustainability debate. The question "which issues should be considered so that a business can be seen as sustainable?" had a better reception than the previous one. The number of probe questions, which increase from interview to interview, oscillated between four and nine.

Altogether, the method helped to achieve a common understanding on sustainability within the network. After the interviews were completed, each of the members received a memo presenting their common idea of sustainability. For instance, Maignan *et al.* (2005) highly recommend the use of interviews to yield fruitful insights into the topic. They also recommend the use of documents such as the mission statement, annual reports, sales brochures and web sites as a way to elicit how the organization portrays its relationship to society. In the case of small enterprises, where such documents are scarce or no existent, interviews play a key role. However, convergent interviewing or interviewing in general is only one of the many methods available. Indeed, there are several methods that are recommended for the initial stage of an action research project (see Nielsen & Svensson 2006).

The method of convergent interviewing helped to merge all the perceptions and opinions of the members into a single construct of sustainability which is based on nine dimensions: profitability, way of life, reputation, moral values, quality, safety, networking and environment (Fig. 2). This construct helped the members of the network to agree on which directions their efforts should be channelled. Indeed, they were able to position their idea of sustainability within the goals and strategies of the network. It could also be said that from a network perspective this initial step contributed to strength cooperation between the members. This let us assume that this approach could help to reinforce considerably team work within an organization. Nevertheless, it should be pointed out that the idea of sustainability presented in this section is only relevant to this particular case.

Next, I discuss each one of these dimensions and its relation to the idea of sustainability shared by the members of this action research project.

3.1.1. Profitability

In this group profitability is seen as a key condition for achieving a sustainable enterprise. However, they do not regard profits as the main goal of their endeavour but as a means for carrying on their business activities. It seems that profits are to the firms as oxygen is to living things.

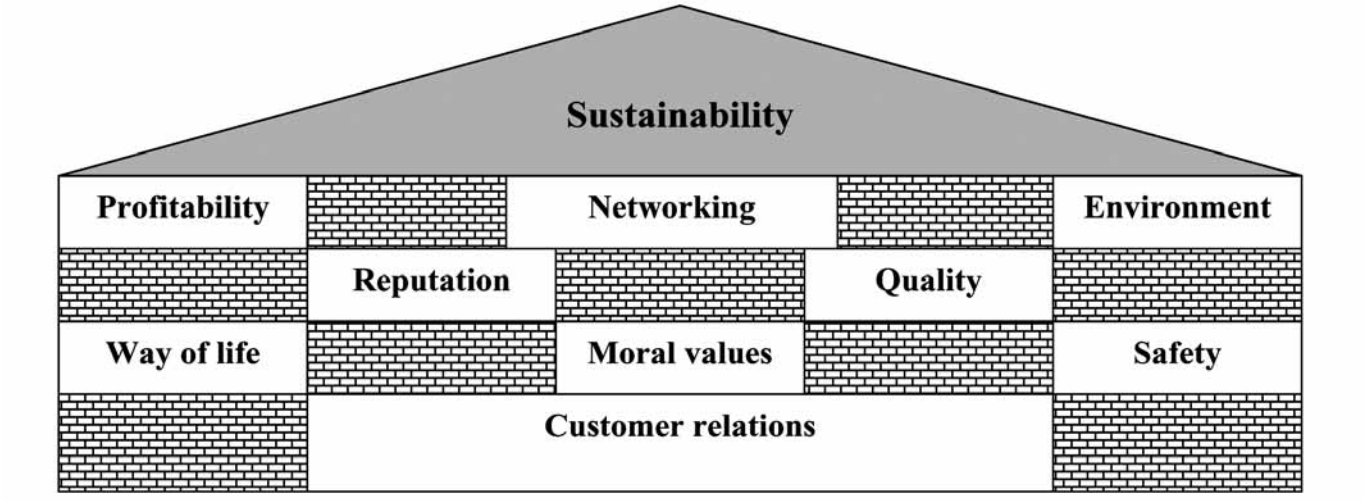

Figure 2.
Sustainability construct shared by the network.

