

Conflict between conservation and recreation at Oulanka National Park?



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Summary

During the early years of Oulanka National Park (ONP), trails and facilities were constructed in biodiversity rich areas. Managers in that time believed that biodiversity would give people a richer visitor experience. As this is currently questioned, research is necessary to investigate the relation between biodiversity and visitors experience. However, the dataset available did not provide sufficient data to explain these interrelations. Additionally, exploratory research was needed to investigate if there were actual indications for a potential conflict between the conservation function and the recreation function of Oulanka National Park. Therefore this research tried to explore: (1) whether there is a conflict between different functions of ONP by spatial analyzing biodiversity hotspots, facility density and visitor usage; (2) which groups of visitors can be distinguished based on their motivations for visiting ONP; (3) whether visitors and different groups of visitors perceive environmental impacts; (4) whether there is a difference in group composition and visitor perception of environmental impacts at different locations throughout the park.

The spatial analysis regarding the identification of conflict zones indicated that there is indeed a conflict between conservancy and recreation at ONP.

From the visitor sample, three motivational groups were distinguished. Nature was the primary motivation for all visitors. One group was less motivated by anything else than nature. Additionally, this group (1) was also less satisfied with facilities and less active than other groups. Another group (2) proven to be, besides nature, motivated by being away. It is suggested that these people are coming to ONP with their families to relax from stress of the daily life. The last group distinguished (3) was motivated by all factors, which included nature, being away and active involvement. This group seems to consist of people which are positive and highly motivated to be in ONP.

The visitors at ONP has perceived erosion, amount of people and waste disposal as the most important issues. The motivational group which was less motivated by anything else than nature, was significantly more disturbed by these issues than the other two groups.

The spatial comparison of motivational group composition and perception of environment impacts did not result in many significant differences which may conclude that either the dataset was too small in some cases or that there is not distinguishable difference between visitors at different locations. Some significant differences were found between different perception of impacts, as locations in the South-East (Juuma) region were significantly more disturbed by erosion and amount of people.

Finally, it was concluded that there indeed existed a potential conflict between nature conservation and recreation. This conclusion is mostly based on the results of the spatial analysis of biodiversity, facility density and visitor usage indicating an overlap. Erosion, amount of people and waste disposal were the factors that most amount of people were disturbed to. This research stresses the importance of further research to explain: the actual environmental impacts, visitor environmental awareness and behavior by studying attitudes and behavior, landscape preference studies, satisfaction at different locations and the creation of visitor opportunities.

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1 Introduction

Increasingly, National Parks are becoming national icons and also attractive destinations for nature tourists (Puustinen et al., 2009). Thus, the management in Natural Parks deals with the need to provide services for tourism without compromising their ultimate goal of nature conservation. Furthermore, the provision of high quality experience for nature tourists is a way to promote environmental education. Therefore, tourism has great potential to be a tool for ensuring nature conservation. However, the integration of tourism in the conservation objective often conflicts.

Nature-based tourism (NBT) can be defined as “tourism that consist of traveling to relatively undisturbed or uncontaminated natural areas with the specific objective of studying, admiring, and enjoying the scenery and its wild plants and animals, as well as any existing cultural manifestation found in these areas” (Boo, 1990 in Luzar et al., 1995: 544). NBT can also be seen as providing an economic justification for the protection of natural areas. The successful management of nature-based tourism can provide additional revenues to managers and offer additional justification for managing the resource base for sustainable use (Luzar et al. 1995).

More than other forms of tourism, NBT is depending upon the quality of the environment, and special measures have to be undertaken by managers to control and minimize the impacts of touristic activities. In this way, two key issues are interrelated: Firstly, the problem of maintaining the quality and ecological integrity. Secondly, managers should maintain the quality of recreation experience for tourists (Boyd & Buttler, 1996). According to Boyd & Butler (1996) “control” becomes a central aspect. Even though in protected areas the aspects of level of intervention, planning procedures, monitoring and enforcement remain under discussion, there is a general acceptance of the need of control.

Currently, Finland is facing this conservation-tourism dilemma. Puustinen et al. (2009) identified a shift in the economic, social and cultural importance of national parks, which has led to an increasing numbers of visitors to parks. Natural parks in Finland are managed by the state-owned enterprise Metsähallitus (Finish Forest and Park Service). Statistics provided by this enterprise indicate that the average number of visits to Finish national parks doubled in the 1990s and continued growth in the 2000s. In this way, by 2007 there were 1.7 million visits to 35 national parks (Puhakka et al. 2009). The aim of Finnish national parks is to “integrate the socio-economic goals of nature-based tourism with the ecological goals of conservation by implementing the principles of sustainability” (Puhakka et al, 2009).

Although the main goal of Finnish protected areas is conservation, providing tourism services is seen as an alternative to generate financing for the management of protected areas (Puhakka et al. 2009) The managerial principles of national parks in Finland point out the importance of the generation of recreational alternatives for tourists such as hiking and experiencing nature. Therefore, many parks in Finland provide facilities e.g. nature trails, cooking facilities, campsites, visitor centers, etc (Puustinen et al., 2009).

The success of Oulanka National Park (ONP) in Finland also depends on ensuring nature conservation and at the same time offer a high quality experience to visitors. Therefore ONP management needs to provide opportunities for tourism without jeopardizing the conservation (protection of biodiversity) objective of the national parks.

§1.1 Problem statement

Oulanka National Park is a certified PAN Park (Protected Area Network). PAN Parks is an European-wide organization focusing on the protection of wilderness areas in its attempt to redefine the concept of wilderness conservation in Europe and combine wilderness protection with sustainable tourism (PAN Parks, 2009).

Finnish people have lived very close to nature due to the environmental circumstances. The country therefore has been involved in wilderness protection from a very early start compared to other countries. The planning of the protection of the Oulanka area dates back to the 1800s (Simula & Lahti, 2005).

PAN Park is an organization with rather modern principles of conservation. This is in conflict with the more traditional principles on conservation by the Finnish people. Hunting, reindeer herding, fishing, etc are part of the culture of the Fins. The PAN Park certification requires that parks have a core/wilderness zone of at least 10.000 hectares¹ where no extractive uses² are permitted and where the only management interventions are those aimed at maintaining or restoring natural ecological processes. Non-permitted activities are not accepted even if they are based on traditional use (PAN Parks, n.d.; PAN Parks, 2006). This may create a conflict between Finnish traditions and PAN Parks.

During the early years of the park, trails and facilities were constructed in biodiversity rich areas, so-called biodiversity hotspots. Manager in that time believed that people would have richer visitor experience at biodiversity rich sites than at other sites. It should however be taken in mind that even low level of tourism activities can create a high level of environment impacts (Lindberg, 1997). PAN Park doesn't allow extractive uses in the core zones, while at ONP a high level of tourist activities take place in the core zone. Furthermore, the Nature Center is constructed in the center of the core zone. The park therefore had some difficulties certifying as a PAN Park.

Managers are interested whether tourists actually have a better experience of the natural environment in biodiversity rich areas than in other areas in the park. If tourists do not have a better experience at the biodiversity rich areas, then managers may consider moving facilities and tourist activities out of these areas. This would also comply better with the PAN Parks concept.

This research is concerned with analyzing if the provision of recreational facilities conflict with the biodiversity hotspots in ONP. This could generate information that could support the managerial aspects to try to find alternatives for providing facilities for tourist without jeopardizing the biodiversity in ONP. This study will focus on investigating the actual status of the problem. Currently there has not been any straight analysis explaining the phenomenon. As most of the facilities and visitor activities are concentrated in biodiversity rich areas, there have been reasons for a possible conflict between the conservation function and the recreation function of the park.

¹ The core/wilderness area meets size the criterion when part of it is under an ecosystem rehabilitation process, but the management must have a clear goal to wholly meet this criterion by a defined deadline.

² The following human activities are not accepted in the core/wilderness zone: hunting/culling, fishing, mining, logging, grazing, grass cutting, road maintenance, road and building construction, motorized transportation, large scale cultural and sporting events, etc.

§1.2 The study area: Oulanka National Park

Biophysical aspects

Oulanka National Park is situated in north-eastern Finland slightly below the Arctic Circle (see figure 1.1). The park was founded in 1956 and was expanded in 1982 and 1989. Currently, this park covers approximately 28,000 hectares (Puhakka et al. 2009).

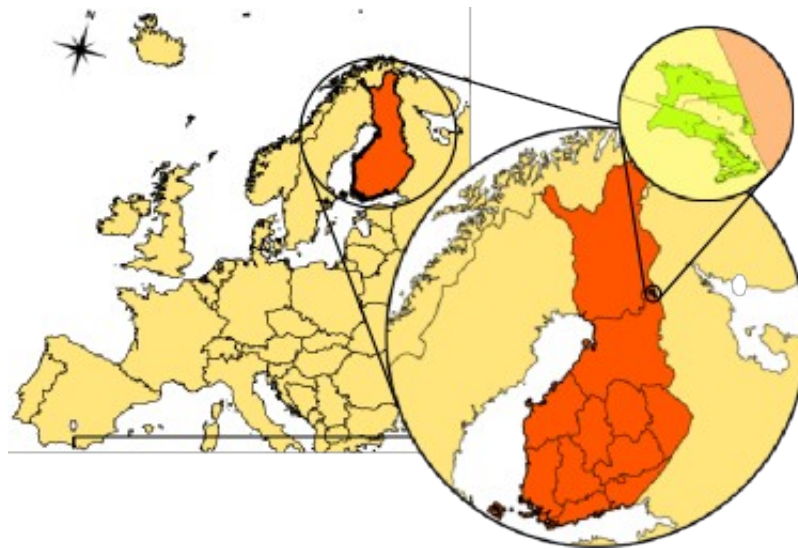


Figure 1.1: Location of Oulanka National Park

The geographic location of Oulanka National Park is one of the reasons for a high species richness. Because of its geographic position at the Arctic Circle in Oulanka you will find both northern and southern species. The park therefore has a high flora biodiversity. More specifically Oulanka is known to have a great number of vascular plants, lichens, fungi and moss species (Simula & Lahti, 2005). Oulanka also finds itself with many different fauna species. The riverbeds and alluvial meadows are the home to rare butterflies and many different bird species nest in the park. Rare birds like the Siberian Jay and Cape nest in the Park. Many meadows are managed using traditional methods and reindeer herding also continues to thrive within the park (PAN Parks, 2009).

Tourism activities in ONP

Tourism development began in ONP since the 1930s and after it was declared a national park in 1956 it has been one of the most popular parks in Finland. Since 1992 the number of visitors to this park had tripled to 185,500 visitors in 2007 (Puhakka et al. 2009).

Tourist activities at ONP are mostly related to nature. Most of the people come to Oulanka to hike. There are many trails that allow people to either do a day trip or hike longer trails and stay overnight. Other activities at ONP are bird watching, fishing, canoeing, rafting and during wintertime it is also possible to do skiing (Outdoors.fi, 2009a).

Administration and Management

ONP is managed by Metsähallitus, the Finish Forest and Park Service, and is concerned with finding alternatives to improve the management of the park in order to provide high quality experiences to visitors and at the same time ensure nature conservation. Besides, further demands to

find balance between the conservation objectives and the provision of touristic options are proposed by the PAN park certification. ONP was verified as a PAN Park in autumn 2002 (Cottrell et al., 2008). The certification aims at encouraging synergies between conservation and tourism (Puhakka et al. 2009).

Regarding the regulation of PAN Parks, the minimum size of a PAN Park should be 20,000 hectares with a core zone of at least 10,000 hectares which has to be in a natural state and can only be slightly modified by humans. In practical terms the parks have to comply with legislation protecting the rights of certain uses. In the case of ONP, although sport fishing was prohibited in 2005, in the reindeer herding is allowed. In other areas of the park local people have some rights related to hunting, fishing and reindeer herding (PAN Parks, 2009; Puhakka et al., 2009).

§1.3 Information availability and previous research in ONP

The dataset used in this research has been created with both social and ecological data that originated from previous research of the Finnish Forest and Park Service, Metsähallitus. The research center at ONP provided research and monitoring facilities that assisted in the collection of the data.

Metsähallitus (Finish Forest and Park Service)

Metsähallitus provides data for every national park in the country. This information includes visit numbers, characteristics of natural resources and recreation services. Metsähallitus uses standardized methods for visitor monitor and therefore creates opportunities to make comparisons between different parks (Puustinen et al. 2009).

Annually, Metsähallitus collects visitor information in order to determine the visitor satisfaction. Subsequently they can compare the visitor satisfaction between different parks (Puustinen et al. 2009).

Additionally, Metsähallitus possess many spatial information for every park. The spatial information can be used for spatial analysis'.

Research Center at ONP

The research center at ONP provides a comfortable and professional environment for research.

Currently, the Socio-Spatial Analysis Group-Wageningen University together with the University of Colorado and the University of Oulu, are working on the research project "Interrelationships between biodiversity, recreation facilities and visitors satisfaction- a socio-spatial analysis of recreational experiences at ONP" with support of Lapland Biosphere-Atmosphere Facility (LAPBIAT) Finland (LAPBIAT, 2008).

The LAPBIAT research aims at applying new methodologies to explore the linkages between biodiversity and tourism. It considers that the satisfaction levels are correlated with levels of biodiversity in the park and proximity of visitors to biodiversity.

§1.4 Target group

It is of importance to mention at which people this research is aimed. As this research is an inter-disciplinary study, this research is aimed at the following inter-disciplinary target groups:

- tourism researchers interested in sustainable tourism and looking for ways to combine

nature with tourism.

- ecologists that are concerned about environmental degradation and functioning
- managers that have to both satisfy the conservation of the natural environment and satisfaction of recreants.
- researchers interested in new methods of research of interdisciplinary research using spatial tools with visitor survey data.

§1.5 Research objectives and research questions

Research objectives

This research intends to do an explorative study on the available data gathered by Metsähallitus. The LAPBIAT project intended to explore whether tourists have different experiences of the natural environment at biodiversity rich areas in the park compared to other areas. Due to data limitations it is not possible to aim this research at this issue. Hence, this study therefore intends *to investigate whether there is a potential problem between recreational activities and the ecosystem functioning in the natural environment*. Hence, *whether there is a potential conflict between the conservation function and the recreation function of the park*. This will be done by investigating variables like biodiversity, visitor pressure, motivations, visitor perception of environmental impacts and a spatial comparison of these variables.

Other objectives of this study are:

- to do an interdisciplinary study combining spatial information with visitor survey data i.e. exploring the linkages between biodiversity and tourism using spatial analysis and statistical resources.
- to analyze the linkages between biodiversity and tourism exploring how different groups of tourists may have a different perception of environmental impacts in ONP while considering aspects of motivation and environmental awareness.
- to show how it is possible to use spatial information and visitor data to explore a potential ecological problem.
- to identify different groups of tourists coming to ONP
- to provide a foundation for future research in this topic.

Research questions

Main research question of the study is:

Is there a potential conflict between the conservation function and recreation function of the park?

This question can be answered by elaborating on the following four subquestions:

1. *In which areas of the park are tourist activities concentrated and in which areas of the park are the biodiversity hotspots? Do they overlap?*

If there is actual overlap between tourist activities and biodiversity hotspots then this would be the first indication for a potential conflict between the recreation function and conservation function of the park.

2. *Which groups of people based on their motivations for visiting Oulanka National Park can*

be distinguished?

In this research it is of importance to identify different groups of people visiting ONP for various reasons. Firstly, as this research intends to provide a foundation for further research it is of importance to know which type of tourist are visiting ONP. Previous research has stressed that identifying groups based on motivations is useful (1) for designing of better products and services, (2) it is linked to the satisfaction of visitors and (3) it is a crucial element to understand the visitors' decision making process (Crompton & McKay, 1997 in Nicholson & Pearce, 2001: 449).

Additionally, this research analyzes the linkages between biodiversity and tourism exploring how different groups of tourists may have a different environmental impact. In order to do so, it is also important to question:

3. Do tourists perceive any environmental problems or degradation?

It is important to know whether visitors are aware of environmental problems in the park. The dataset has various indicators that would give more insights about the current knowledge of the visitors concerning disturbances and quality of (environmental) services. Additionally, it would be of interest to see whether people with different motivations to visit the park have a different perception of the environmental problems (see §2.3).

4. Which differences in motivations and perception of environmental problems can be found comparing different locations in the park using the results from the previous questions?

Finally, the research considers the spatial component in relation to the above mentioned variables as not every area in the park is the same. Different people with different motivations may go to different areas in the park. It is therefore of essence to see whether there are differences on different locations.

The next chapter (2) will discuss various previous literature that support the research questions of the report. Chapter 3 explains the methodological steps of the research: the dataset availability is presented as well as the limitations of the research, the tools are defined and finally the methods used in the research process are described. In Chapter 4 the results for answering the research questions are presented and interpreted. The last Chapter (5) regards at the conclusion of this research.

2 Literature review

In this chapter different literature that applies to this research will be discussed. Firstly, as ONP receives many nature tourists, nature-based tourism is explained. Secondly, the negative impacts of tourism on nature are discussed. Thirdly, the awareness tourists have of their impacts on tourism are addressed. Fourthly, literature will be discussed concerning tourists' travel motives and destination choice. Finally, the biodiversity and the ways to measure it are briefly addressed.

§2.1 Nature-based tourism

There are many forms of nature-based tourism or sustainable tourism. For a general overview, different types of tourism will be discussed. This is of importance for readers who are not familiar with tourism studies and to understand which type of tourism is being practiced in Oulanka National Park.

Types of tourism and their impact

Basically, two major forms of tourism can be distinguished: the traditional mass-tourism and alternative tourism. Mass-tourism commonly is associated with environmental, social and cultural degradation. People commonly give this reason for the rise of new alternative forms of tourism (Mowforth & Munt, 2003: 90). However Munt (2003) argues that new forms of tourism have arisen because mainstream tourism industry has tried to find a way to legitimate themselves with the new invention of being sustainable and rational with the environment (Mowforth & Munt, 2003: 90-92). Therefore alternative tourism should not be generalized with sustainability as it can also have negative environmental, social or ecological effects.