3.1.2. Way of life

Entrepreneurs do not see business as a simple means of income, but as an opportunity to become involved in activities that fulfil them as human beings. In fact, they see their business activities as *a way of life*. Their businesses, which they regard as a way to contribute to the well-being of society, provide them with personal satisfaction and self-realization.

3.1.3. Moral values

Sustainability demands that business values are in accordance with the moral values of the entrepreneur. Only so, he/she can feel absolutely committed to his/her business. Though sometimes the market conditions do not permit to hold to one's moral values, a business owner should always try to act according to his/her values.

3.1.4. Reputation

While a sustainable business approach fosters reputation, a good reputation is also the basis for introducing sustainable thinking. The previously mentioned dimensions (profitability, way of life and moral values) contribute to creating a good reputation. However, their contribution depends on the involvement of the business owner in the whole business process. The higher the involvement, the easier will be to build and manage a good reputation. It is also important that he/she has a high knowledge of expertise in his/her business field.

3.1.5. Quality

The idea of sustainability lies in the quality of the product. Features such as durability, utility and final touch. Here again the involvement of the entrepreneur plays a key role. He/she should make sure that the final product fulfils not only his/her own expectations but also the expectations of the customer.

3.1.6. Safety

Business should deliver products which are safe to use. The customer safety should not be endangered by the use of any product or service.

3.1.7. Networking

A sustainable business is based on co-operation with other businesses. As entrepreneurs we should look for partnerships which provide a win-win-win situation. That is, a win situation for the entrepreneur, his/her business partners and society.

3.1.8. Customer relations

In general, all these dimensions contribute to promoting customer-firm interactions and thus, building sound customer relations. Good interactions make that the customer not only come back but also recommend the firm *word of mouth*. The customer should not be seen as a subject that has to be satisfied by the product. Moreover, the entrepreneur should understand the social and environmental benefits to which he/she contributes by choosing a sustainable business. Customer relationship become more than a business relationships, it becomes an emotional interaction.

3.1.9. Environment

Finally, the entrepreneur should consider the social and natural environment. Changes in those environments can alter the conditions on which the firm relies for creating their offerings. After all, tradition, nature and localness among others form the framework and context for business development.

4. Conclusions

The idea of this paper was to present action research as a useful methodological approach or tool for fostering sustainability. Indeed, I emphasize how action research can contribute to moving towards greater sustainability by fostering multi-stakeholder engagement, continuous reflection and changes in the organizational culture. The action research approach described in this paper differs from traditional approaches in a particular aspect. While action research is mostly implemented as single interventions, the action research approach to sustainability presented here has been integrated into the service development; a business process that happens in a daily basis.

Service development, which is based on production and consumption interactions, offers an ideal empirical context for testing this action research approach. Especially, the service development process becomes a business activity through which entrepreneurs can plan and initiate actions by taking into consideration local values, expectations, capabilities and resources. By this means, a business organization is able to identify ways to achieve its business objectives without threatening the quality of life of their main stakeholders.

The practical application of this action research approach to sustainability was demonstrated by presenting preliminary finding from an ongoing project implemented in the Finnish province of Lapland. The empirical data is based mainly on the results obtained from the planning stage of the first cycle of the action research process. This action research project will help to determine to which extent the use of action research in a service development context can contribute to increasing understanding on sustainability and thus fostering its consolidation within an organizational setting. It will also show to which extent action research can be integrated successfully within a business process.

To conclude, I wish to point out that sustainability is a complex phenomenon, which entails political, socioeconomic and moral questions that go beyond a micro perspective. From a business perspective, there is a need for approaching sustainability as a social process which involves different stakeholders. In fact, not only the firm, but also the consumers and other stakeholders play a key role in moving towards sustainability by changing or maintaining their production and consumption patterns. As a result, commitment to sustainability requires being willing to negotiate its meaning with the different stakeholders existent at a particular time and space. In this regard, the use of action research offers an opportunity for fostering more sustainable practices and life-styles.

References

Ballard, D. 2005: Using learning processes to promote change for sustainable development. –Action Research 3: 135-156.

Barry, J. 1996: Sustainability, Political Judgement and Citizenship: Connecting Green Politics and Democracy. – Democracy and Green Political Thought: Sustainability, Rights and Citizenship (eds. Doherty, B. & De Geus, M.): 115-31. Routledge, London.

Belz, F. M. 2005: Sustainability marketing: Blueprint of a research agenda. –TUM Business School, Freising.

Bradbury, H. 2001: Learning with the Natural Step: Action Research to Promote Conversations for Sustainable Development. –Handbook of Action Research: Participative Inquiry & Practice (eds. Reason, P. & Bradbury, H.): 307-313. Sage, London.

Cairncross, F. 1993: Costing the Earth: the challenge for governments, the opportunities for business. –Harvard Business School Press, Boston.

Carroll, A. B. 1999: Corporate Social Responsibility: Evolution of a Definitional Construct. –Business and Society 38: 268-95.

Charter, M. 1992: Greener marketing. –Greenleaf, Sheffield.

Coddington, W. 1993: Environmental marketing: Positive strategies for reaching the green consumer. –McGraw-Hill, London.

Coghlan, D. & Brannick, T. 2001: Doing action research in your own organization. –Sage, London.

Collier, J. 1995: The virtuous organization. –Business Ethics: A European Review 4: 143-9.

Collier, J. & Wanderley, L. 2005: Thinking for the Future: Global Corporate Responsibility in the Twenty-First Century. –Futures 37: 169-82.

Crane, A. 1999: Are you Ethical? Please Tick Yes or No: On Researching Ethics in Business Organizations. –Journal of Business Ethics 20: 237-48.

Crane, A. 2000: Marketing and the natural environment: what role for morality. –Journal of Macromarketing 20: 144-54.

Crane, A. & Matten, D. 2004: Business Ethics: An European Perspective. –Oxford University Press, Oxford.

Dick, B. 1990: Convergent interviewing. –Interchange, Chapel Hill.

Dickens, L. & Watkins, K. 1999: Action Research: Rethinking Lewin. –Management Learning 30: 127-140.

Doane, D. 2005: Beyond corporate social responsibility: minnows, mammoths and markets. –Futures 37: 215-29.

Doppelt, B. 2003: Leading change toward sustainability: a change-management guide for business, government and civil society. –Greenleaf Publishing, Sheffield.

Dunphy, D., Griffiths, A. & Benn, S. 2003: Organizational Change for Corporate Sustainability: A guide for leaders and change agents of the future. –Routledge, London.

Elkington, J. 1997: Cannibals with forks: the triple bottom line of the 21st century business. –New Society Publishers, Oxford.

European Commission 2001: Promoting a European framework for corporate social responsibility: Green Paper. –European Communities: Luxembourg

Fadeeva, Z. 2003: Exploring Cross-Sectoral Collaboration for Sustainable Development: A Case of Tourism. –Lund University, Lund.

Freeman, E. R. 1984: Strategic Management: A Stakeholder Approach. –Pitman, Boston.

Fuller, D. A. 1999: Sustainable marketing: Managerial-ecological issues. –Sage, Thousand Oaks.

García-Rosell, J. C. 2007: Action research and grounded theory: methods for understanding social responsibility in theory and practice. –Vastuullinen liiketoimita – monitieteisyys ja systeemiajattelu (eds. Kamppinen, M., Koivisto, K. & Nurmi, P.): 39-53. Turun Kauppakorkeakoulu, Turku.

Greenfield, W.M. 2004: In the name of corporate social responsibility. –Business Horizons 47: 19-28.

Greenwood, D. J. & Levin, M. 1998: Introduction to Action Research: Social Research for Social Change. –Sage, Thousand Oaks.

Hawken, P. 1994: The ecology of commerce. –Harper Collins, New York.

Heikkinen, H. L. T. & Jyrkämä, J. 1999: Mitä on toimintatutkimus? –Siinä tutkija missä tekijä – toimintatutkimuksen perusteita ja näköaloja (eds. Heikkinen, H., Huttunen, R. & Moilanen, P.): 25-62. PS-Kustanus, Jyväskylä.