Nature-based tourism is considered a form of alternative tourism. Nature-based tourism includes “all tourism directly dependent on the use of natural resources in a relatively undeveloped state including: topography, water features, vegetation and wildlife (Ceballos-Lascuráin, 1996: 19-20).” Hence, activities that concern nature-based tourism also include: hunting, countryside motor biking and water rafting, even if the use of nature resources by tourists is neither wise nor sustainable (Ceballos-Lascuráin, 1996: 20). Nature-based tourism can have, like traditional mass-tourism, a negative impact on the natural environment as nature-based tourists often go to places which are less stable and vulnerable (Weaver, 1998: 31-33).

Types of nature-based tourists

Another aspect to consider is that different groups (or types) of tourists may have different impacts on the environment. For this research, this is of importance since the recreation facilities are to be analyzed regarding the different groups of tourists that visit ONP. As will be further explained (see §2.3), previous research suggests that different groups of tourist can have a different impact on the environment.

There are many different options to classify tourists as there are many different people and different individuals have different attitudes, behavior and preferences. In this regard the recreation opportunities spectrum (Clark & Stankey, 1979) may be helpful. As stated in Clark & Stankey's (1979) paper, “Quality seems to be a highly personalized matter.” A different set of managerial actions lead to different opportunities for visitors and thus to a different experience for each opportunity. Within the framework of the eco-tourism³ recreation opportunities spectrum Boyd & Buttler (1996) suggested that different kinds of visitors can be identified in a range from 'eco-

3 Eco-tourism is considered part of nature-based tourism

specialists' to the 'eco-generalists' (Boyd & Buttler, 1996). These categories are presented as follows:

'Eco-specialists': This category is related to those eco-tourists who try to immerse themselves in the local natural and cultural environment, requiring little infrastructure and generating minimal environmental impact. Usually, this kind of tourists travel in individual or small groups and they often have specialized knowledge and obtain a high skill level to participate in activities.

'Eco-generalists': These tourists are usually part of larger groups (e.g. tour packages). They require a higher level of comfort and demand certain infrastructure and facilities.

Intermediate forms of eco-tourists: Between these two categories different kinds of tourists can be identified. Intermediate eco-tourists generally travel in small groups rather than individually, use basic forms of transportation and local infrastructure and services, and rely on prearranged facilities and touring services.

Nature-based tourism in Finland

There are many aspects to take into account in order to differentiate groups of nature tourists. This research is interested in the groups of visitors in ONP and it considers the conceptions of visitors in the park. Oulanka National Park mostly attracts Finnish (national) visitors. Because of their history the Finnish have an important economic relationship with nature (Simula & Lahti, 2005). Forestry for example has been a mayor component of the Finnish economy for a long time. Finland is a country covered by forest and the contact with nature is inevitable. It is therefore of importance to consider the Finnish definition of 'nature tourism'. The Finnish government, in an action plan for developing outdoor recreation and nature tourism⁴, stated nature tourism as following (Kajala, Erkkonen, & Perttula, 2004).

“Nature tourism refers to all tourism that is based on nature. In a slightly narrower definition, nature tourism is tourism that involves recreation in natural surroundings. Nature tourism combines recreational use of nature and tourism. In nature tourism nature is a significant attraction or environment for activities. In recreational use of nature nearly everything that is not part of daily outdoor recreation in the immediate surroundings is regarded as nature tourism.”

As discussed earlier, nature-based tourism includes the use of nature resources by tourists which is neither wise nor sustainable (Ceballos-Lascuráin, 1996: 20). This corresponds with the definition of nature tourism above, as it clearly states that nature tourism involves all tourism in a natural setting. Hence, it is essential to notice that the nature tourism in Finland is not necessarily always sustainable.

§2.2 The negative effects of tourism on nature

The provision of facilities for tourism in natural parks can conflict with its main goal of nature conservancy. One definition of tourism is the business of providing tours and services for tourists (The American Heritage Dictionary Of The English Language, 2000). This means that tourism cannot exist without services and facilities. It can thus be considered that nature conservancy and tourism do not directly go together. However in nature-based tourism tourist services and conservation of nature have to be combined. Additionally, previous research has shown that relatively low tourist activities still lead to relatively fair high levels of impact (Hammitt & Cole, 1987; Lindberg, 1997).

4 The term “Nature tourism” is considered a synonym of “nature-based tourism”

Viewing wildlife in their nature habitat has become a popular attraction for many tourists. This phenomenon results in large amount of people entering the environment, which can affect the natural behavior of the wildlife (Holden, 2008). However, the extent of the impact depends on the type of tourist activities and the level of development (Duffus & Dearden, 1990). According to Knight & Gutzwiller (1995) there are 4 categories of impact, caused by recreational activities, that can lead to a negative response of the wildlife: harvest, habitat modification, pollution and disturbance. From these categories Reynolds (2001) defined an extended set of categories shown in Appendix VI (p. 69). These categories are of importance as they suggest impacts that may currently exist at ONP.

Another common problem associated with tourism is littering, erosion of the ground and the amount of people (Holden, 2008). It has to be considered that these factors do not only affect the natural environment, but also the visitor experience as will be discussed in the next section.

From this section we can conclude that tourists have impacts on the environment, nevertheless it is not possible to generalize the tourists' impact. Some tourists may be responsible and create much smaller effects than others. The next paragraphs gives a review of previous research considering the ongoing discussion on the perception of environmental quality and the theories explaining travel motivations.

§2.3 Tourist awareness of environmental impacts

In the previous part different environmental impacts have been discussed. Hence, it is of importance to describe how visitors perceive the environmental quality. The perception of the visitors may provide insights in how tourism affects the natural environment.

For managers it is important to realize that environmental impacts do not just cause ecological problems. It is required to take into account that the environmental quality and the visitor perception are interrelated. The visitors' environmental behavior affects environmental quality (Petrosillo et al., 2007). On the other hand, perceived impacts can degrade the quality of experience of the visitor (Leung & Marion, 2000). Previous research considered that the visitors' experience was mostly impacted by ground vegetation loss and bare ground on campsites (Taylor & Knight, 2003). Additionally, impacts associated with a specific type of use may intensify perceived crowding and conflict between different visitors or groups (e.g. hikers may be disturbed by the manure left by horseback riders (Taylor & Knight, 2003)).

It is therefore essential to discuss how visitors usually perceive environmental quality and which factors influence their perceptions. In the following paragraphs, some of the more relevant aspects (factors) that have been analyzed in previous literature, will be described.

In the last decades, there has been an increasing awareness and sensitivity to environmental impacts created by tourism (Hillery, 2001). In this way, previous research has been trying to obtain further insights regarding the perception of environmental problems. One of the first of these studies has suggested that tourists have a limited perception of the wear and tear impacts, but are more sensitive to direct impacts resulting from litter, human waste, and the maltreatment of the environment (Lucas, 1979).

Subsequent research has also shown that tourists are mostly observant of the direct impacts of other visitors consisting of littering along trails, roadsides and streams (Hammitt, Bixler, & Noe, 1996). On the other hand, more recent research has provided new significant conclusions, where it is considered that perception varies between different individuals (Hillery, 2001; Petrosillo et al., 2007; Priskin, 2003). Additionally, it has even been suggested that in some cases visitors do actually

perceive their own impacts (Priskin, 2003).

Accordingly, the perception of environmental quality can depend on different concepts described below:

- Petrosillo et al. (2007) explained that a person's socio-economic status, cultural ties and past experiences are important factors that influence the perception of the environmental quality.
- The research of Priskin (2003) found significant differences for perception for age, origin and level of education.
- The environmental quality of the location of origin of the visitor seems to have influence on the perception of environmental quality. For example, if a person lives in an environment with a high environmental quality, this person is likely to be more perceptive on environmental impacts in other environments (Petrosillo et al., 2007).
- Perception differs for park related attitudes and whether tourists frequently visit the park. When people often visit the park, they are likely more able to perceive environmental impacts (Petrosillo et al., 2007).
- People who are already environmental aware more likely perceive their own impacts on the natural environment (Priskin, 2003)

The ecological perception usually occurs along two axes; spatial and temporal. In the case of tourism, tourists seem to be more sensible to the spatial element, i.e. the perception of landscape elements and patterns. This can be supported by other research that concluded that different landscapes is something people notice and respond to (Axelsson-Lindgren & Sorte, 1987). Regarding the temporal aspects, Petrosillo et al (2007) consider that tourists seem to be more interested in the actual natural attractiveness related to their recreational experiences rather than in related potential environmental impacts (Petrosillo et al., 2007).

As explained previously, in some cases visitors are aware of their impacts, however this does not mean that they will act in accordance with their opinion (Priskin, 2003). Attitudes are good indicators of environmental awareness. However, available evidence indicates that little relationship exists between verbal behavior or attitude and overt behavior or action of a person (Mihalic, 2000; Mitchell, 1979). This means that even though visitors are environmental aware, this does not mean that they behave responsibly.

Although, little evidence is found that links actual behavior or action of tourists with the environmentally responsible behavior, Petrosillo et al. (2007) stressed that it is of importance to identify visitor profiles. Knowing which type of visitors are coming to the park, gives more insights how to manage the visitors' behavior. As it was mentioned above, studies on perception can lead to a better understanding of the type of visitors that is being dealt with. The next part (§2.4) builds on the essence of creating different visitor profiles based on travel motivations.

§2.4 Travel motivations and destination choice

This research tends to classify visitors based on their motivations for visiting ONP. It is therefore of importance to further explain theories that have intended to explain travel motivations.

Motivations can be defined "as the global integrating network of biological and cultural forces which gives value and direction to travel choices, behavior and experience" (Pearce, Morrison, & Rutledge, 1998 in Espinoza, 2002:3). Pearce, Morrison, and Rutledge (1998) outline 10 trends important in describing tourist motives, of which four are related to nature tourism motivation: motive to experience the environment, motive to rest and relax in pleasant settings, motive to

pursue special interests and skills (scuba diving, fishing), and motive to be healthy and fit.

It is of importance to research motivations for three interrelated reasons (Crompton & McKay, 1997 in Nicholson & Pearce, 2001: 449):

- it is important for the designing of better products and services
- it is linked to the satisfaction of visitors
- it is a crucial element to understand the visitors' decision making process.

Nature tourism is considerably one of the fastest growing sectors in tourism (Orams, 1996).

Therefore, it is important to investigate the motives of nature tourists for choosing this type of tourism. Different frameworks had been developed to understand the phenomenon of destination choice (Espinoza, 2002). In the following paragraphs different aspects that have been used to examine motivations for travel to natural settings will be described.

Push & Pull factors

Most discussions of tourist motivation have revolved around the concepts of “push” and “pull”. Travel motives are considered a set of push and pull factors. Push factors are those considered origin-related, which are intangible or intrinsic desires of tourists (e.g. rest and relaxation, adventure, health). 'Pull' factors are the ones related to the attractiveness of destinations, these are tangible characteristics (e.g. beaches, recreation facilities, cultural or historical resources) (Kozak, 2002).

The concept of “push” and “pull” factors can further be explained considering Gray's (1979) and Crompton's (1979) theoretical frameworks as examples. Crompton's research considered the push factors as the motivation to travel and the pull factors as the benefits of a specific locations to satisfy needs. Gray's theory examined travel motivation suggesting two main motives that explain why people visit natural areas: wanderlust, *the desire to go from a known to an unknown place* (push factors); and sunlust, *the visitors looks for a place which can provide the traveler with specific facilities that do not exist in his or her own place of residence* (pull factors) (Espinoza, 2002).

It has been considered that the push factors, rather than pull factors, are the most important factors for determining destination choice (Espinoza, 2002). For example, there are two similar tourist destinations in two different countries, the choice for one specific location eventually is made by intrinsic desires, rather than what the places has to offer. Therefore other research has focused only on the needs that influence motivations.

Accordingly, another approach that has been of importance in the studies of travel motivation is the focus on the analysis of needs that influence motivation. For instance, Maslow's theory “Travel Career Lader” described different levels in a career ladder, e.g. 'need of achievement' where tourist prove their competences in achieving a goal (e.g. hiking or climbing).

However, the concentration on just needs can limit the analysis of motivations. Therefore, a more integrating approach may require a “complete knowledge of the processes whereby these *needs* are transformed into motivated behavior and, in particular, of the way in which people's expectations give motivated behavior its direction” (Witt & Wright, 1992 in Espinoza, 2002: 6). Thus, Witt & Wright (1992) presented the 'expectancy theory' which included the needs that are important to motivation. It also recognized the “decision making” process in which tourists choose the destination of their holiday (Witt & Wright 1992 in Espinoza, 2002). The 'expectancy theory' is related to Vroom's framework of work motivations. Vroom (1964) suggested an approach which included important variables to understand motivation: needs, values and beliefs. Moreover it

considered that “a tourist to natural setting does not go only to have an encounter with nature, but also to achieve a further self-indulgent goal” (Vroom, 1964 in Espinoza, 2002:7).

Relating “New Environmental Paradigm” with the “Theory of Planned Behavior”

Besides the 'expectancy theory', it is of importance to further analyze the '*intentions influencing behavior*' which is linked to attitudes and subjective norms (Fishbein & Ajzen, 2010). This model was first called 'Theory of Reasoned Action'. However, the model was updated by including 'perceived behavioral control' as an element influencing intention, creating a new model called the 'Theory of Planned Behavior'. The 'Theory of Planned Behavior' suggested that changing beliefs can produce a change in the behavior, as long as attitudes and/or subjective norms also change (Fishbein & Ajzen, 2010). In this way, “*beliefs influence attitudes and the perception of subjective norms (social pressure), at the same time these attitudes and subjective norms influence intention, and intention determines behavior*” (Espinoza, 2002:7). Accordingly, the behavior of an individual depends largely on the intention to perform that behavior which in turn is determined by:

- the person's attitude towards behavior
- the subjective norms the individual believes significant others have concerning the behavior
- the perception of the individual whether the behavior can be performed (i.e. perceived behavioral control)

Hence, those who hold positive environmental beliefs or attitudes are more likely to have a desire to learn and experience nature or have an intention to pursue an environmentally friendly behavior associated with Nature Based Tourism (NBT) (Luo & Deng, 2007).

The 'Theory of Planned Behavior' (TPB) becomes useful in the understanding of tourist motivation when is related to the New Environmental Paradigm (NEP). The NEP considers a new set of beliefs and values. This paradigm develops a scale that includes three conceptual domains: beliefs about our ability to conflict with nature, limits to growth, and the proper role of humans in nature (Dunlap & Van Liere, 1978) (see Appendix V for an example of such a scale).

NEP suggested that the changes in beliefs in society are affecting the motivation of tourist, who consequently are more keen to visit natural areas. Accordingly, Espinoza (2002) considers that when relating NEP to the Theory of Planned Behavior it is possible to find a more complete and integral approach in the understanding of nature tourists motivation. Hence, it has been suggested that this new set of beliefs (NEP) are influencing the attitudes and subjective norms of our societies (TPB). Therefore, it would be possible to understand the increasing importance of nature tourism world-wide.

The motivational groups

In order to classify tourist based on their motivations it is important to consider that motivation is a dynamic concept as “it may vary from one person to another, from one market segment to another, from one destination to another as well as from one decision- making process to the next” (Kozak, 2002: 222). Thus, previous literature had suggested that the examination of the differences of motivation between populations and cultures may be important to understand tourists' values, preferences and behavior (Kim, 1999 in Kozak, 2002). Some research have suggested that tourists have multiple motivations (Cohen, 2004; Dann, 1977; Plog, 1974). Other researchers believe that tourists have limited motives, but these may change over time (Pearce, 1993). Consumer behavior literature emphasizes that needs and motivations are interrelated (Witt & Wright, 1992), e.g. people may intend to take a trip to fulfill their physiological (food, climate and health) and psychological (adventure and relaxation) needs.

Kozak (2002) suggested that tourist motivations may vary according to *countries of origin* and the *destination* and suggested the following motivational categories: 'culture', 'pleasure-seeking/fantasy', 'relaxation', and 'physical (activities)'. (Kozak, 2002:231). Nicholson & Pearce (2001) have considered variation between *repeat and first-time* visits, as well as between visitors that are part of *different groups* such as friends, family, and couples.

In this sense, this research considers the analysis of different motivational groups to have a more accurate understanding of the perceptions of ONP's visitors. This may provide further insights regarding the relationship between tourism and environmental aspects in ONP.

§2.5 Biodiversity, Indicator species, Habitat and Landscape configuration

One of the main objectives was to investigate the biodiversity at different sites in ONP. Therefore it is necessary to discuss what biodiversity exactly stands for and how previous researchers have intended to measure it.

In the summit of Rio de Janeiro 1992, the international agenda on environmental issues of United Nations was concerned with the importance of the biological diversity at global level. In this way the Convention on Biological Diversity (CDB) states that: “*Biological diversity*” means the *variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems* (UNEP, 1992).

Moreover, different aspects can be considered when analyzing and trying to find indicators of species rich sites and diversity. I.e. Jonsson and Jonsell (1999) studied if rare and threatened species tend to co-occur in valuable standards. This study analyzed potential biodiversity indicators in boreal forests in Sweden which is in a comparable environmental situation as Oulanka National Park in Finland. The authors regard at the tendency for species to form nested subsets as important. A set of species is nested “if species that occur on sites with n species also occur on sites with $n+1$ species” (Jonsson & Jonsell, 1999). In this case the species composition at poor sites are suggested by this research as proper subset of the species present at richer sites. Furthermore:

“species with intermediate number or occurrence may serve as indicators of species rich sites where rare species tend to be more common (Jonsson & Jonsell, 1999 p.1418)”.

Besides the species richness, another aspect to consider in this research are the habitat composition and the landscape configuration in ONP. Habitat quality may be the most important factor that determines the presence of species at given sites (Dauber, 2003). Jonsson and Jonsell (1999) argue that in addition to the use of species as indicators, there are opportunities to use habitat and substrate variables as indicators on the status and value of boreal forest sites. These authors aim at analyzing the potential of habitat and substrate variables as indicators of biodiversity (Jonsson & Jonsell, 1999).

In this respect Dauber et al. (2003) suggests that landscape configuration has a strong impact on local diversity and community structure. According to these authors, besides the habitat quality the composition of a landscape is one of the key factors explaining species richness at the regional scale (Dauber, 2003). The authors revealed in previous research that strong variability in species richness between study sites could not be sufficiently be explained by internal factors such as habitat quality. Hence, external factors (e.g. spatio-temporal dynamics, boundary characteristics, neighborhood effects) may contribute to species richness and community composition (Dauber, 2003).

Accordingly, this research acknowledges the studies of Dauber et al. (2003) stating that habitat

quality depends on two different set of variables (Dauber, 2003):

- Intra-patch variables (e.g. field-size, soil type, aspect, vegetation cover) and
- Matrix-variables (e.g. heterogeneity of the surrounding landscape, portions of surrounding land-use types).

The applicability of these aspects in the research will be further explained in the methodology.

§2.6 Summary of theory

For a better understanding of the literature discussed, the following section summarizes the major concepts that have been useful for the purposes of this research.

Nature-based tourism considers all nature related tourism. It is not necessarily sustainable as nature-based tourism can impact the environment. Four categories of impact, caused by recreational activities, that can lead to a negative response of the wildlife are considered: harvest, habitat modification, pollution and disturbance. The visitors' awareness of these impacts differs between individuals. In general tourists are aware of direct impacts like littering, overcrowding, etc caused by other tourists. Although visitor are less sensitive to their own impacts, the visitors' awareness may vary between different visitor groups.

The visitors' motivations for going to ONP are important for this study to categorize the visitors. Motivations are the reason for action, that give purpose and direction to behavior. Most theories are based on 'push' and 'pull' factors. However, some authors have also suggested the need for more integral approaches for more accurate analysis. When relating the 'Theory of Planned Behavior' with the 'New Environmental Paradigm' we may better understand how a new set of beliefs influence attitudes and subjective norms of the society. NEP suggested that these changes in beliefs in society are affecting the motivation of tourist. The combination of these theories may explain the growing importance of nature-based tourism. In order to classify people by their motivation it is recommended to take into account the difference of people and the different factors that affect their motivations. Identifying motivational groups in ONP may provide further insights in the relationship between tourism and environmental aspects, i.e. environmental perception and awareness.

Biodiversity is one of the most relevant subjects at global level. Biodiversity is defined as the variability among living organism, etc. Biodiversity can be calculated using indicators species. Red-listed species have seemed to be good indicator species. Additionally the landscape configuration (habitats) are also considered as indicators for biodiversity rich sites.

§2.7 Overview of concepts

The figure (2.1) below explain how the different concepts discussed are related and how they are used in this study.

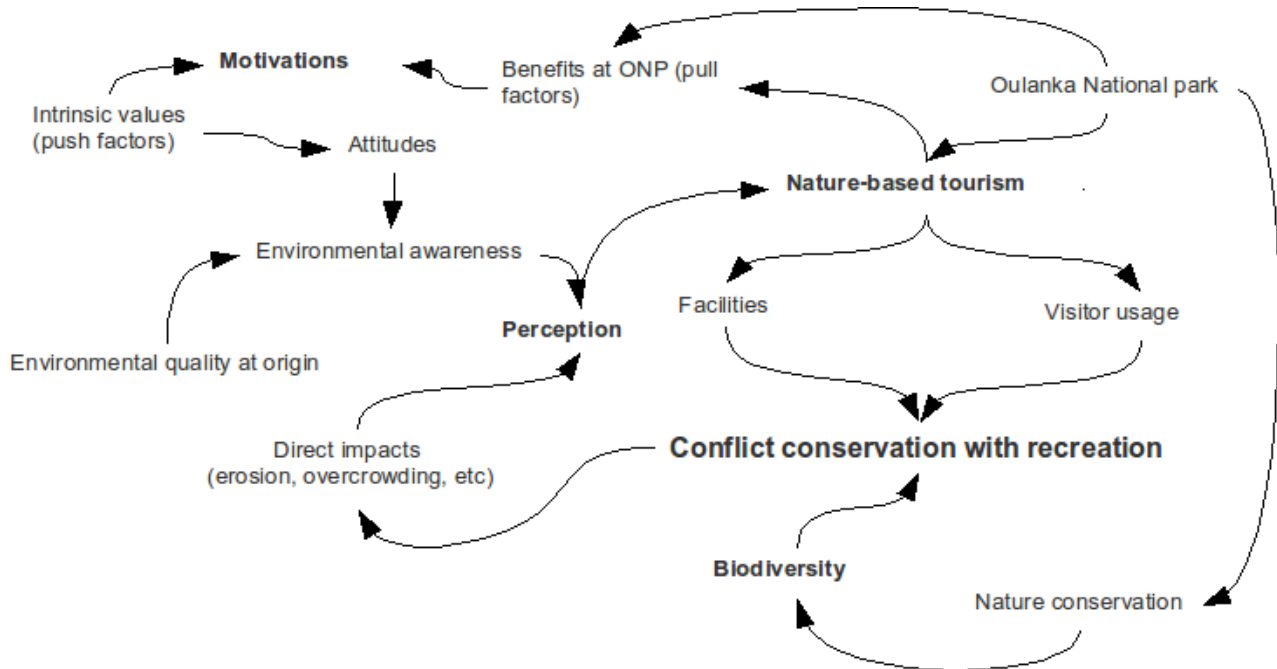


Figure 2.1: The relation between different concepts as used in this study

3 Methodology

This chapter explains how the results were created. Firstly, it explains the dataset available for this research. Secondly, it describes which limitations were present. Thirdly, it outlines the tools which are used for the analysis of the data. Finally, the methods for creating the results concerning the research questions are explained.

§3.1 Data availability

The following three sets of data were available for this thesis:

1. The Oulanka National Park Visitor Survey 2005.
2. Spatial Data of ONP which includes ecological data.
3. Visitor Flow Data of 2007 of ONP which includes spatial data.

The Oulanka National Park Visitor Survey 2005

Every year the forest service of Finland, Metsähallitus, carries out visitor surveys for all national parks in Finland. The surveys allow Metsähallitus to make comparisons in visitor satisfaction between different parks. In this thesis there was access to the data concerning Oulanka National Park. The survey was carried out in the months July and August of the year 2005. The survey was based on the participation of 585 individuals. A copy of the survey can be found in Appendix I.

The survey provided insights of tourist characteristics which consisted of the variables age, educational background, gender and nationality (see table 3.1). Additionally, the survey provided insights on the trip characteristic of the respondents. Table 3.2 shows which variables of information have been provided by the survey concerning trip characteristic. Finally, information has been provided concerning preliminary knowledge of the respondents as can be seen in table 3.3.

Table 3.4 shows the general characteristics of the survey respondents. Men and women were equally represented. The park was visited mostly by people between the ages of 35 and 45 years old. The respondents together had an average age of 42 years. The majority of the visitors were Finnish (80%), while approximately 20% of the visitors had a foreign nationality. Most respondents had a college degree or higher (61%).

Table 3.1: Variables concerning tourist characteristics

<i>Variable</i>	<i>Question from survey</i>
nationality	question 16
age	question 17
gender	question 18
education	question 19

Table 3.2: Variables concerning trip characteristics

<i>Variable</i>	<i>Question from survey</i>
time spend in the park	(question 2)
places in the park visited	(question 3)

3 Methodology

transport to the park	(question 4)
group size and composition	(question 5 and question 6)
motivation	(question 7)
activities	(question 8)
quality of services	(question 9)
meeting expectations	(question 10)
money spend for various purposes	(question 11)
disturbances	(question 15)

Table 3.3: Table 3.2: Variables concerning preliminary knowledge of the respondents

<i>Variable</i>	<i>Question from survey</i>
previous visits	question 12
importance of destination	question 13
information sources	question 14

Table 3.4: General characteristics of the respondents

<i>Variable</i>	<i>Classification</i>	<i>Value</i>
Gender	Men	47%
	Women	53.00%
Age	15 – 35 years	33.00%
	35 – 54 years	46.00%
	54 – 74 years	21.00%
	Average age	42 years
Nationality	Finnish	80.00%
	Foreign	20.00%
Highest level of education	No vocational or professional qualifications	10.00%
	Vocational training	19.00%
	College-level qualification	37.00%
	University degree	34.00%

Spatial data

The Metsähallitus also collected spatial data in course of time. This spatial data provided the following information:

- *biodiversity* by maps of indicator species and a map of habitats
- *location of facilities and other structures*
- *location of trails*
- *landscape types*

The maps are provided as ESRI Shapefiles. The attribute tables have an extended amount of information stored for comparisons between different parks. Therefore, not all data is of importance when only investigating Oulanka.

Visitor flow data

Research was done to study the interaction between human and ecosystem at Oulanka National Park. Part of this study was to study and monitor visitor flow. Visitors were counted at different locations in the park using visitor counters during the summer of 2007 (Dolinšek, Kangas, & Siikamäki, 2009). The spatial data that was part of the results of this study were provided for use in this thesis. This spatial data consisted of the locations and the usage of campsites and trail segments. The *usage of the trail segments* has been used in this thesis to calculate the usage per grid cell as is explained further.

§3.2 Limitations

The original idea for this research was to investigate whether biodiversity rich areas would affect the visitor experience. In this scenario, the visitor experience and the biodiversity would be compared for different locations in the park. The dataset provided for this research was intended for other research which lead to various limitations in this study.

Firstly, the survey did not provide any questions related to biodiversity or landscape preference. It was therefore not possible to compare the actual interest in biodiversity and landscapes for different respondents. Additionally, as will be made clear in the actual research, the biodiversity is relatively high in almost all locations visitors were interviewed. The sample size was therefore too small to compare the visitor experience at different biodiversity levels.

Secondly, in this study one of the variables studied was the perception of environmental quality, however no data was available on environmental awareness and environmental attitudes. The only variable that would contribute to the understanding of environmental impacts perceived by visitors, was the visitors' disturbance to certain factors. This element would only give an indication of a problem. Other factors can also influence whether a visitor was disturbed by a certain factor or not. For example, a visitor may have been dissatisfied in general and therefore was also more disturbed by erosion than visitors who were satisfied.

Thirdly, the dataset did not provide strong variables to predict visitor behavior. This would have been interesting in order to explain a visitors' responsible behavior with the environment. Nevertheless, this study took motivations to provide among others further insights to visitor behavior, even though the actual relationship between motivations and actual behavior is still uncertain.

Hence, the limitations for this study included:

- No data about the landscape preference of visitors or the knowledge and preference for biodiversity rich areas.
- Not enough respondents in areas with a rather low biodiversity to make an actual comparison between satisfaction in biodiversity rich areas and other areas.
- Data about environmental attitudes and environmentally responsible behavior to better understand the visitors' capability to perceive environmental quality.

§3.3 Research tools

Spatial analysis

A main element in this research is the recognition of the relevance of spatial analysis as an important tool for the managerial aspects on natural parks. In this research the spatial analysis is the principal tool to analyze the relationships between the provision of recreation facilities in the park and the location of main biodiversity hotspots.

According to Geneletti and Duren (2008) spatial analysis is an important element within the context of environmental planning and land management as most information has a spatial component. For instance, managers and planners in natural parks need to evaluate the spatial distribution of land properties and decide the location of restriction areas and/or the areas of stimulate certain activities (e.g. *tourism, conservation*). In this way studies have revealed the strength of using GIS enabling of the computation of spatial criteria (Geneletti & Vanduren, 2008).

The importance of the spatial analysis has been also recognized by the LAPBIAT-Wageningen project “Interrelationships between biodiversity, recreation facilities and visitors satisfaction- a socio-spatial analysis of recreational experiences at ONP”. As previously mentioned this research aims at applying new methodologies to explore the linkages between biodiversity and tourism by using spatial analysis in ONP (LAPBIAT, 2008).

This study used Quantum GIS (QGIS), an open source Geographic Information System, for the spatial analysis performed in this study. This application provided functionality for this study by its core functions and plug-ins (Quantum GIS, n.d.). Especially due to its plug-in system, QGIS provided a great extent of flexibility and created the opportunity to add custom implementations and functionality in the form of plug-ins. For this research specific plug-ins were developed. Plug-ins were written in the scripting language Python. Due to these reasons QGIS was chosen for spatial analysis in this research over the other known commercial alternatives.

Statistical analysis

This research uses SPSS 13 (Statistical Package for Social Sciences).

§3.4 Biodiversity and visitor pressure

This section explains how to obtain the results for answering the first research question: *In which areas of the park are tourist activities concentrated and in which areas of the park are the biodiversity hotspots? Do they overlap?* The result desired was to create maps of biodiversity in order to identify biodiversity hotspots and maps of visitor pressure in order to identify the zones with a high density of visitors. Using these maps it then was possible to create a map that describes the actual conflict between nature conservation and recreation.

Vector grid

In order to make comparisons between different topics like biodiversity and visitor pressure, a grid overlay was used. After experimenting with different grid sizes, the most optimal grid size resulted to be 1x1km. A smaller grid of 500x500m resulted in too few observations per grid cell to do statistical analysis. A larger grid like 2x2km proved too big to make a comparison between different areas in the park. The approximate size of the park is 390 km², a 1x1km grid size resulted in 390 different cells, while a 2x2km resulted in 97 different cells.

Biodiversity hotspots

In order to identify ecological hotspots, the biodiversity for different zones (grid cells) in the park had to be calculated. Biodiversity does not just refer to the number of species in a specific area, but it is also important to consider the abundance of these species. Therefore, in this report the Shannon diversity index (see figure 3.1) was used. The Shannon diversity index has been a common method for researchers to calculate species richness (biodiversity) (Tramer, 1969). A diversity index in general is a statistic which is intended to measure the diversity of a population. The Shannon diversity index describes the diversity of the data by taking into account both the number of different categories of data (e.g. the number of species) and the abundance (e.g. the number of individuals per species). The index can be increased when having either more additional unique species or by having a greater species evenness. A major limitation of this method is that it does not take into account the spatial distribution of species (Spellerberg & Fedor, 2003).

$$H' = - \sum_{i=1}^S p_i \ln p_i \quad \text{where } p_i \text{ is the fraction of individuals belonging to the } i\text{-th species.} \\ \text{(Shannon, 1948)}$$

Figure 3.1: Shannon diversity index

The spatial data provided a map of the location of red listed species observations and a map with habitat types. Two methods were used for calculating biodiversity. Each method has its advantages and its disadvantages.

Indicator species

Maps were available with the locations and the characteristics of red listed species, which can be used as indicator species as suggested by Jonsson & Johnsell (1999). The indicator species consisted of lichens, mushrooms, mosses and vascular plants. The method is considered reliable as both the number of species and the abundance of species is known. Additionally, biologist Pirkko Siikamäki suggested the use of these data in combination with the Shannon diversity index. However, at many places in the park there were no indicator species observed and these places would then appear to have no biodiversity. Nevertheless, this method is sufficient for identifying biodiversity hotspots.

Habitat definitions

As discussed in the literature (§2.5), in addition to the use of species as indicators, there are opportunities to use habitat and substrate variables as indicators on the status and value of boreal forest sites (Jonsson & Johnsell, 1999). The spatial data of this research provided a habitat map of ONP including the Natura 2000 habitat codes for most habitats. The Natura 2000 explains for different habitats the characteristic species. However, it does not explain the abundance⁵ of these characteristic species. Therefore, in order to use the Shannon diversity index, the assumption had been made that the abundance of every species in a specific habitat is equal. Another disadvantage of this method is the incompleteness of the Natura 2000 codes in the attribute table of the habitat map. These had to be added by deductive reasoning with the explanations of codes in other fields of the maps attribute table. As this method is rather experimental, it is considered not as reliable as the method using indicator species as deductive reasoning was used to fill in the gaps of the data. However, this method could calculate the biodiversity for every zone in the park. The results generated using this method required the visual confirmation of the pattern produced by an expert in order to proceed with further analysis.

⁵ Species abundance is the number of individuals per species (Encyclopædia Britannica, 2010).

Spatial programming

In order to calculate the biodiversity, different plug-ins for QGIS had to be developed. In fact the plug-ins consisted of three elements. Firstly, a *user-interface* in order to request which layers and which field would be used as input and which as output for the formula (Shannon diversity index). In the case of this research, it would request the the species layer as input and the grid overlay as output.

Secondly, the plug-in consisted of the interaction code to communicate with the core of QGIS. After the necessary layers and fields would have been obtained, the plug-in would communicate with the core of QGIS to request the layer and field objects to obtain its values.

The third element of the plug-in was the actual code in which the Shannon diversity index was implemented. The values that would be supplied by the interaction code were inputted into the formula and subsequently the interaction code would write the actual diversity index (H') to the target layer i.e. the grid overlay.

The plug-in that implemented the method using indicator species basically would count all species and its number of individuals. Subsequently, it would calculate the diversity index. The plug-in that implemented the method using habitat definitions would instead of counting individuals, sum the total potential area of one species. Additionally, the habitat codes and characteristic species had to be copied from the Natura 2000 document and to be made available for the plug-in. The actual code of the plug-ins can be found at: <http://qgis-oulanka.googlecode.com>.

Visitor pressure

In order to determine the visitor pressure at different zones (grid cells) in the park, the dataset offered two suitable indicators: structure density and visitor flow.

The structures density is an indicator for the recreation facilities density. In this study the structure density is considered as the density of all structures like buildings, facilities, signs, information boards, etc. Two maps were available, one with the location of building and one with the location of other structures. The structures consisted of signs, information boards and campfire locations, and buildings consisted of actual buildings like the nature center and wilderness cabins. Using the QGIS functionality *points in polygon* it was possible to calculate the number of structures in a specific zone (grid cell).

The visitor flow data consisted of a map with the visitor usage of trail segments. In order to compare the visitor pressure (in this case visitor usage) with biodiversity, the visitor usage of the trails needed to be transferred to the grid overlay. QGIS has the functionality of *joining attributes* of one layer with another based on their locations. This functionality was used to transfer the average visitor usage in a specific grid cell to the grid overlay. Graduated symbology was used with quintiles as intervals for different levels of usage.