Heiskanen, E. 2005: The Performative Nature of Consumer Research: Consumers' Environmental Awareness as an Example. –Journal of Consumer Policy 28: 179-201.

Heiskanen, E. & Timonen, P. 2003: Kohti kestävää tietoyhteiskuntaa? Päivittäistavaroiden verkkokaupan osallistuvan ja rakentavan teknologian arvioinin kokeilu. –National Consumer Research Centre, Helsinki.

Henion, K. E. and Kinnear, T. C. 1976: Ecological Marketing. –American Marketing Association, Columbus.

Irwin, A. 1995: Citizen Science: A Study of People, Expertise and Sustainable Development. –Routledge, London.

Kotler, P. 1972: Marketing Management: Analysis, Planning, and Control. –Prentice-Hall, Engelwood Cliffs.

Maignan, I. & Ferrell O. C. 2004: Corporate social responsibility and marketing: An integrative framework. – Journal of the Academy of Marketing Science 32: 3-19.

Maignan, I., Ferrell, O. C. & Ferrell, L. 2005: A stakeholder model for implementing social responsibility in marketing. –European Journal of Marketing 39: 956-977.

Marshall, J. 2001: Self-reflective inquiry practices. – Handbook of Action Research: Participative Inquiry & Practice (eds. Reason P. W. & Bradbury, H.): 433-439. Sage, London.

Masters, J. 2000: The History of Action Research. –Action Research E-Reports 3. Available from: http://www.fhs.usyd.edu.au/arow/arer/003.htm [2.6.2006].

Matten, D., & Crane A. 2005: Corporate Citizenship: Toward an Extended Theoretical Conceptualization. –Academy of Management Review 30: 166-179.

Matten, D., Crane, A. & Chapple, W. 2003: Behind the mask: revealing the true face of corporate citizenship. –Journal of Business Ethics 45: 109-120.

Mintu, A. T. & Lozada, H. R. 1993: Green Marketing Education: A Call for Action. –Marketing Education Review 3: 17-23.

Nielsen, K. A. 2005: Sustainability and democracy in food production: Bridging consumption, working life, and environmental management. –Action Research, 3: 157-173.

Nielsen, K. A. & Svensson, L. 2006: Action research and interactive research; Beyond practice and theory. -Shaker publishing, Maastricht.

Ottosson, S. 2003: Participation action research: A key improved knowledge of management. –Technovation 23:87-94.

Palmu, M. 2000: Action Research in Finland. –Action Research E-Reports 12. –Available in electronic format: http://www.fhs.usyd.edu.au/arow/arer/012.htm [2.6.2006].

Peattie, K. 1992: Green Marketing. –Pitman Publishing, London.

Peattie, K. 1995: Environmental marketing management: Meeting the green challenge. –Financial Times Management, London.

Perry, C. & Gummesson, E. 2004: Action research in marketing. -European Journal of Marketing, 38, 3/4, 310-320.

Rao, S. & Perry, C. 2003: Convergent interviewing to build a theory in under-researched areas. –Qualitative Market Research: An International Journal 6: 236-247.

Reason, P. & Bradbury, H. (eds.) 2001: Handbook of Action Research: Participative Inquiry & Practice. –Sage, London.

Rondinelli, D. A. & Berry M. A. 2000: Citizenship in multinational corporations: social responsibility and sustainable development. –European Management Journal 18: 70-84.

Smith, A. 1999: The Wealth of Nations Books I-III. -Penguin Classics, London.

Stahl, B.C. 2005: The responsible company of the future: reflective responsibility in business. –Futures 37: 117-131.

Taipalinen, J. & Toivo, T. 2004: Vastuullinen yritystoiminta pk-yritysten voimavarana. –KTM, Helsinki.

Williams, W. & Lewis, D. 2005: Convergent interviewing: a tool for strategic investigation. –Strategic Change 14:219-229.

World Commission on Environment and Development, (WCED) 1987: Our Common Future - The Brundtland Report. –Oxford University Press, New York.

Zuber-Skerritt, O. 2001: Effective Change Management Using Action Learning and Action Research. –Southern Cross University Press, Australia.