Critical zones

Finally, with the analyses explained above, sufficient data was created to determine where biodiversity hotspots and where tourist activities are located. In order to explain whether there is an actual overlap between biodiversity hotspots and tourist activities, critical zones were calculated. The critical zones were selected based on the criteria that the zones have a high biodiversity and have a high structure density or experience heavy usage by visitors. Using this criteria a new map was created explaining critical zones in the map where there is potential conflict between

conservation and recreation. Actual definitions for high and heavy are explained in the results.

Additionally, basic statistics have been calculated for:

- the *percentage of all structures* in considered *high biodiversity zones* and *core zones*.
- the *percentage of visitor usage* in considered *high biodiversity zones* and *core zones*.

§3.5 Motivation groups

The literature suggested that the attitude and behavior of visitors are indicators of environmental awareness. The survey data gave information concerning the motivation of people for visiting Oulanka National Park. This information was obtained from question 7 in the survey by asking “*What is important to you here today?*”. The outcome explained here will determine the answer of research question 2: *which groups of people based on their motivations for visiting Oulanka National Park can be distinguished?*

The first step was to perform a factor analysis on the scales. The outcome presented the relationship between different scales. Using this information different solutions could be suggested. In order to confirm whether these solutions were valid factors, a reliability test was executed to confirm whether there was inter-item correlation between the different scales. The reliability between scales is determined by calculating the Cronbach's alpha. By convention a Cronbach's alpha of 0.6 was considered reliable in exploratory studies such as this one (Tripathi & Cervone, 2008).

The second step was to perform a K-Mean cluster analysis to determine the motivational groups. In order to verify whether there were significant differences between the clusters one-way ANOVA was used. Finally, a discriminant function analysis was done to confirm the validity of the clusters. A discriminant function analysis, or simply a discriminant analysis, is used to classify cases into values of a categorical dependent. This analysis is a useful method for testing theory by observing whether cases are classified as predicted (Garson et al., 2006).

In order to describe the different groups distinguished, the relationship between the motivational groups and various variables was investigated. These variables consisted of: gender, age, nationality, education, first/repeat visit, group size, type of group, participation in activities at ONP and the assessment of the quality of services.

§3.6 Visitor perception of environmental problems

As discussed in the literature, tourists mostly notice direct impacts caused by other tourists (Hillery, 2001). Question 15 from the dataset provided to what extent people are disturbed by factors like erosion, littering, treatment of the natural environment, the amount of visitors and the behavior of visitors. Additionally, question 9 provided the assessment of quality for various factors which will be discussed later. Hence, these data made it possible to evaluate whether tourists perceive any environmental problems or degradation (research question 3).

The disturbance factors were the most important variables for determining whether tourists perceive any environmental problems. As mentioned previously, the dataset provided information to what extent people are disturbed by factors like erosion, littering, treatment of the natural environment, the amount of visitors and the behavior of visitors.

The dataset also provided information about how visitors assessed the quality of facilities and services (survey question 9 a-t). The relationship with environmental quality was not clear for most factors of the question and were therefore not considered suitable for analysis. Nevertheless, question 9i (waste disposal) was considered an important factor to explain how people are satisfied

with the waste disposal of ONP. Scoring low on waste disposal would mean there is no proper way for people to dispose their litter, trash cans are full or there is much waste found throughout the park.

The environmental perception related variables considered in this chapter had values based on Likert scales (i.e. values between 1 and 5). In order to know whether people were disturbed/dissatisfied by the specific variables, new variables had to be created with values true or false (1 for true and 0 for false). Concerning the disturbance variables, values 1 and 2 of the Likert scale meant “fairly much” or “very much” disturbed. For the variable quality of *waste disposal* values 1 and 2 meant a “fairly poor” or a “very poor” quality of the environment. Hence for the new variables, values 1 and 2 were recoded as true and other values as false.

The results consisted firstly of a frequency table that provides a summary of which factors people were disturbed by or dissatisfied with. Secondly, the results consisted of a comparison between the motivational groups and the environmental perception related variables. This comparison was done using cross-tabulations and Pearson Chi-Square method to verify significant differences.

§3.7 Comparison of the variables at different locations in park

After describing biodiversity, visitor pressure, motivational groups and visitor perceptions for the whole park, it is possible to make a comparison of these factors at different locations in the park. Results consisted of a map of the different locations included in the comparison, and graphs and tables to present the actual differences between the different areas and locations.

The first step was to determine the locations visited by the respondents of the survey. From the data there are two ways to make up the locations a visitor has been. Firstly, the data mentions the location where the person had been interviewed. This information is reliable as it is known for sure that this person had been on this location. Secondly, the survey contained the question which places people have visited (question 3). A map was created describing these locations.

In order to make a proper comparison between different locations, all people that have visited more than just one location would have to be excluded. This would significantly decrease the sample size. Therefore the comparison was done using two different methods.

The first method compared *different areas* in the park. Different groups of close-by locations were considered to represent these different areas. Only the people that have visited one specific area and no other were included in this comparison. The advantage of this method was that the visitor experience only concerned one specific area. The disadvantage was that the sample for comparison was significantly reduced.

The second method compared all locations in the park. The advantage of this method was that the whole sample was included in the comparison. However, the disadvantage was that the experience would include all the locations one person has visited. Nevertheless, it was assumed that the average experience of all visitors at this location would still represent the general experience at the specific location. Some locations in the park were visited by rather a small amount of people. Therefore, all locations that were visited by less than 30 person were excluded from the comparison.

After describing the differences between the variables discussed at different locations, it was possible to answer the last research question concerning differences between different locations in the park.

4 Results

In the previous chapter the methodology for obtaining the results necessary for answering the research questions were explained. In this chapter these results are presented and interpreted. In order not to interfere with the text flow, tables and figures are usually shown at the end of the section.

§4.1 Biodiversity and visitor pressure

The first research question concerned the location of biodiversity hotspots and visitor pressure related factors. In this section the answer on this question is given. Maps are used to present the results, these maps have been added at the end of the chapter from page 26 and further.

Biodiversity

Biodiversity was calculated using two methods. Method 1 was using the location and the abundance of indicator species and method 2 was using habitat definitions from the Natura 2000.

Figure 4.1 (p.26) presents the results of the biodiversity calculated using method 1 indicator species. It is possible to distinguish three main biodiversity hotspots. These locations coincide with the Oulanka Canyon/Taivalköski area, the Luontokeskus area and the Juuma area. This is already one indication for a possible conflict between nature conservation and recreation.

The results of method 2 habitat definitions are presented in figure 4.2 (page 27). The results are not as expected. For example, the results indicated that biodiversity in the Juuma area is relatively low compared to the rest of the park, while the Juuma area, according to figure 4.1, is actually a very biodiversity rich area. Additionally, at the Juuma area there is a restricted area (see Appendix II p.65) where people have to remain on designated trails. It is therefore expected that Juuma would actually have a high biodiversity. However, these results show the contrary. Another inconsistency is that biodiversity values seem to be too high for grid cells on locations where it doesn't seem very logical, like on the sides of the park border. The inaccuracies are expected to be related to the rather experimental method of calculating biodiversity using habitat definitions of the Natura 2000. Biologist Pirkko Siikamäki confirmed that the pattern produced did not seem very logical. Hence, in further analysis the results of method 2 are not used.

Visitor pressure

The visitor pressure was calculated using two methods. Firstly, the dataset provided maps with visitor usage per trail segment. Figure 4.4 shows the visitor usage per grid cell. As can be seen, most visitors go to Juuma, Luontokeskus (Nature center) or Oulanka Canyon. One explanation is that car parking is located at these sites (see Appendix II p.65).

Secondly, the dataset provided maps with the locations of structures and building. These data had been used to calculate the structure density. Figure 4.3 shows the structure density throughout out the park. The map gives an indication at which locations most facilities are located. Luontokeskus has a very high structure density, Juuma and Taivalköngäs have a medium structure density and the rest of the park has a rather low structure density. At the locations of Luontokeskus various facilities can be found such as the nature center and research center. At Juuma there are lots of facilities as it is a popular location. At Taivalköngäs both a camping and a nature hut is situated (see Appendix II p.65), which explains the medium structure density. Nevertheless, it can be concluded that the

facilities centers are located at Luontokeskus and Juuma.

Level of conflict

The results concerning biodiversity and visitor pressure have given insights at which places there may be a conflict between the conservation and the recreation function of the park. The presence of recreation activities in biodiversity rich areas have been calculated for both the visitor usage and the structure densities; results are present in table 4.1 and 4.2. Zones with a *very high* biodiversity are zones with a Shannon diversity index (H') of 2.1 or higher. Zones with a *high* diversity are zones with a Shannon diversity index (H') of 1.1 or higher.

Table 4.1: Percentage of structures in core zones and in biodiversity rich areas

Zone	Percentage of all structures
Areas with a very high biodiversity ($H' \geq 2.1$)	49%
Core zones	52%

As can be seen in table 4.1, almost half of all structures are both located in biodiversity rich zones and in core zones. This is an indication for a conflict between conservation and recreation. Additionally, PAN Park certification states that in the core zone extractive uses are permitted and where the only management interventions are those aimed at maintaining or restoring natural ecological processes. Nevertheless, about half of the structures (and possibly facilities) are constructed in the core zone.

Table 4.2: Percentage of visitor usage in core zones and in biodiversity rich areas

Zone	Percentage of visitor usage
Areas with a very high biodiversity ($H' \geq 2.1$)	24%
Core zones	26%

The results from table 4.2 describe the percentage visitor usage for grid cells in areas with a high biodiversity and in core zones. The percentage of usage in these zones can be considered critical, because it means that approximately one quarter of the visitors to Oulanka National Park visit areas with a high biodiversity and the core zones. As concluded earlier, Luontokeskus and Juuma are both biodiversity rich and highly visited locations. Therefore, it is to be expected that high amount of people are visit biodiversity rich areas.

As final conclusion a map has been created in which the critical zones in the park are identified (see figure 4.5). This map has been created by marking the zones which have a high biodiversity ($H' \geq 1.1$) and have a high structure density ($structures \geq 16$) or experience heavy usage ($usage \geq 5978$) by visitors⁶.

Research question 1 stated: *In which areas of the park are tourist activities concentrated and in which areas of the park are the biodiversity hotspots? Is there overlap?* The results presented in this chapter identified that there are three main ecological hotspots near the locations *Oulanka Canyon*, *Luontokeskus* and *Juuma*. The main tourist activities were also situated at these three locations. Hence, it can be concluded that there is overlap between tourist activities and ecological hotspots. Additionally, it can already be suggested that there is a potential conflict between the conservation function and the recreation function of Oulanka National Park.

⁶ The following SQL statement is used to select features: $Hind \geq 1.1$ AND ($structs \geq 16$ OR $Usage \geq 5978$)

Figure 4.1: Biodiversity calculated using red listed species as indicators

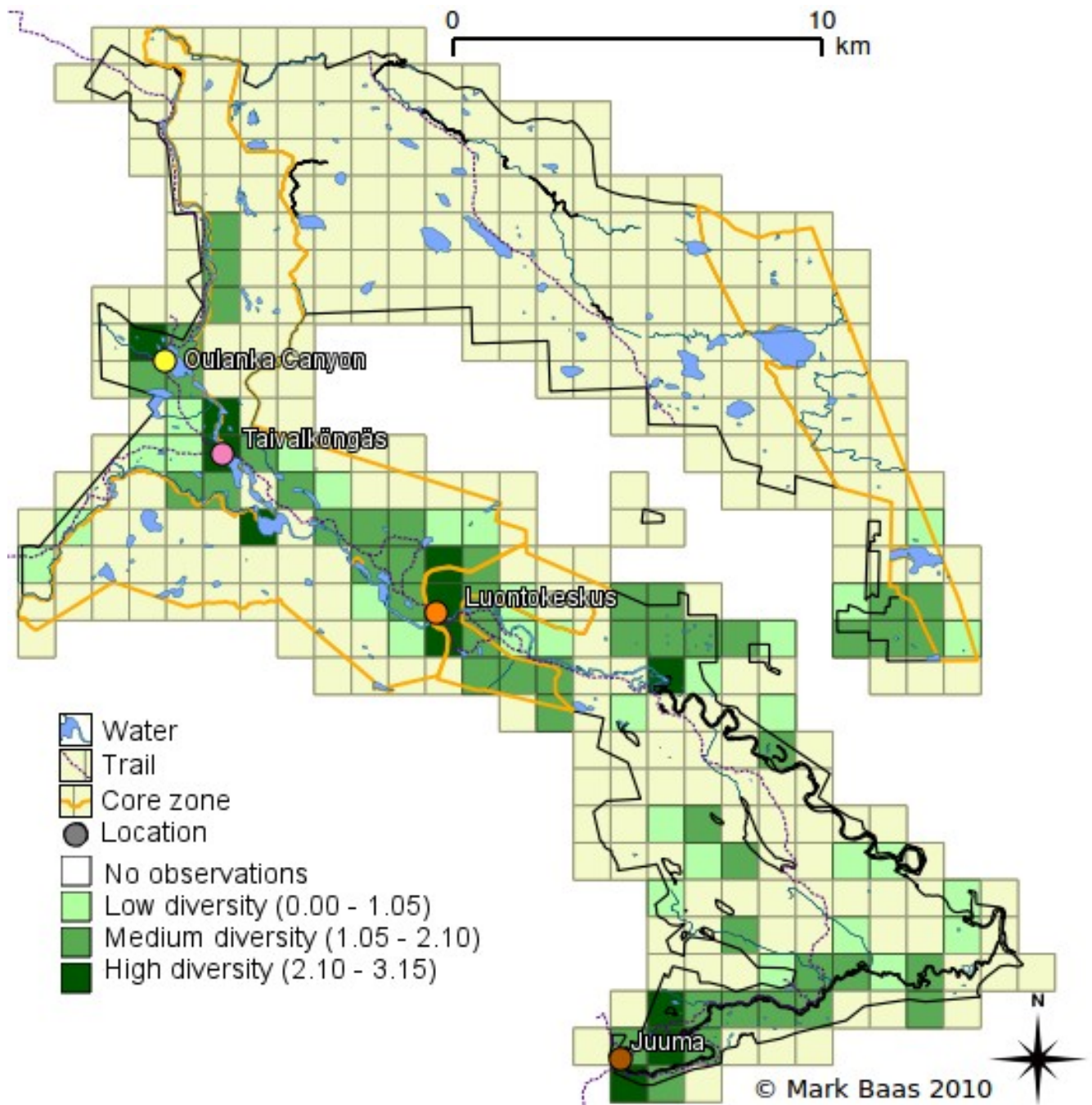


Figure 4.1: Biodiversity calculated using red listed species as indicators

Figure 4.2: biodiversity calculated using habitat definitions

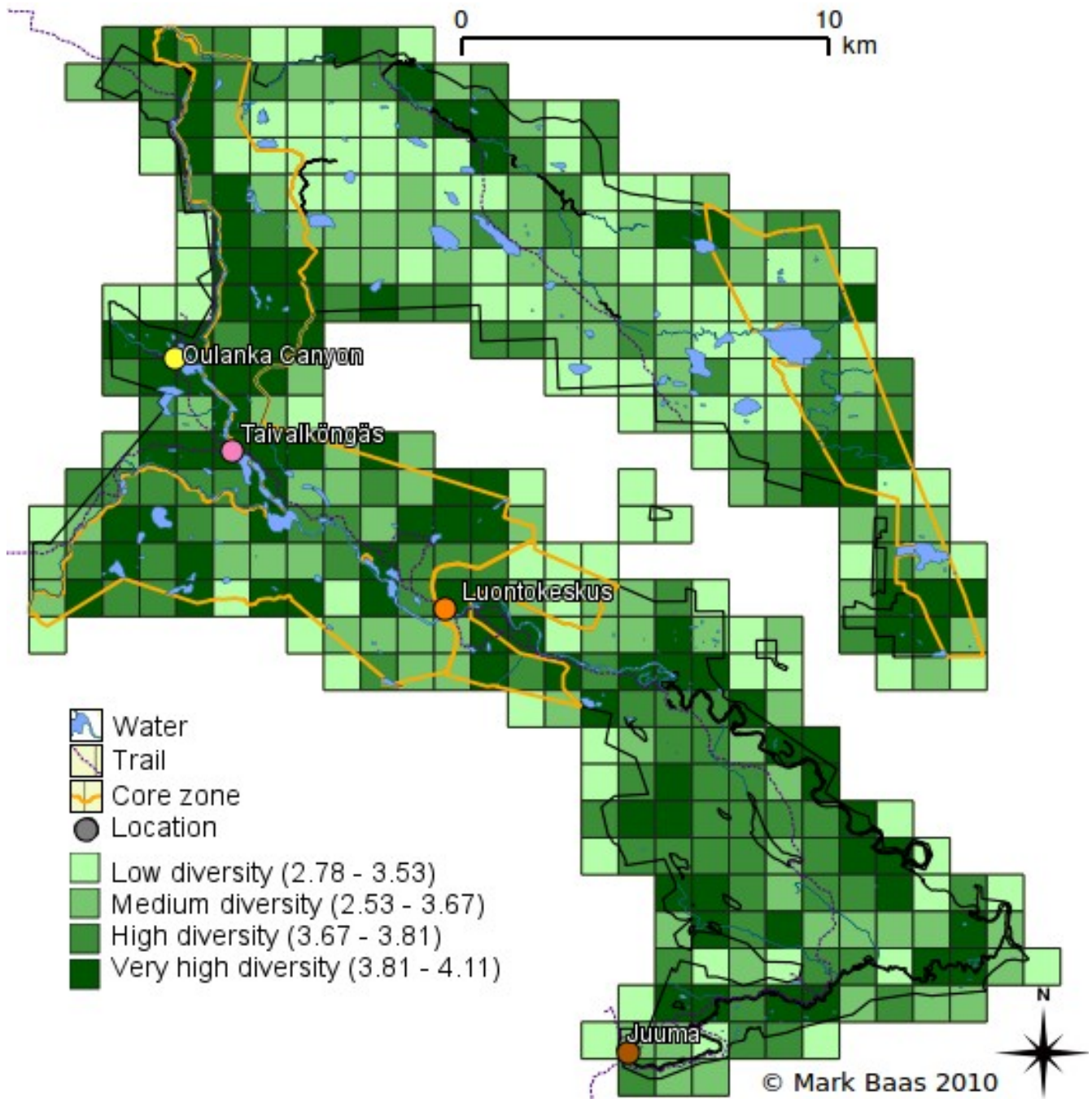


Figure 4.2: biodiversity calculated using habitat definitions

Figure 4.3: Structure density

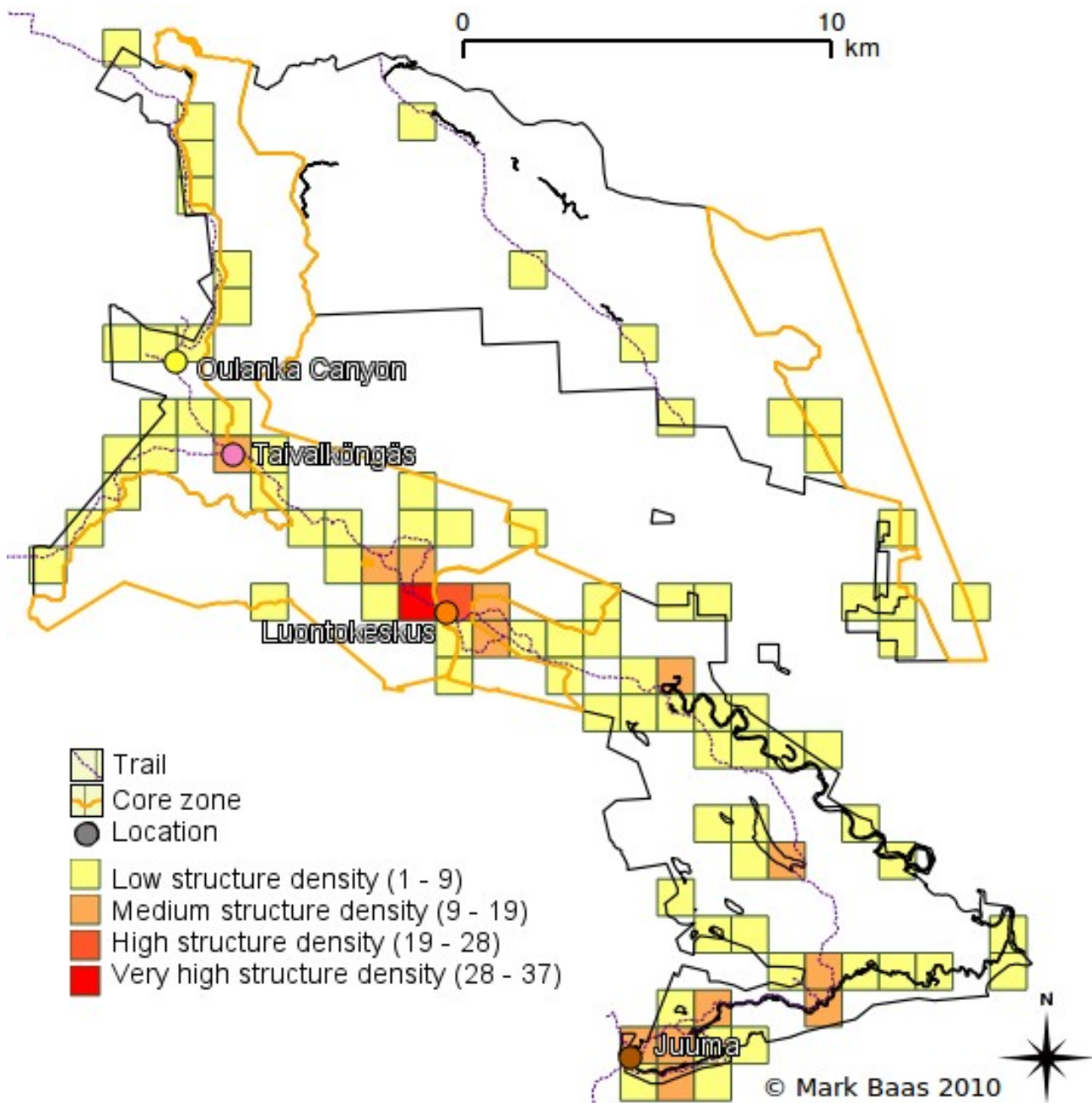


Figure 4.3: Structure density

Figure 4.4: Visitor usage

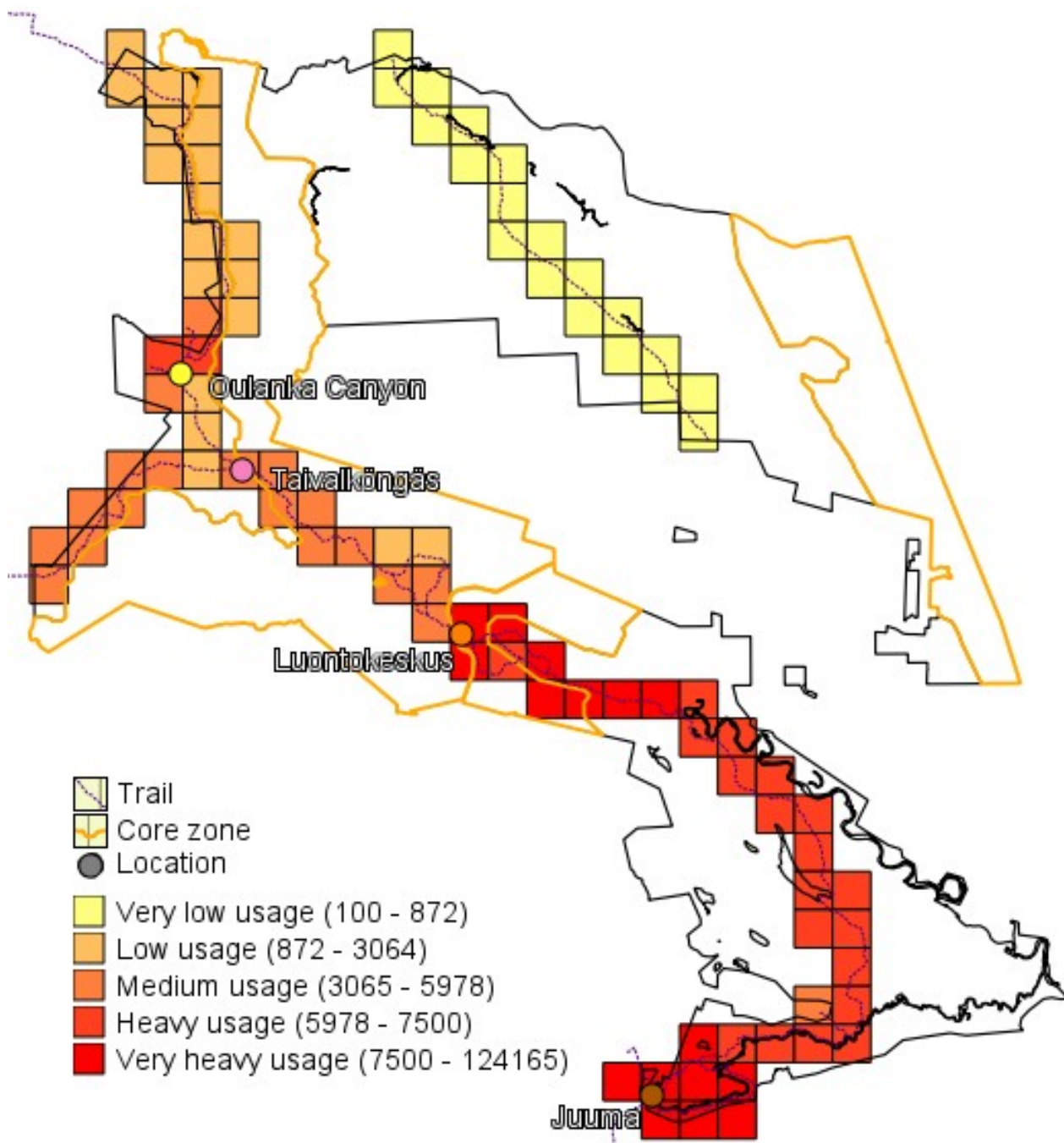


Figure 4.4: Visitor usage

Figure 4.5: Conflict zones

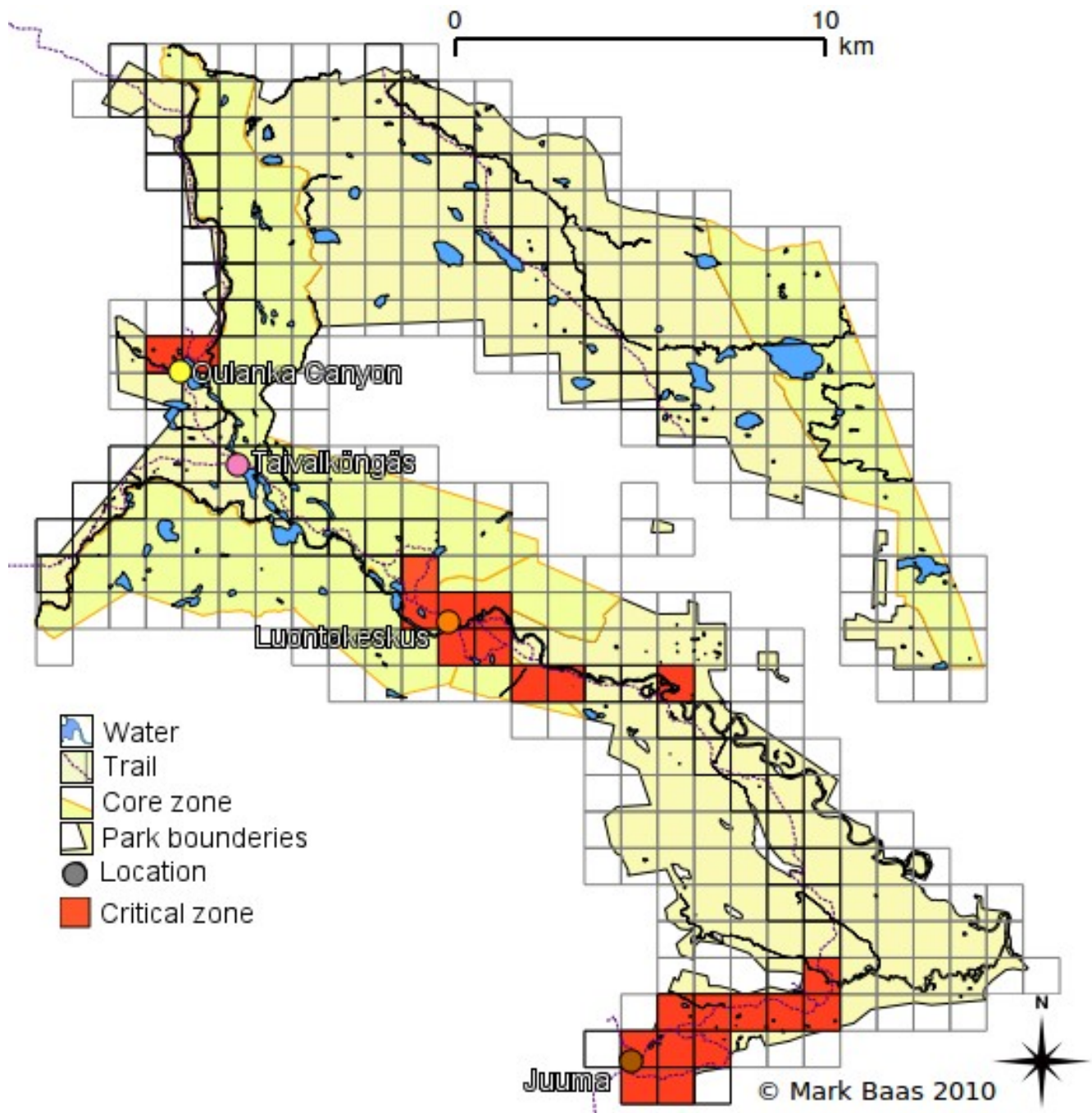


Figure 4.5: Conflict zones

§4.2 Motivation groups

For managers it is relevant to know why tourists visit Oulanka National Park. The results presented in this part answer research question 2 concerning the motivation groups visiting the park.

Factor Analysis

Questions 7a-o in the questionnaire determine the most important factors for coming to Oulanka National Park. From this information the motivations for coming to ONP can be extracted.

Firstly, a factor analysis was done using the principal component (PC) method with Varimax rotation. The number of factors were determined using the *Kaiser criterion*. This means that all components with eigenvalues under 1.0 were dropped. Finally, a reliability analysis was performed in order to determine whether the factors were reliable. By convention a Cronbach's alpha of 0.6 was considered reliable in exploratory studies such as this (Tripathi & Cervone, 2008). The exclusion of questions 7k (*Importance of getting to know the area*) and 7j (*Importance of pleasant old memories*) of the questionnaire resulted in more reliable factors and were therefore left out of the analysis (table 4.3).

Finally, three reliable factors were created. Based on their items the three factors were named respectively “(people motivated by) activities”, “(people motivated by) being away”, “(people motivated by) nature”. Table 4.3 shows the results from the analysis.

Table 4.3: Results factor analysis

<i>Motivations factors and items (question)</i>	<i>Factor loading</i>	<i>α (Cronbach's alpha)</i>
F1: Activities		0.696
<i>Importance of developing my skills (7m)</i>	0.742	
<i>Importance of meeting new people (7g)</i>	0.672	
<i>Importance of experiencing excitement (7o)</i>	0.649	
<i>Importance of keeping fit (7n)</i>	0.580	
<i>Importance to learn about nature (7l)</i>	0.535	
<i>Importance of being with friends (7h)</i>	0.507	
F2: Being away		0.608
<i>Importance of being on own (7i)</i>	0.684	
<i>Importance of relaxation (7c)</i>	0.677	
<i>Important to get away from noise and pollution (7f)</i>	0.654	
<i>Importance of mental well-being (7e)</i>	0.612	
<i>Importance of being together with family (7d)</i>	0.463	
F3: Nature		0.662
<i>Importance of scenery (7b)</i>	0.840	
<i>Importance of natural experiences (7a)</i>	0.800	

Cluster analysis

A cluster analysis was employed to classify people into mutual motivational groups using the KMEANS clustering procedure. The results from the analysis have indicated that a three group clustering was appropriate. The results from ANOVA tests concluded that there are significant differences between the groups ($p < 0.001$).

Table 4.4 describes the average scores per cluster for the motivational factors. Firstly, cluster 1 is regarded a group of people only motivated by nature and less interested in the other motivational factors than the other groups. Secondly, the people of cluster 2 are also motivated by nature, however they are also motivated by being away from the daily life. Finally, cluster 3 is a group of people that are motivated by all motivational factors. Subsequently, the differences between different groups are explained. Additionally, table 4.5 to 4.7 and figure 4.6 and 4.7 provide further information about the characteristics of each groups.

Cluster 1 is in general a less motivated group than the other groups (table 4.4). People belonging to this group are mainly motivated by nature and very little by the other factors. This groups significantly distinguishes itself from the other groups by the amount of people dissatisfied with certain facilities at ONP (table 4.7). Additionally, compared to the other groups people were less active (in hiking and nature observation) (table 4.6). A higher number of individuals belonging to cluster coming alone to ONP than in the other groups (figure 4.6). Men are more represented than women and the group consists of a majority of young people (table 4.5). Results also indicate that the group appears to have a higher participation of foreigners compared to other groups (table 4.5). Finally, it can be concluded that this group is a rather lower motivated, less satisfied and less active group than the other groups.

Cluster 2 consists of people that are motivated for being in ONP mostly by nature, but also by being away from the daily life (table 4.4). This group has a significant higher education than other groups (table 4.5). A significant higher amount of people come in groups of two people and with family than in the other groups (figure 4.6). Hence, this may indicate that these people are coming as (married) couples. This group appears to consist of educated people that want to escape from the daily life and therefore come to ONP .

Cluster 3 is a group of people that are very motivated to be in ONP by any of the factors with nature as their highest motivation (table 4.4). In general, people mostly come with family or friends in either couples or in big groups of more than 4 persons (figure 4.6). The group is both involved in hiking and nature observation, but compared to the other groups is mostly active in nature observation. Additionally, women, rather than men, seem to be more represented in this group. Finally, this group appears to be an active group that is motivated by many things.

In order to validate the results of the cluster analysis a discriminant analysis was performed with the three cluster groups and the three factors. The results of the discriminant analysis (Table 4.8 & Table 4.9) show that 98.1% of the groups were classified correctly.

Finally, it can be concluded that three motivational groups could be distinguished: one that consisted of less motivated, less active people in general, while some of them were unhappy with certain facilities; a group motivated by nature, but also by being way from the daily life; finally an active group that was very motivated by all factors.