Protected areas and benefits: Russian experience

Svetlana U. Belova

Ecocentre "Zapovedniks",
117218, Nakhimovskiy prospect 32, Moscow, RUSSIA
zapovedniks@gmail.com

Abstract

Most of the Russia´s procted areas are located in rural areas and their conservation depends on the local socio-economic situation. The development of recreational services and ecological and cultural education programs could create solid foundations for the sustainable development of protected areas and their surroundings. At the same time, tourism could improve the economical situation of livelihoods and increase the motivation of local people towards conservation. The Ecocentre "Zapovednigs" with a partnership of the Europark Federation identified the existing gaps and initiated a joint project "Catalyzing civil activities and local socio-economic initiatives using the potential of protected areas and PS-based NGOs" to find a new model for regional development in live with the nature conservation objectives in the Mary El and in the Buryatia Repulic, Russia. During the project, training courses about the sustainable development of the tourism and environmentally sound service production were organized, coordination committees comprising of relevant stakeholders were established, guest houses were built and package tours were developed. The money spent by tourists was further invested to improve tourist services in the region and conservation of natural and cultural heritage. During the project, visible positive effects were achieved, both in economic terms and in changed attitudes of local communities and politicians towards the protected areas. According to results of the project, the success of the implementation of sustainable livelihoods and tourism development programmes seem to depend only partly on the level of economical investments. It is also important to create efficient co-operation networks of the relevant stakeholders and achieving their support and involvement in these programmes. Only if there is a positive attitude among local communities toward the development project long-term benefits could be achieved.

Keywords: protected areas, sustainable development, Russia, tourism

1. Introduction

The principles of sustainable tourism state that tourism in and around protected areas must be a tool for conservation: building support; generating much needed income for conservation work; and raising awareness of the need for the protection of biodiversity, ecosystem integrity and cultural heritage. Tourism must contribute to the quality of life of indigenous and local communities; and educate the public about the many values of protected areas; protect and respect sacred sites; and, acknowledge traditional knowledge (World Parks Congress Recommendations 2005).

Protected areas have traditionally played a key role in preserving biodiversity in Russia. The network of protected areas was developed already during the period of the Soviet Union. The created network based on a biogeographical principle represents all natural zones and biogeographical regions of the country, alongside with their typical and unique landscapes and species (Zabelina *et al*. 1998). From the very beginning, particular attention was paid to include habitats of rare and endangered species into the network. The core territories of the network are federal zapovedniks (strict nature reserves) and national parks. Nowadays, there are 101 zapovedniks and 39 national parks in Russian (Fig. 1). In addition, many other protected areas exist at federal and regional levels.

Most of Russia's protected areas with valuable natural and cultural heritage are located in rural areas. To a large extent their conservation depends on the socio-economic situation. Many people near protected areas live in poverty, with having low or no direct income. The opportunities for employment are very limited. Under such circumstances, people look for additional sources of sustenance, frequently encroaching into protected areas and making uncontrolled and unsustainable use of local natural resources. Activities such as poaching and illegal logging occur frequently.

Protected areas (PAs) provide a favorable and attractive environment for tourism, the development of recreational and related services, and ecological and cultural education for visitors. These activities could create solid foundations for sustainable development of PAs and their surroundings; improve livelihoods and motivate local populations into active nature conservation. Importantly, "tourism development should be designed to protect what is good

Figure 1.
Russian protected areas system.

about a host community and tackle those aspects that need to be improved. One way in which this can be done is to develop facilities and services for tourism which can also benefit the living conditions to local residents. Indeed protected areas can be the engines of sustainable rural development" (Eagles *et al*. 2002).

The traditional Soviet system of protecting territories based on bans not only does not work under the region's new political conditions, but also creates points of friction between local populations and protected areas. Currently, political elected representatives and authorities responsible for natural resources management do not fully acknowledge the importance of PAs for both biodiversity conservation and economic development. Hence, genuine ecotourism development, benefiting both the environment and poor local communities living in or around PAs, would increase the understanding of the need for biodiversity conservation as a means of achieving sustainable development.

During the 1990s there had been practically no ecotourism development in Russian protected areas. Zapovedniks (nature reserves) were closed to visitors. The development of tourism was not a priority for national parks either. Despite that already in 2003, as the official data indicate, there were 200,000 visitors to zapoveniks and 800,000 to national parks. Furthermore, the recently adopted State Strategy for the Development and Management of Protected Areas until 2015 defines among its main priorities the creation of an integration mechanism of protected areas into socio-economic development of regions and implementation of sustainable livelihood support programmes which foster social cohesion and small business initiatives, in particular in ecotourism (Bukvareva *et al*. 2007). However, the development of ecotourism in Russian protected areas remains quite problematic. According to Novikov (2006), and Belova and Grigorian

(2007) the main reasons are: 1) Low level of central and regional governmental support for protected areas; 2) Lack of tourism support services such as accommodation, transport, guiding, souvenirs; local people often have insufficient capacity and resources to initiate the development of business in tourism support services; 3) Protected area managers lack adequate skills and know-how to create the conditions for sustainable tourism development; there is a lack of efficient cooperation networks of the relevant stakeholders and low level of public involvement in programmes on tourism development; and 4) Lack of information and marketing.

Ecocentre "Zapovedniks" in partnership with Europarc Federation identified the existing gap and initiated a joint project spearheading a new model for regional development in line with nature conservation objectives. The project entitled: "Catalyzing civil activities and local socio-economic initiatives using the potential of protected areas and PA-based NGOs" was implemented in two pilot territories, one in the designated zone of cooperation of the nature reserve "Zapovednik Bolshaya Kokshaga" in the Mary El Republic, and another one in the designated zone of cooperation of the biosphere reserve "Baikalsky Zapovednik" (Fig. 2) in the Republic of Buryatia. The focus of this case-study project was predominantly on local capacity building and innovative approaches to sustainable livelihoods and tourism development programmes. Already after two years of the project duration visible positive effects were achieved, both in economic terms and in changed attitudes of local communities and politicians towards the respective protected areas.

Figure 2.
Baikalskiy zapovednik (Photo: V.Sutula).

2. Project activities and results

The key factor for the success of the project appears to be the establishment of coordination committees comprising of relevant stakeholders, i.e. municipal officials and councillors, protected area managers, representatives of tour operators, NGOs, local cultural and educational institutions. These committees permitted efficient cross-sector communication and co-operation, and sharing of competences and roles. Moreover, the leaders of these committees took part in a special study tour to national parks in Austria, and in training "Protected areas and civil society: problems and solutions" in Moscow. Stakeholders were involved in the process of regional socio-economic assessment, and participated in the preparation of sustainable livelihoods and tourism development programmes. Local authorities officially approved the programmes. The process of change has begun.

The director of the tourism department of the Kaban district administration of the Republic of Buryatia, expressed: "The project enabled the exchange of information at all levels, i.e. between civil officials, councillors, zapovednik administrators and the local public. At the first time for many years, it became possible to directly involve officials. They decided to earmark 1 million rubles (about 30,000 euros) from the district budget and further 250,000 rubles from the republic budget to implement the tourism development programme" (Interview, Moscow, 2007).

The director of tour company "Matur" in Yoshkar-Ola, stated: "Thanks to the project, an initiative group was established at the level of the Republic by local entrepreneurs who are interested in the development of

tourist infrastructure, i.e. mainly tour companies as ours". (Interview, Yoshkar-Ola, 2007).

A significant part of the rural population in the Mary El and Buryatia Republic lives in poverty and is still as passive as it used to be in the era of the Soviet Union. Having lost their jobs in now bankrupt state companies and collective farms, living rather far from the cities, these people have neither resources nor knowledge and skills to start their own businesses. They are unable to initiate positive change reversing negative impact and damage in and around the protected areas. Local communities are in particular need of financial support, and assistance in planning and development of environmentally and socially responsible businesses, first of all in tourist services.