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Table 4.4: Results cluster analysis

<i>Final cluster centers</i>				
	Cluster 1	Cluster 2	Cluster 3	Significance
F1: Activities	3.020	2.990	4.110	0.000
F2: Being Away	3.160	4.260	4.340	0.000
F3: Nature	4.420	4.870	4.880	0.000

Table 4.5: General characteristics of clusters

	<i>Gender (%)</i>		<i>Average age (years)</i>	<i>Finnish or foreign (%)</i>		<i>Education (%)</i>			<i>First visit</i>	<i>Total participation</i>	
	Male	Female	Years	Foreign	Finnish	None	Vocational	College or University		%	Number
Cluster 1	64	36	38	28	72	11	21	68	54	25	131
Cluster 2	46	54	41	19	81	6	20	74	52	35	182
Cluster 3	38	62	42	13	87	12	17	71	45	41	214
Total Sample	47	53	42	19	81	10	19	71	50		
<i>Chi-Square</i>	<i>0.000</i>		<i>0.004</i>	<i>0.003</i>		<i>0.010</i>			<i>0.23</i>		

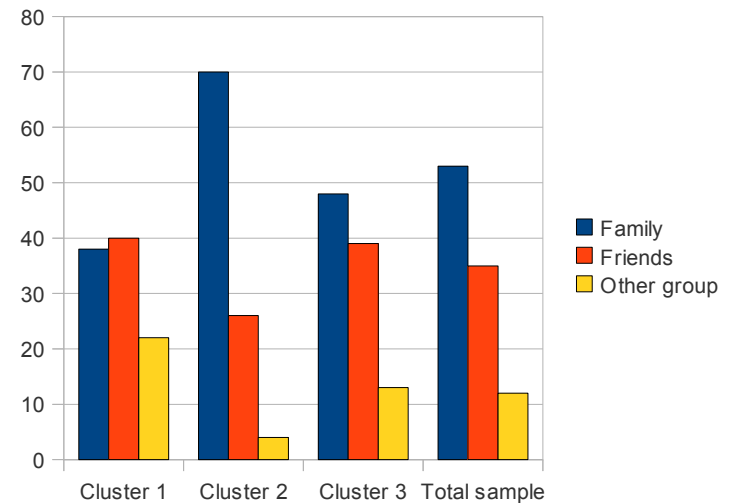
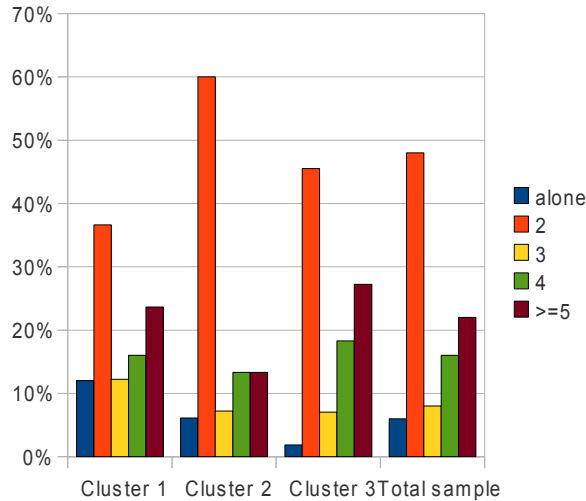


Figure 4.6: Group size for each cluster (Sig. $p < 0.05$) **Figure 4.7: Primary group type (Sig. $p < 0.05$)**

Table 4.6: Percentage of people active in hiking and observing nature

	Hiking (%)	Observe nature (%)
Cluster 1	50	56
Cluster 2	63	66
Cluster 3	62	70

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All people	59	66
<i>Sig</i>	<i>0.05</i>	<i>0.03</i>

Table 4.7: Assessment of standard of services for each cluster

	Car parking (%)	Road network (%)	Information boards (%)	Written information (%)	<i>Significance</i>
Cluster 1	7	15	8	8	<i>.02</i>
Cluster 2	1	7	4	3	<i>.01</i>
Cluster 3	1	6	3	1	<i>.00</i>
Total sample	2	9	5	4	<i>.02</i>

Table 4.8: Results discriminant analysis part I

Discriminant function	Eigenvalues	Canonical correlation	Wilks' lambda	<i>Significance</i>
1	2.028	0.818	0.187	<i>0.000</i>
2	0.768	0.658	0.566	<i>0.000</i>

Table 4.9: Results discriminant analysis part II

<i>Standardized canonical discriminant function coefficient</i>			<i>Classification results</i>		
	Function 1	Function 2	<i>Predicted group membership</i>		
Motivations			Cluster 1	Cluster 2	Cluster 3
F1: Activities	0.674	-0.741	130	0	1
F2: Being Away	0.616	0.635	7	175	0
F3: Nature	0.287	0.313	0	2	212

a. 98,1% of original grouped cases correctly classified.

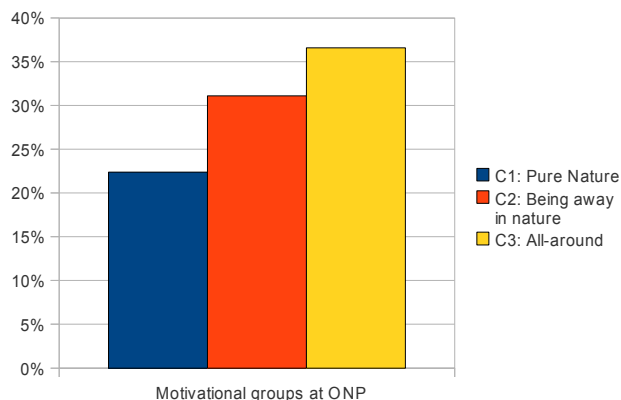


Figure 4.8: Distribution of clusters throughout the park

§4.3 Visitor perception of environmental problems

The results discussed in this section will answer the question whether tourists perceive any environmental problems or degradation (research question 3).

Question 15 from the dataset provided variables related to disturbances during a persons visit to the park. The disturbances consisted of the *erosion of the ground, littering, treatment of the natural environment, the amount of visitors and the behavior of other visitors*. Additionally, the questions 9i and 9t provided the satisfaction considering *waste disposal* and *wilderness-like areas*.

Table 4.10 presents the amount of people disturbed by or dissatisfied with a specific variable. From these results it can be concluded that the main disturbance factors are erosion of the ground and the amount of people as 10% of the respondents are disturbed by erosion and 9% of the people are disturbed by the amount of people.

Table 4.11 explains the relationship between the motivational groups (clusters, see §4.2). Cluster 3 compared to the other groups perceived little environmental problems. Cluster 1 on the other hand perceived problems in some of the factors. Cluster 2 is in between, however still perceives little problems. Cluster 1 was considerably disturbed by erosion and dissatisfied with the waste disposal of the park. There was a significant difference between these variables and the motivational clusters ($p < 0.05$). At first sight, the results indicate that cluster 1 was also considerably disturbed by the amount of people and moderately disturbed by the behavior of other visitors. However, the difference between these variables was not significant (see table 4.11) and will not be taken into account for further conclusions.

The results may suggest that the members of a very motivated group (cluster 3) are less capable of perceiving environmental impacts. As discussed in the previous section, cluster 1 is a group of less active and less motivated people of which some are unhappy with facilities at ONP. In addition to this, the current results have shown that they are also perceiving more environmental problems. Hence, it may be suggested that members of this group have become more critical due to their dissatisfaction. This will be further discussed in the conclusions.

Table 4.10: Summary visitor perception of environmental impacts

	Percentage (%)	Number of persons
Disturbed by erosion	10	54
Disturbed by too many people	9	53
Disturbed by littering	6	36
Disturbed by behavior of other visitors	6	34
Dissatisfied with waste disposal	6	26
Disturbed by the treatment of the environment	5	27

Table 4.11: Percentage of people of a cluster disturbed/dissatisfied

	Cluster 1	Cluster 2	Cluster 3	Chi-Square Sig.
Disturbed by erosion (%)	16	8	6	0.01
Disturbed by too many people (%)	15	9	7	0.05

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Dissatisfied with waste disposal (%)	13	5	3	0.04
Disturbed by littering (%)	6	8	4	0.38
Disturbed by behavior of other visitors (%)	10	5	3	0.06
Disturbed by the treatment of the environment (%)	6	6	2	0.08

§4.4 Spatial analysis of different variables

In the previous chapters different subjects have been discussed i.e. conflict between biodiversity and visitor pressure, motivational groups and the visitors' perception of environmental problems. In this chapter these different subjects have been discussed for different locations in the park. Hence, with the results from this chapter the last research question could be answered: *Which differences in biodiversity, visitor pressure, motivations and perception of environmental problems can be found comparing different locations in the park using the results from the previous questions?*

As discussed in the methodology the spatial analysis is done using two different approaches i.e. between different areas and between all different locations in the park. Figure 4.9 describes where the different locations are situated. The area West Oulanka actually consisted of the locations, “Oulanka Canyon”, “Taivalköngas” and “Ristikalli”; Central Oulanka consisted of the locations “Leirintäalue”, “Luontokeskus” and “Kiutaköngas”; South-East Oulanka consisted of the locations “Juuma”, “Harrisuvanto” and “Siilasmaja”.

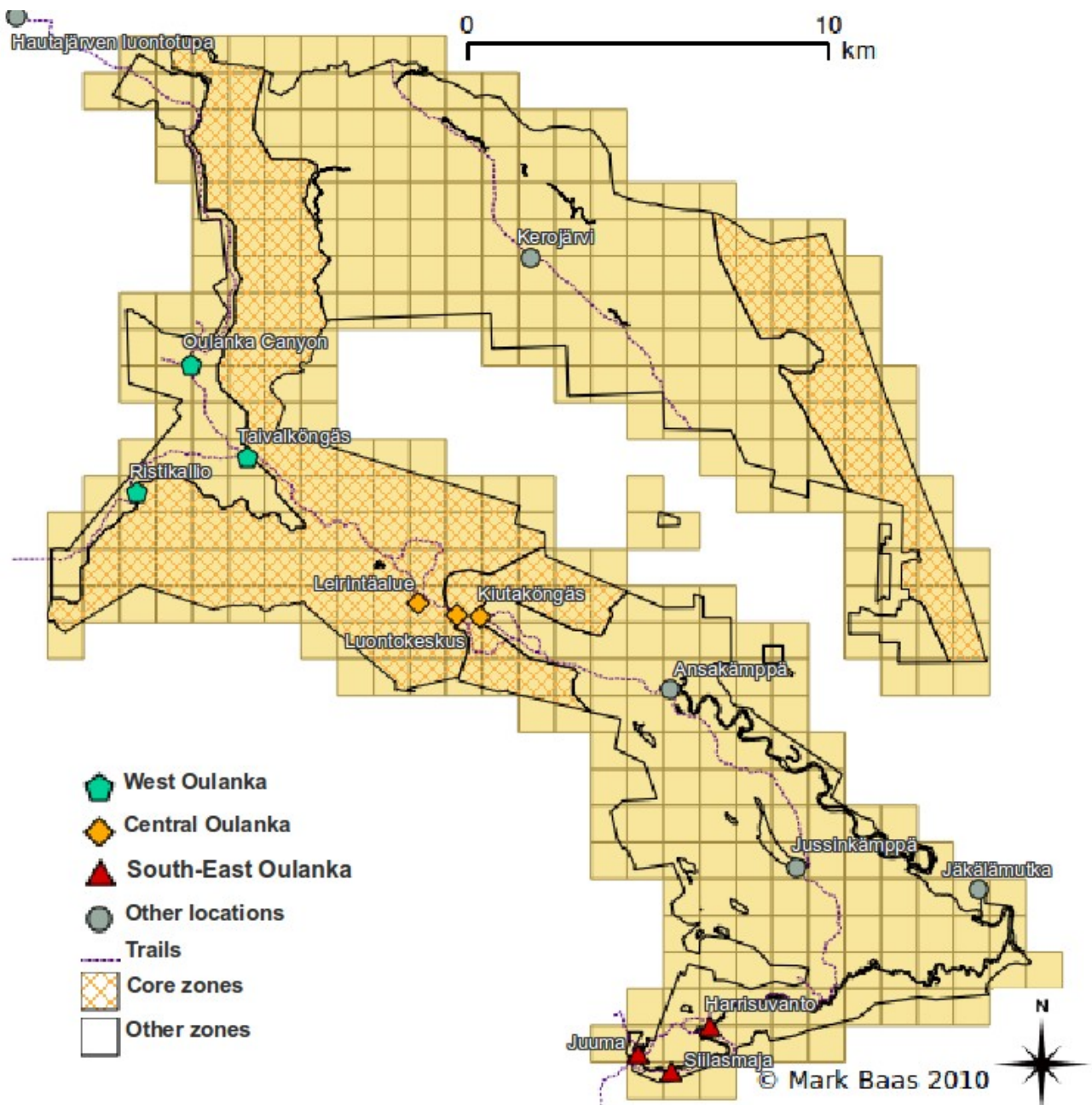


Figure 4.9: General overview of locations throughout the park

Comparison between different areas in the park

Three areas were created based on nearby location of the Juuma region (South/East), Nature Center region (Center) and a larger area based on three locations in the West of Oulanka (see Figure 4.9). Like mentioned in the methodology, the number of people per group has become smaller as only the people that have only visited this specific region have been added to the group. Table 4.12 shows the sample size for the different areas. As can be seen in the table, the sample size of West Oulanka is considerably smaller than the other areas.

Table 4.12: Sample size for different areas

	<i>Sample size</i>
West Oulanka	31
Central Oulanka	112
South-East Oulanka	114

Motivational groups

A comparison was done between the different areas and the different motivational groups that have been distinguished previously. Figure 4.10 shows the results from this comparison. As no significant changes could be found (Pearson Chi-Square: $p = 0.712$), it may be concluded that there is no specific difference in motivational group between different areas in the park.

Disturbances

A comparison was done between the different areas and the different perceptual factors of environmental problems. Figure 4.11 shows the results of this comparison. As no significant changes could be found, it may be concluded that there is no specific difference in perception of environmental impact between different areas in the park (see table 4.13).

As no significant differences were found, it was not possible to compare the different areas in the park. From this it may be concluded that either the data sample was too small, or that there are indeed no differences in motivations and perception of environmental problems between the visitors of Oulanka National Park. This will be further discussed in the conclusion.

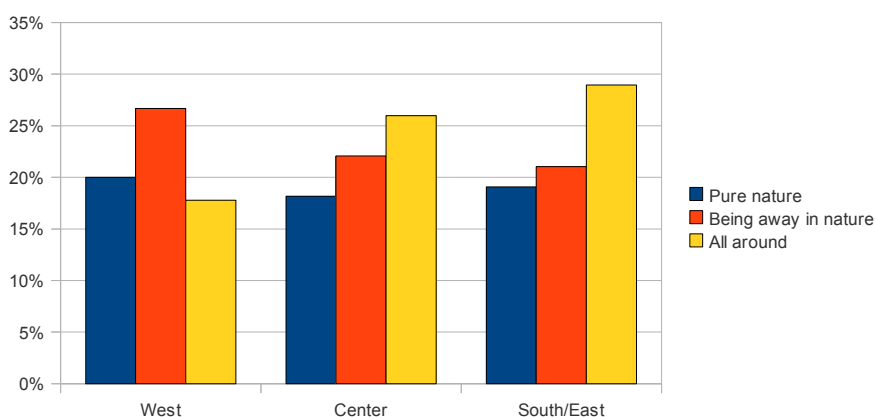


Figure 4.10: Different motivational groups at different areas in the park

4 Results

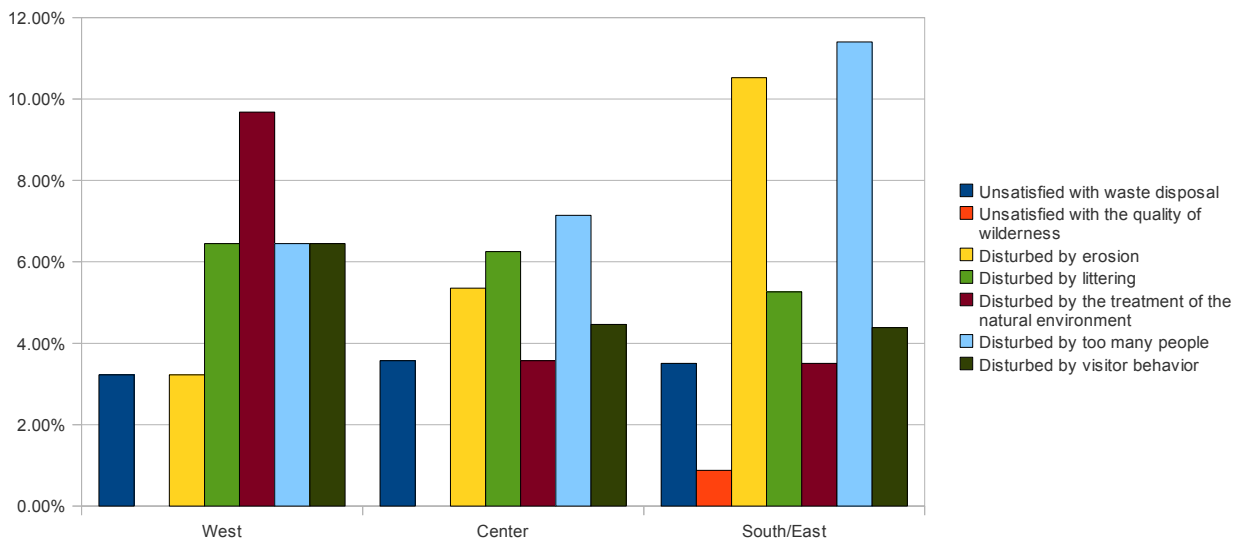


Figure 4.11: Different perceptual factors of environmental problems at different areas in the park

Table 4.13: Results from the Pearson Chi-Square test

	<i>Chi-Square</i>	<i>Asymp. Sig. (2-sided)</i>
Dissatisfied with waste disposal	0.400	0.819
Dissatisfied with the quality of wilderness	1.234	0.539
Disturbed by erosion	2.580	0.240
Disturbed by littering	0.134	0.935
Disturbed by the treatment of the natural environment	2.547	0.280
Disturbed by too many people	1.329	0.514
Disturbed by visitor behavior	0.255	0.880

Table 4.14: Statistics for biodiversity and visitor pressure at different areas in the park

	<i>Shannon index</i>	<i>Structure density</i>	<i>Visitor usage</i>	<i>Conflict zone</i>
West	1.89	9	5033	0
Center	2.38	29	34767	1
South-East	1.84	9	63274	1

Comparison between individual locations

A comparison was done between persons who visited a specific location and were disturbed/dissatisfied by a specific factor, and to which motivational group they belonged. Table 4.15 shows the number of visitors per location. Locations with less than 30 visitors were not used in further analysis'. Therefore, the locations *Hautajärven*, *Jäkälämutka*, *Nurmisaarenniemi*, *Ansakämpä*, *Jussinkämpä* and *Kerojärvi* were excluded from further analyses. The disturbance variable *wilderness* was not used for the comparison as only 6 persons over the whole park were not satisfied with the quality of wilderness.