At the first stage of the project, Ecocentre "Zapovedniks" and Europarc carried out a four two-days training programmes in each region. About 60 people living near pilot protected areas took part in these training courses. The training topics included development of sustainable tourism and environmentally sound service provision related to tourism. Professional economists and tourism managers instructed the participants of the training programmes. They were also explained the construction of eco-friendly guest accommodation, traditional crafts and souvenir production (Fig. 3), certification of ecological agri-products carrying the logo of the protected area as a guarantee for quality and ecological origin of food. In addition, special training was provided for local entrepreneurs in financial management (including micro-credits andbusiness plan preparation). The crucial element of the project rested in the conversion of the expertise gained through training into practical steps and pilot activities, i.e. establishing appropriate conditions for sustainable livelihoods and tourism. Two credit lines were established to support concrete local business initiatives.

In the Kilimary district of the Mary El Republic (the area of the planned biosphere reserve "Kugu-Kakshan") the local municipal authority signed a contract with a credit institution "Mariysky Kredit". Instead of 4,000 EUR envisioned as the start-up capital, the initial credit fund pooled over 30,000 EUR. The municipal authority subsidized credits (lowering the interest rates) earmarked for sustainable tourism and ecological agriculture. Up to now, five local residents benefited from such credit finance. These people were pleased by the low level of bureaucracy and paperwork as well as by favourable interest rates. A

Figure 3.
Traditional crafts and souvenir production; Master from Mary El
(Photo: S.Belova).

local entrepreneur, said: "I will take a credit to build a new guest house in the next year. I can build it within a few months. First, I will see how this will all work; how profitable it all will be. When all things go well, I wish to build more" (Interview, Kilemary, 2007). The first of new guesthouse owners, stated: "I like this place very much. It is suitable for recreation and relaxation. We have already bought several houses here and we will convert them into tourist accommodation (Fig. 4). We have already taken a credit. We have our own farm, so we can take care of food supplies and catering for tourists. We will build a traditional Russian oven as well. You know, to me and my family it makes fun and gives us a lot of pleasure to do these things". (Interview, Kilemary, 2007).

In the Kaban district in the Republic of Buryatia they did it in another way. At the beginning, the municipal educational administration decided to allocate 3,000 EUR from its budget into a micro-credit fund to support community initiatives in the area of Vydrinskoe village. The success of the fund led the Kaban district administration

Figure 4.
Guest house (Photo: V.Sutula).

Figure 5.
Tourist in Baikalskiy biosphere reserve (Photo: V.Sutula).

to earmark a further 65,000 EUR for small business development. These financial means subsidized the commercial interest rates, providing local entrepreneurs with advantageous financial conditions to start environmentally and socially responsible business.

In the course of project implementation 18 guest houses were established and the first two hundred tourists had an opportunity to enjoy the hospitability of the new local tourist entrepreneurs in the designated zone of cooperation of the nature reserve "Zapovednik Bolshaya Kokshaga", and of the biosphere reserve "Baikalsky" (Fig. 5). Several package tours were developed to allow tourists to observe natural beauties, and to acquaint themselves with local culture and traditions. The money spent by visitors in the region is further invested in the improvement of tourist services and in the enhanced conservation of natural and cultural heritage. In the Mary El Republic, the project helped to attract to the region one of the major Russian tour operators – company "Vladinvesttour". The company already invested about 150,000 EUR into the development of tourist services and promotion.

One of the main project results was well summarized by the director of the House of Crafts in the village. She contended: "The most important thing is that more hope appeared among people, and that they believe things can change and become better. The interest in handmade products, traditional crafts and tourist services has significantly grown. Tour businesses became aware of our region. In co-operation with them we became more experienced. We managed to understand that our activities attract their interest and how to develop viable collaboration" (Interview, Kilemary, 2007).

Nowadays, the linkage between the preservation of biodiversity and local socio-economic development is recognized as one of the key factors for protected area management (Seville Strategy 1995). Even the current government strategy for the development of the network of protected areas pays special attention at the integration of PAs with local communities. Activities such as sustainable tourism and environmentally oriented business using the potential of protected areas are

encouraged. However, it is increasingly difficult to achieve nature conservation objectives when PAs remain perceived as a hindrance for local development.