The distributions of the motivational groups at different locations has the similar pattern as throughout the park i.e. the “all-around” group is the largest, then the “being away in nature” group and finally the “pure nature” group is the smallest (see figure 4.12). However, the motivation groups at Leirintäalue do seem to have a different distribution pattern. At this location, the “being away in nature” group has the largest distribution. The Chi-Square test however shows that there are no significance differences between Leirintäalue and other locations concerning motivational groups.

Table 4.17 and figure 4.13 show the results of the comparison of different perceptual factors of environmental problems. The last column of table 4.17 'any' explains the percentage of people that were disturbed by any of the variables. Significant differences were found. Firstly, at Juuma and especially Siilasmaja, visitors were in general significantly more disturbed by something than visitors at other locations. Secondly, at Kiutaköngas, visitors were in general less disturbed by something than at other locations.

At Siilasmaja disturbance to erosion and disturbance to the amount of people was significantly higher than at other locations. Siilasmaja is, as can be seen in figure 4.9, a place closely situated to Juuma and located in a highly visited area. Siilasmaja (definition: Siilas' nature hut) itself is a nature hut that can be found at this location. The location is a common campground for many people. Thus, it could be expected that people would be disturbed by factors like erosion and overcrowding. The fact that people are disturbed by both erosion and the amount of people could mean that erosion has been a result of human impact.

At Kiutaköngas, people were significantly less disturbed by the amount of people and visitor behavior than at other locations. Nevertheless, Kiutaköngas is situated in a highly visited area. At Juuma and Siilasmaja people were more disturbed by something in general, as this is a highly visited location, this could be expected. A hypothesis could be that Kiutaköngas is visited by another type of tourist than at the Juuma area. However, with the data available, this hypothesis would be false as the motivational groups at different locations did not show any significant differences. Further research is necessary to confirm the possible validity of this hypothesis.

Table 4.18 shows the statistics for biodiversity and visitor pressure related variables. As can be seen, almost all locations, except Taivalköngäs and Ristikallio, are located in considered conflict zones. Both the visitor pressure and the biodiversity levels are high at these locations. Especially at the Juuma area (Juuma and Siilasmaja) various significant disturbances have been found. Therefore, it is possible that the visitors at these locations are aware of the conflict between conservation and recreation.

Table 4.15: Number of visitors per location

<i>Location Visited</i>	<i>Number of visitors</i>
Oulanka Canyon	119
Taivalköngas	164
Ristikallio	109
Luontokeskus	397
Kiutaköngas	107
Leirintäalue	33
Juuma	311
Siilasmaja	108
Harrisuvan	78
Jäkälämutka	22
Ansakämpä	7
Jussinkämpä	13
Kerojärvi	3
Hautajärven	6

Table 4.16: Percentage of people belonging to a certain motivational group at different locations

	<i>C1: Pure Nature</i>	<i>C2: Being away in nature</i>	<i>C3: All-around</i>	<i>Significance</i>
Luontokeskus	23%	35%	42%	0.308
Kiutaköngas	22%	33%	46%	0.534
Siilasmaja	20%	31%	49%	0.153
Harrisuvan	29%	32%	40%	0.683
Leirintäalue	10%	52%	39%	0.053
Taivalköngas	27%	32%	41%	0.742
Oulanka Canyon	30%	31%	38%	0.327
Ristikallio	21%	34%	45%	0.587
Juuma	25%	32%	44%	0.244

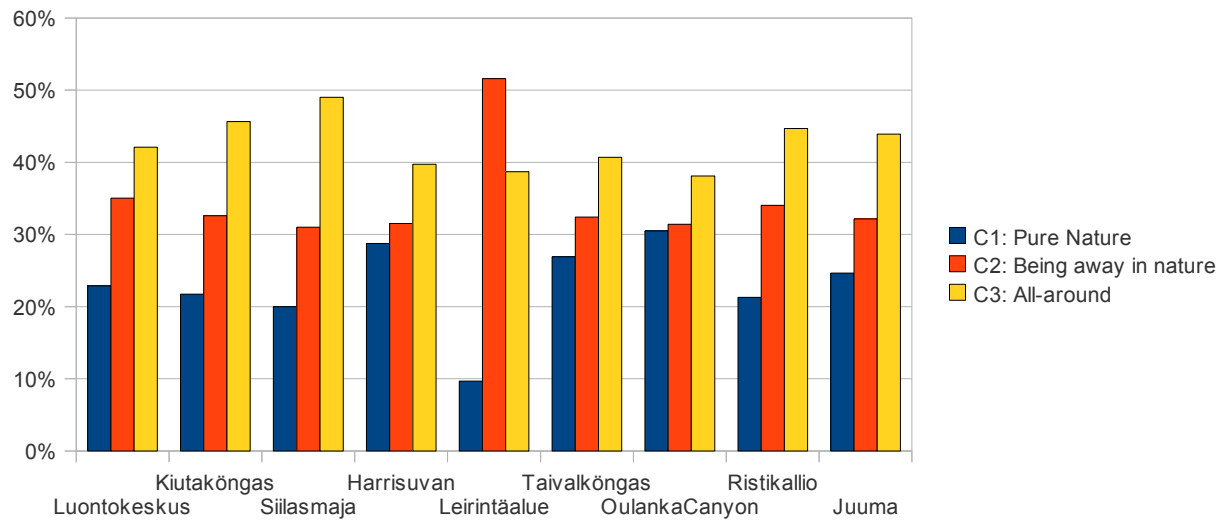


Figure 4.12: Percentage of people belonging to a certain motivational group at different locations

Table 4.17: Different factors of environmental problems at different locations in the park

	<i>erosion</i>		<i>littering</i>		<i>treatment of the natural environment</i>		<i>amount of people</i>		<i>visitor behavior</i>		<i>waste disposal</i>		<i>wilderness*</i>		<i>any</i>	
	%	Sig.	%	Sig.	%	Sig.	%	Sig.	%	Sig.	%	Sig.	%	Sig.	%	Sig.
Luontokeskus	9	0.9	6	0.6	5	0.94	9	0.59	6	0.98	7	0.44	1	0.42		0.70
Kiutaköngas	5	0.08	3	0.12	3	0.35	3	0.02	1	0.02	2	0.1	0	0.26		0.00
Siilasmaja	16	0.01	7	0.89	6	0.65	16	0.01	6	0.87	4	0.37	2	0.34		0.00
Harrisuvan	13	0.26	4	0.35	4	0.72	12	0.44	5	0.75	5	0.59	1	0.82		0.57
Leirintäalue	9	0.94	9	0.51	9	0.21	12	0.57	12	0.13	12	0.23	0	0.54		0.57
Taivalköngas	4	0.78	4	0.12	3	0.26	7	0.24	9	0.08	5	0.37	3	0.04		0.88
OulankaCanyon	9	0.73	7	0.79	7	0.22	6	0.19	10	0.07	4	0.43	3	0.07		0.14
Ristikallio	11	0.45	4	0.25	4	0.61	9	0.79	9	0.21	5	0.66	4	0.00		0.83
Juuma	10	0.38	6	0.68	5	0.52	11	0.29	7	0.31	7	0.36	1	0.52		0.05

* This variable has not been taken into analysis as the sample is too small, it is remains in the table as reference.

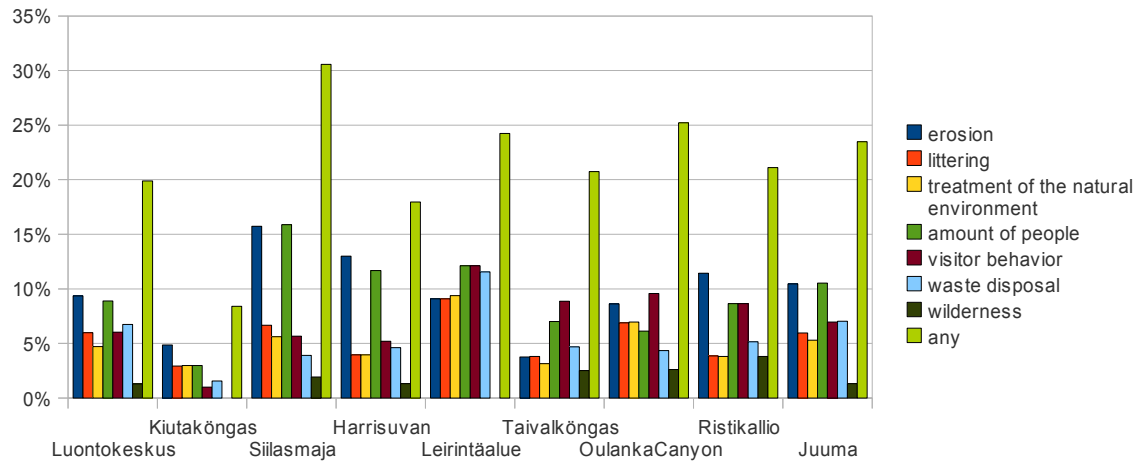


Figure 4.13: Different factors of environmental problems at different locations in the park

Table 4.18: Statistics for biodiversity and visitor pressure at different locations in the park

	<i>Shannon index</i>	<i>Structure density</i>	<i>Visitor usage</i>	<i>Conflict zone</i>
Luontokeskus	2.73	25	50248	1
Kiutaköngas	2.73	25	50248	1
Siilasmaja	2.09	15	55575	1
Harrisuvan	1.68	2	45884	1
Leirintäalue	1.69	37	3806	1
Taivalköngas	3.15	13	3392	0
OulankaCanyon	2.53	8	7290	1
Ristikallio	0	6	4416	0
Juuma	1.75	10	88364	1

5 Conclusion & discussion

This study intended to research whether there was a potential conflict between the conservation function and the recreation function of Oulanka National Park (ONP). The original idea was to explore if tourists have a different experience of the natural environment at biodiversity rich areas compared to other areas. As there were no sufficient available data for realizing this, the study focused on the identification of a potential conflict and the exploration of different motivations and perceptions of visitors.

At first, the potential conflict between the different functions in the park was explained by spatial analysis of the location of biodiversity, facilities and visitor usage. Subsequently, using these locations different conflict zones were identified. Secondly, the identification of different motivation groups has given more insights into the type of visitors that are visiting ONP. Thirdly, it was considered that the visitor perception of environmental problems would give an actual indication of existing conflicts between conservation and recreation. Finally, a spatial comparison was performed to discover differences in motivation and perception of environmental problems at different locations in the park.

In this section firstly the main conclusions will be explained and subsequently these results are further discussed.

§5.1 Conclusion

The main research question of this study was to investigate whether *there is a potential conflict between the conservation function and the recreation function of the park*. This question could be answered by elaborating on the following four subquestions:

1. *In which areas of the park are tourist activities concentrated and in which areas of the park are the biodiversity hotspots? Do they overlap?*
2. *Which groups of people based on their motivations for visiting Oulanka National Park can be distinguished?*
3. *Do tourists perceive any environmental problems or degradation?*
4. *Which differences in motivations and perception of environmental problems can be found comparing different locations in the park using the results from the previous questions?*

These questions were answered as following:

- 1) The results of the spatial analysis of biodiversity hotspots, facility density and visitor usage has shown that tourist activities and biodiversity hotspots indeed overlap. The areas around Luontokeskus (Nature Centre) and Juuma have appeared to be the most critical areas.
- 2) This study identified three different groups of visitors based on their motivation for visiting ONP. It became clear that for any of the groups, nature was the main motivation. One motivational group distinguished (1) was less motivated by other factors than nature than the other groups. This group was less satisfied with facilities of ONP and was less active. It also appeared that the group had a higher percentage of foreigners than in the other groups. The other two clusters of people distinguished were significantly motivated by other motives to visit the park. One group (2) was apart from nature also motivated by being away from the daily life. This group consisted of people with a higher education than the other groups. The other group (3) was apart from being motivated by nature and being

away, also motivated by recreational activities in the park.

- 3) Visitors to ONP have indicated that they were mostly disturbed by: erosion, the amount of people and waste disposal. From the motivational group (1), the group which was more motivated by nature than by other factors, was in general more disturbed by these factors than the other groups.
- 4) Two different comparisons were done to investigate the differences in motivations and perception of environmental problems at different locations. Firstly, by comparing different areas including visitors that have only been in this area and did not visit other areas, it was concluded that there were no significant differences in motivation and perception. Secondly, by comparing different locations including the complete data sample, various significant differences were found. Firstly, at Juuma and especially Siilasmaja (see figure 4.9 p.38), visitors were in general significantly more disturbed by something than visitors at other locations. The visitors at Siilasmaja appeared to be more disturbed by erosion and amount of people. Secondly, at Kiutaköngas (see figure 4.9 p.38), visitors were in general less disturbed by something than at other locations.

Hence, this research suggests that there is indeed a potential conflict between nature conservation and recreation in ONP. The spatial analysis of biodiversity, facility density and visitor usage had clearly shown the overlap between the different form of use. Additionally, in general a relatively higher amount of people were disturbed to the erosion throughout the park, the amount of visitors and waste disposal.

§5.2 Discussion

As now the main findings were presented, this sections will further discuss and explain these results.

Spatial analysis of conflict zones

The spatial analysis of the location of the biodiversity, facilities and visitor usage has been successful in analyzing whether there was an overlap between biodiversity, facility kernels and visitor usage. Hence, different conflict zones were identified showing at which locations there is a potential conflict between nature conservation and recreation. The biodiversity analysis was intended to be done in two different methods in order to draw stronger conclusions. The first method, using the location of red listed species as indicators for biodiversity, was a reliable method which created a logical pattern. However, the results of the second method, which used characteristic species of habitats defined in the Natura 2000, seemed to be rather incoherent with the results of the first method and according to Pirkko Siikamäki the pattern produced was not very logical. Nevertheless, the results of the first method were sufficient for identifying conflict zones.

Motivational groups

As nature was the primary motivation for the visitors to ONP, it can be concluded that all visitors can be classified as nature-based tourists. As previous literature has concluded a nature based tourist does not only go to have an encounter with nature, but also to achieve a further self-indulgent goal (Vroom, 1964). Therefore, it was expected that tourists have other motives than just nature. In general, the results from this research correspond with this although one group was mostly motivated by nature and much less by the other factors. However, one group was also motivated by being away and another group was motivated by all factors i.e. nature, being away and activities.

Push & pull factors are often used by researchers to describe travel motives (Kozak, 2002). As nature is the primary motivations for all groups, it is obviously the most important pull factor for nature-based tourists like the tourist going to ONP. However, as stated in literature, it has been considered that the push factors, rather than pull factors, are the most important factors determining the destination choice (Espinoza, 2002). Therefore, it is important to discuss the intrinsic motives that visitors may have. As the first motivational group was less motivated by other factors than nature and no other specific data concerning their intrinsic desires were found, it is not possible to clearly describe the push factors influencing their motives to go to ONP. However, for the second and the third group it was possible to draw some ideas concerning their intrinsic motives:

- The people belonging to group 2 possibly come from the city and come to the park with their family to *relax*.
- The people belonging to group 3 are possible out to *pursue special interests and skills*, but also want to *relax* in a natural environment.

Previous research on motivations have indicated that motivations differ between countries of origin. The study of Kozak (2002) did a “*comparative analysis of tourist motivations by nationality and destinations*” between tourists in Turkey and Mallorca and concluded that tourists from different nationalities did have a different motivations for some factors (i.e. culture, pleasure-seeking and physical). As there has been done little research on different motivations from different nationalities, Kozak (2002) could not explain the reasons for these differences. Accordingly, the results presented in this thesis also concluded that the motivations differed between different nationalities. The motivational group which was less motivated by “being away (to relax)” and “activities” had a significant higher percentage of foreigners than the other groups. The difference in motivations for different nationalities could be explained by the differences in the subjective norms the individual believes significant others have concerning their behavior (Fishbein & Ajzen, 2010). The difference in subjective norms is dependent on culture and norms at the origin, therefore it is expected that it differs between Finnish and non-Finnish.

The study of Kozak (2002) also concluded that motivations differ between repeat visits. Kozak (2002) concluded that tourists that have visited a location more often become less motivated by culture, because returning tourists would know what to expect. In this research, repeat visits did not seem to influence motivation as no significant differences were found in motivation between first time and repeat visits. Most visitors are Finnish and it can be considered that they know what to expect when visiting ONP. As all visitors are primarily motivated by nature, it can be suggested that visitors repeatedly come for nature.

The results of this study indicate that people who are less motivated to be in ONP than other people also seem to have a lower satisfaction. The least motivated group (group 1) was both less satisfied with facilities at ONP and more disturbed by factors like erosion and amount of people. This is considered a valid suggestion as Ross et al. (1991) in their study on “sightseeing tourists' motivation and satisfaction” concluded that “when the primary motivation is relatively high and met through tourist experiences, the resultant satisfaction spills over the various aspects of the experience.” The visitors' disturbances to certain factors were used to understand whether visitors were perceiving environment impacts. In this context, it is not clear whether the visitors of group 1 were experiencing environmental impacts or that they simple had a negative attitude in general.

Perception of environmental quality

In the literature used (see §2.3) it was discussed that visitors mostly notice direct impacts from other

visitors and they were less aware of their own impact. On the other hand, more recent literature suggested whether tourists perceive their own impacts differs between individuals. This study on ONP had no data available on environmental attitudes or environment awareness. Therefore, it was unable to measure the visitors' perception of their own impacts. However, it explained to what extent visitors perceive direct impacts. The most perceived impacts included erosion and the amount of people (overcrowding) which corresponds with the study by Taylor & Knight (2003) which explained that erosion and overcrowding are common disturbance factors for visitors. The fact that both erosion and the amount of people were most important disturbances, may indicate that there is a possible relationship between the effect of the amount of people on the environmental resulting into erosion of the ground.

Hence, it is important to realize that visitors' experience is interrelated with the visitors' satisfaction (Petrosillo et al., 2007). This would mean that a low environmental quality could cause visitors to have a negative experience and therefore not satisfied with their visit. On the contrary of what was stated earlier, this context indicates that people who are less satisfied may have a valid perception of environmental quality even though they have a negative attitude.

Spatial comparison of the motivational groups and perception of environmental problems

The spatial comparison intended to compare visitors at different locations. It was therefore expected to find differences in motivations and perception of environment problems. However, the results were not as expected as there were little significant differences found.