Director of "Baikalsky Zapovednik" asserted: "The main outcome of this project is an ongoing dialogue among various stakeholders. This dialogue positively affects co-operation and fosters participation of local communities in the tourism development. The members of the coordination committee are also local leaders and decision makers, i.e. the key people in touch with local residents. So they were able to gather public support for our protected area. This, together with the biosphere reserve approach, is an excellent example of accomplishing the goals of the Seville Strategy in our zapovednik" (Interview, Moscow, 2007).

3. Conclusions

Thanks to this project, Ecocentre "Zapovedniks" has established and tested a new form of regional development uniting various stakeholders in solving problems near protected areas. The success of the implementation of sustainable livelihoods and tourism development programmes depends only partly on the level of investments (e.g. project grants). It is also important to create efficient co-operation networks of the relevant stakeholders and achieving their active support and involvement in those programmes. Only if there is a positive attitude and feeling of ownership among local communities, long-term results can be attained. Sustainable livelihoods enhancement projects need to be tailored to local conditions and provide for the needs and ideas of the stakeholders in order to deliver positive outcomes, thus facilitating the implementation of action plans and concrete activities.

The project has developed methods for training protected area staff, as well as regional administrators and tourism managers. Coordination committees comprising of relevant stakeholders were created, so that sustainable livelihoods and tourism development programmes could have been jointly implemented. We tried to provide favorable conditions (e.g. micro-credits and consulting support) for community involvement in visitor accommodation and related services in order to provide local communities with revenue opportunities. These activities increased the understanding of the link between biodiversity conservation and sustainable development. The public became aware of the value of protected areas. Hence, innovative participatory strategies for tourism and sustainable livelihoods development, tested in the project, contribute to community-based conservation across larger scales.

We believe that the gained knowledge and experience will be useful to national parks, biosphere reserves, regional governments and other organizations in Russia and post-soviet countries, and that they will make a significant contribution in addressing socio-economic and community issues linked with the conservation of natural and cultural heritage. Many of our skills and approaches are instrumental and beneficial to other protected areas as well as to rural communities living near these areas. Therefore, Ecocentre "Zapovedniks" disseminates relevant information about the project and encourages further projects of this kind.

References

Belova, S. & Grigorian, A. 2007: Protected areas and local communities: problems and solutions. -Ecocentre "Zapovedniks", Moscow.

Bukvareva, E., Danilina, N. & Dejkin, V. 2007: Areas of Nature: The System of Protected Areas of Russia and the Strategy for their Development. (English version edited by Bednar, J.) -Ecocentre "Zapovedniks", Moscow.

Eagles, P. F. J., McCool, S. F. & Haynes, C. H. 2002: Sustainable Tourism in Protected Areas: Guidelines for Planning and Management. -IUCN Publication Services Unit, Cambridge.

Novikov, V. (ed.) 2006: Rural tourism: actual situation and management. -Post scriptum, Kaluga.

Seville Strategy for biosphere reserves 1995. -Service, Moscow.

Zabelina, N., Isaeva-Petrova, L. & Kuleshova, L. 1998: Zapovedniks and national parks in Russia. -Logata, Moscow.

World Parks Congress Recommendations 2005. -IUCN, Durban.

Tourism is on the rise all over the world and at the same time, tourists are selecting their holiday resorts more carefully. Tourism entrepreneurs have already reacted to the new demands of customers by arranging recycling and working in an energy-efficient way. However, there is increasing need for knowledge about the impacts of growing tourism on nature, culture and local communities.

This book considers how tourism affects the environment and local society and how tourist destinations can be developed in a sustainable way. Leading scientists provide new information about the effects of tourism on tourist destinations and the way in which possible negative impacts can be estimated and avoided. This publication is a product of the international conference on *Nature and Tourism: Tools for Sustainability* that was organised by the EU LIFE Environment founded project *Tourist Destinations as Landscape Laboratories – Tools for Sustainable Tourism (LANDSCAPE LAB)*.

The book is intended for everyone interested in sustainable tourism and it will be of particular interest to managers, industry practitioners, decision makers and students of sustainability and tourism.

ISSN 1235-0583
ISBN 978-952-484-168-9
ISBN 978-952-484-169-6 (PDF)