Two comparisons were performed: (1) one comparing different areas and (2) the other by comparing different locations. The first method included the visitors that have only visited one of the specific areas, while the second method included the whole data sample. The advantages of the first method was that the experience measured only concerned this specific area, however the disadvantage was that the data sample significantly became smaller. The second method included the whole data sample, however it was based on the average visitor experience of all places visited. Therefore, it has to be realized that the first method considered more reliable than the second method.

The analysis of the different variables at different areas (method 1) in the park did not show any significant difference. It can be concluded that either there indeed was no difference between different areas or that the data sample was too small. Therefore, one of the major findings of this report suggests that further research should consider comparing the different locations in ONP with a larger sample of data. Although the second method is not as strong as the other method, there were some results that would indicate interesting conclusions:

- a) First of all, the Juuma area (South-East; see figure 4.9 p.38) is clearly a heavily visited area. The comparison indicated that at this location people were in general more disturbed than at other locations. Additionally, people at Siilasmaja, a locations located in the Juuma area, were significantly disturbed by erosion of the ground and the number of people. This corresponds to the above mentioned conclusion that erosion and amount of people were common disturbances among all people visiting ONP. Hence, it can be concluded that in this aspect at the Juuma area, there is a strong indication of a conflict between the conservation function and recreation function of the park. It is suggested that further research should also investigate the actual environmental degradation especially in the Juuma area.
- b) Even though the Luontokeskus area (center; see figure 4.9 p.38) is considered a critical zone concerning biodiversity and visitor pressure related variables, people at the nearby location

Kiutaköngäs were significantly less disturbed by something and more specific less disturbed by the amount of people and by the behavior of other visitors. It is possible that this area is visited by a different type of tourists, however there were no significant difference found in motivational groups between this location and the others. It is considered a possible difference in settings or visitor management could be the cause of this difference. On the other hand, it could also depend on the expectations people have for a certain place (Oliver & DeSarbo, 1988). If people expect to meet lots of people in the Luontokeskus area, they would probably not be that disturbed by the amount of people. Or that in the Juuma area, people did not expect that many people.

Relating motivations with perceptions

Different motivational groups had a different perception of environmental impacts. However, it was not clear whether this was related to a rather negative attitude or that they were actually having a lower satisfaction due to a lower environmental quality. A study into environmental attitudes may provide more insights as it can determine whether there is a difference between attitudes for the different groups.

Additionally, it was not clear how at different locations with the same visitor usage, visitors were more disturbed to something at one location and less disturbed at the other location. It is possible that visitors at one location behave more responsible with the environment than at the other location. Therefore, it is suggested that researching environmental responsible behavior of the visitors would provide more insights. The method for realizing this will be explained under suggestions for further research.

Final remarks

Hence, this research suggests that there is indeed a potential conflict between nature conservation and recreation in ONP as this research has been able to identify potential conflict zones. Until now, there was only a strong indication that biodiversity hotspots were overlapping with recreation activities and facilities. However, this research has clearly identified which zones in the park are considered more critical in this overlap. Additionally, visitors have indicated, especially in the Juuma area, to be disturbed by environmental impacts like erosion, overcrowding and waste disposal. The motivational groups distinguished in this research have provided insights in different groups coming to ONP. Nevertheless, the relation between the perception of environmental quality and these motivational groups was not clear. Therefore, further research should put attention explaining this relation as will be explained later.

Suggestions for further research

One of the research objectives of this study was to provide a baseline for further research. This study has described potential conflict zones in the park. Additionally, it has provided insights into different motivations of visitors visiting the park. However, due to limitations of the dataset, this study has not been able to:

- investigate the actual impact on the natural environment
- estimate the visitors' environmental attitude nor their environmental responsible behavior

These topics are important for future research to assess the difference in experience at sites with a rather high biodiversity and sites with a low biodiversity. It is questionable whether tourists actually

want to visit the most ecologically sensitive parts of a nature park (Duim, 2002). For example, in Monteverde and Manuel Antonio in Costa Rica tourist experiences have not seemed to have been hampered by the fact that large parts of the park area were not accessible (Duim & Philipsen, 1996).

A subsequent study should consist of the following elements:

- Study of the impacts of recreation on the natural environmental

This research has identified a potential conflict between recreation and nature conservation. However, in order to confirm the existence of this conflict, the actual (ecological) impact should be measured. Hence, data which explains changes in environmental quality at different locations in the park should be obtained. For example, if biodiversity is known for different points in time, it would be possible to see how biodiversity changed at different spots. Subsequently, it should be investigated whether there is a correlation between the loss or gain of biodiversity and the change in visitor usage. Additionally, the categories of impacts on wildlife as discussed previously should be taken into account.

- Study concerning visitors' landscape preference

In general visitors are mostly interested in natural attractiveness rather than in related potential environmental impacts. Hence, in order to investigate if visitors prefer a specific landscape at ONP in relation to biodiversity, the study of landscape preference is important. If then, visitors claim to prefer a landscape with a low biodiversity rather than a landscape with a high biodiversity, biodiversity would not be of very importance to the visitors of ONP. Additionally, it is important to perform this study for the different visitor groups distinguished as the visitor preference for landscape may differ among visitors. This type of study can be performed using photos of visual distinguishable vegetations (Axelsson-Lindgren & Sorte, 1987) in which a visitor has to choose his/her preference.

- Measure difference in satisfaction at biodiversity rich and biodiversity low sites

The LAPBIAT project initially proposed to research the relation between biodiversity and visitor satisfaction. This study was not able to investigate the correlation between biodiversity and satisfaction as there were not enough respondents that only visited places with a low biodiversity. Thus, in order to compare satisfaction between places with a high biodiversity and places with a low biodiversity, firstly it is necessary to have a equal sample of respondents at both places. Secondly, both places must be equal in non-nature related features, like facilities which can influence the visitors' satisfaction.

Nevertheless, it would be very challenging to perform such a study at ONP. It is difficult to find individuals that have only been in places with a low biodiversity. Firstly, because in general most visitors go to more than one place at the park and secondly because most popular places are at the biodiversity rich places. Therefore, this study recommends to investigate the interest in biodiversity by studying landscape preferences like described above.

- Perform a study to obtain visitors' attitudes preferably using the NEP

Gaining insights of visitors' attitudes and behavior would enable us to explain visitors' attitudes and behavior towards the environment. This is of importance at ONP to study the environmental awareness of visitors in relation to environmental quality. Especially, environmental attitudes would allow to gain insights into the awareness of environmental quality among visitors. Subsequently, it would be possible to see if a lower environmental quality would impact the visitors' experience. As discussed previously, the visitor experience is interrelated with the environmental quality (Petrosillo

et al., 2007). This study suggests the use of the The New Environmental Paradigm (NEP) to gain insights in the public attitudes towards the environment (Dunlap & Van Liere, 1978). Within the NEP, different Likert scale items assess the three conceptual domains of the paradigm: beliefs about our ability to conflict with nature, limits to growth and the proper role of humans in nature. Appendix V (p. 68) shows the NEP scale items used in the research of Luo & Deng (2007).

- Gain insights in the environmental responsibility of visitors

In a national park like ONP which serves for both nature conservation and recreation, it is necessary to know what kind of impact different type of tourist have on the environment. In this matter, if there is a more polluting group, different opportunities can be created for this type of tourists in less environmental fragile zones. Therefore, it would be of importance to know more concerning the responsibility of the visitors' behavior. In the literature (§2.4), it has been suggested that by relating the NEP with TPB (Theory of planned behavior) it may be possible to provide insights in the destination choice of nature-based tourists. This research therefore suggest to use this approach to understand how environmental attitudes relate to nature-based motivations, the intention to act and finally responsible behavior (Espinoza, 2002; Luo & Deng, 2007). Additionally, this study has not been able to explain how at different locations with the same visitor usage, visitors were more disturbed to something at one location and less disturbed at the other location. A study on the visitors' environmental behavior may provide further insights as the difference in environmental behavior may be of influence.

- Development of different visitor opportunities

As mentioned, the creation of different opportunities is of importance to manage tourists. Some tourists have greater 'need' for specific features than others. Therefore in order to avoid overcrowding environmentally fragile zones, visitors can be lead to other locations by creating specific opportunities at these locations. It is also important to realize that biodiversity has a different meaning for different tourists. Therefore the preference of different tourists should be respected as much as possible and the opportunities for having different experiences should be provided (Elands & Lengkeek, 2000 in Duim & Caalder, 2002). The Recreation Opportunity Spectrum (ROS) by Clark & Stankey (1979) is a common framework which assists in the creation of visitor opportunities. This framework suggests that recreationists will be able to choose the experience they desire by describing the factors that influence or define the range of possible settings and by communicating this information to them. Additionally the ROS stresses to take into account environmental, social and managerial aspect (Clark & Stankey, 1979). The development of visitor opportunities would have been the final step that should be regarded in further research.

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7 Appendix

Appendix I Oulanka National Park Visitor Survey 2005



Oulanka National Park

Visitor Survey 2005

How to fill in this questionnaire:

The information collected by this Visitor Survey will be used for developing this national park. We hope that you note the following instructions:

1. Read the questions with care.
2. Answer to the questions personally by ticking the appropriate circle (○). Where it is possible to choose more than one alternative, place your ticks in the response squares (□). In some of the questions, you can write your

answer in the space reserved for it.

3. The questions refer only to this visit at Oulanka National Park, (see the map).

4. Please return the filled-in form to the person you got it from or to the place mentioned in the instructions.

5. For more information, please contact Leena Jartti at the following number: 050 524 8173 (leena.jartti@metsa.fi)

THANK YOU!

The person collecting the form will fill in this field:

Number	Place	Interview	Self	Initials

Oulanka National Park

Visitor Survey 2005

Date _____ **and time of day** _____ .
Weekday: Monday ○₁, Tuesday ○₂, Wednesday ○₃, Thursday ○₄,
 Friday ○₅, Saturday ○₆, Sunday ○₇

1. When did you arrive at the National Park?

Date _____ and time of day _____

please specify?

2. How long did you stay or do you intend to stay at the National Park?

(Use number of days or hours)

Approx. _____ days or _____ hours

3. Which part of the National Park did you visit or do you intend to visit?

(Select more than one alternative if applicable)

- 1 ☐ Area around Kiutaköngäs (Nature centre)
- 2 ☐ Little Bear 's Ring (Juuma)
- 3 ☐ Bear 's Ring -hiking trail
- 4 ☐ Taivalköngäs
- 5 ☐ Oulanka canyon
- 6 ☐ Ristikallio
- 7 ☐ Elsewhere, please specify?

4. By what means of transport did you get to the National Park?

- 1 ☐ Car
- 2 ☐ Car + trailer, motorhome
- 3 ☐ Public bus
- 4 ☐ Charter coach (tour group)
- 5 ☐ Train + further connection
- 6 ☐ Airplane + further connection
- 7 ☐ Other (e.g. bicycle, motorcycle),

5. What is your group like?

A I'm alone ☐ → Move on to Question 7.

B The size of the _____ person group (incl. yourself) S

C The age of the _____ years eldest?

D The age of the _____ years youngest?

E Persons under 16 _____ person years? S

F Disabled? _____ person S

6. The type of your group?

- 1 ☐ Family
- 2 ☐ Friends, relations
- 3 ☐ Co-workers
- 4 ☐ Company guests
- 5 ☐ School class or student group
- 6 ☐ Club, association, etc.; please specify?

7. What is important to you here today?

(Please respond to each alternative)

(5 = Very important, 4 = Fairly important, 3 =

Can't say,

2 = Of little importance, 1 = Not important at all)

5 4 3 2 1

A Nature Important ○ ○ ○ ○ Non-experiences important

B	Scenery	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	the family	important
C	Being on my own	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	J Pleasant old memories	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Non-important
D	Mental well-being	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	K Getting to know the area	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Non-important
E	Get away from noise and pollution	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	L To learn about nature	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Non-important
F	Relaxation	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	M Developing my skills	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Non-important
G	Meeting new people	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	N Keeping fit	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Non-important
H	Being together with friends	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	o Experiencing excitement	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> Non-important
I	Being together with	Important <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>		

8. What did you mainly do or are going to do at the Oulanka National Park this time?

(Select more than one alternative if applicable)

- | | |
|---|---|
| 1 <input type="checkbox"/> Walking | 16 <input type="checkbox"/> River rafting |
| 2 <input type="checkbox"/> Nordic walking | 17 <input type="checkbox"/> Stop by the cafeteria |
| | <input type="checkbox"/> |
| 3 <input type="checkbox"/> Jogging | 18 <input type="checkbox"/> Rowing |
| 4 <input type="checkbox"/> Hiking | 19 <input type="checkbox"/> Swimming |
| 5 <input type="checkbox"/> Observing nature | 20 <input type="checkbox"/> Nature photography |
| 6 <input type="checkbox"/> Picnicking | 21 <input type="checkbox"/> Camping |
| 7 <input type="checkbox"/> Cycling | 22 <input type="checkbox"/> Courses in the Research Station |
| 8 <input type="checkbox"/> Fishing | 23 <input type="checkbox"/> Walking the dog |
| 9 <input type="checkbox"/> Bird watching | 24 <input type="checkbox"/> Cross-country horseback riding |
| 10 <input type="checkbox"/> Picking wild berries | 25 <input type="checkbox"/> Conduct/Take part in outdoor classroom activities |
| 11 <input type="checkbox"/> Picking mushrooms | 26 <input type="checkbox"/> Hunting |
| 12 <input type="checkbox"/> Studying plants | 27 <input type="checkbox"/> Scout camp or other organized camping |
| 13 <input type="checkbox"/> Education-related visit | 28 <input type="checkbox"/> Walking on nature trails |
| 14 <input type="checkbox"/> Visiting Nature Centre | 29 <input type="checkbox"/> Other, please specify? |
| 15 <input type="checkbox"/> Canoeing | |

Which of the alternatives that you selected was the most important to you this time?

Indicate the number of the most important alternative here → []

9. Asses the standard of the services that you used and the quality of the environment right now?

Please answer to each part and asses the standard of the service that you used. Otherwise, leave the particular space empty and place a tick alongside the alternative "Did not use this service".

(5 = Very good, 4 = Fairly good, 3 = Neither, 2 = Fairly poor, 1 = Very poor)

		Standard of the service used or quality of the environment					Did not use this service
		5	4	3	2	1	
A	Car parking areas close to the park	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
B	Road network close to the park	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
C	Information boards	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
D	Hiking trail or ski-trail network	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
E	Signposting of paths or ski-trails	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
F	Campfire places and lean-tos	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
G	Firewood	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
H	Outdoor toilets in the park	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
I	Waste disposal	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
J	Huts (owned by Forest Service)	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
K	Tent sites (other than camping site)	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
L	Park's official Camping Site	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
M	Nature Centre services	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
N	Hautajärvi Nature Cabin	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
O	Written information material	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor <input type="radio"/>
P	Security	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor
Q	General tidiness	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor
R	Pleasantness of recreational environment	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor
S	Variability of landscapes	Good	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor

T	Untouched or wilderness- like areas	Good	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Poor
---	--	------	----------------------------------	-----------------------	-----------------------	-----------------------	-----------------------	------

10. How well did this visit to the Oulanka National Park meet your expectations as regards the following?

(5 = Very well, 4 = Fairly well, 3 = Neither, 2 = Fairly poorly, 1 = Very poorly)

		5	4	3	2	1
Natural environment	Well	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Poorly					
Opportunities for outdoor activities	Well	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Poorly					
Services	Well	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Poorly					

11. How much money did you use during your visit for various purposes? Please estimate your

personal expenses and your own share of your group's total expenses. (In case you are on a charter tour or unable to separate your personal expenses, simply respond to item A).

A This is a charter tour ☐

and its overall price is _____ € (→ Move on

to Question 12)

B Meals (cafes, restaurants, grocery purchases and food packed for trip):

Here or in Along the route or at
nearby area home

_____ € _____ €

C Accommodation

Here or in Along the route or at
nearby area home

_____ € _____ €

D Travel costs to hiking area (from home)

_____ €

E Programme services (e.g. guided excursions, etc.)

_____ €

F Other expenses (e.g. permits, equipment hire, etc.)

Here or in Along the route or at
nearby area home

_____ € _____ €

12. How often have you visited the Oulanka National Park before this visit?

(You may select more than one alternative)

A This is my first visit ☐ → Move on to

Question 13

B During the past 5 years _____ times

C When was your first visit?

In _____ (year)

D When were you here last?

In _____ (year)

13. On this trip, is the Oulanka National Park ... (Please select one alternative)

- 1 your trip's only or most
☐ important destination?
- 2 one among other intended
☐ destinations?
- 3 a non-planned destination along
☐ your route?

14. What was your most important source of information concerning the Oulanka National Park? (You may select more than one alternative)

- 1 Acquaintances, friends or relations
☐
- 2 Internet web sites
☐
- 3 Brochures or guide booklets
☐
- 4 TV / radio programmes or articles in
☐ magazines and newspapers
- 5 Can't say
☐
- 6 Other sources, please specify?
☐ _____

15. Did you find any of the following disturbing you during your visit to the Oulanka National Park?

(Please respond to each alternative)

		(5 = Very little, 4 = Fairly little, 3 = Neither, 2 = Fairly much, 1 = Very much)					
		5	4	3	2	1	
A	Erosion of the ground	Little	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Much
B	Littering	Little	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Much
C	Treatment of natural environment	Little	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Much
D	Too many visitors	Little	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Much
E	Behaviour of other visitors	Little	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Much
F	Other, please specify?	Little	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Much

16. Nationality?

17. Year of birth?

[_ _]

18. Gender?

1 ☐ Male

2 ☐ Female

19. Education? (indicate your highest level of education)

1 ☐ Vocational training

2 ☐ College-level qualification

3 ☐ University degree

4 ☐ No vocational/professional qualification

THANK YOU FOR ANSWERING THIS QUESTIONNAIRE!

If you wish to tell us something else, please use the space below.

Appendix II Map Oulanka National Park and surroundings

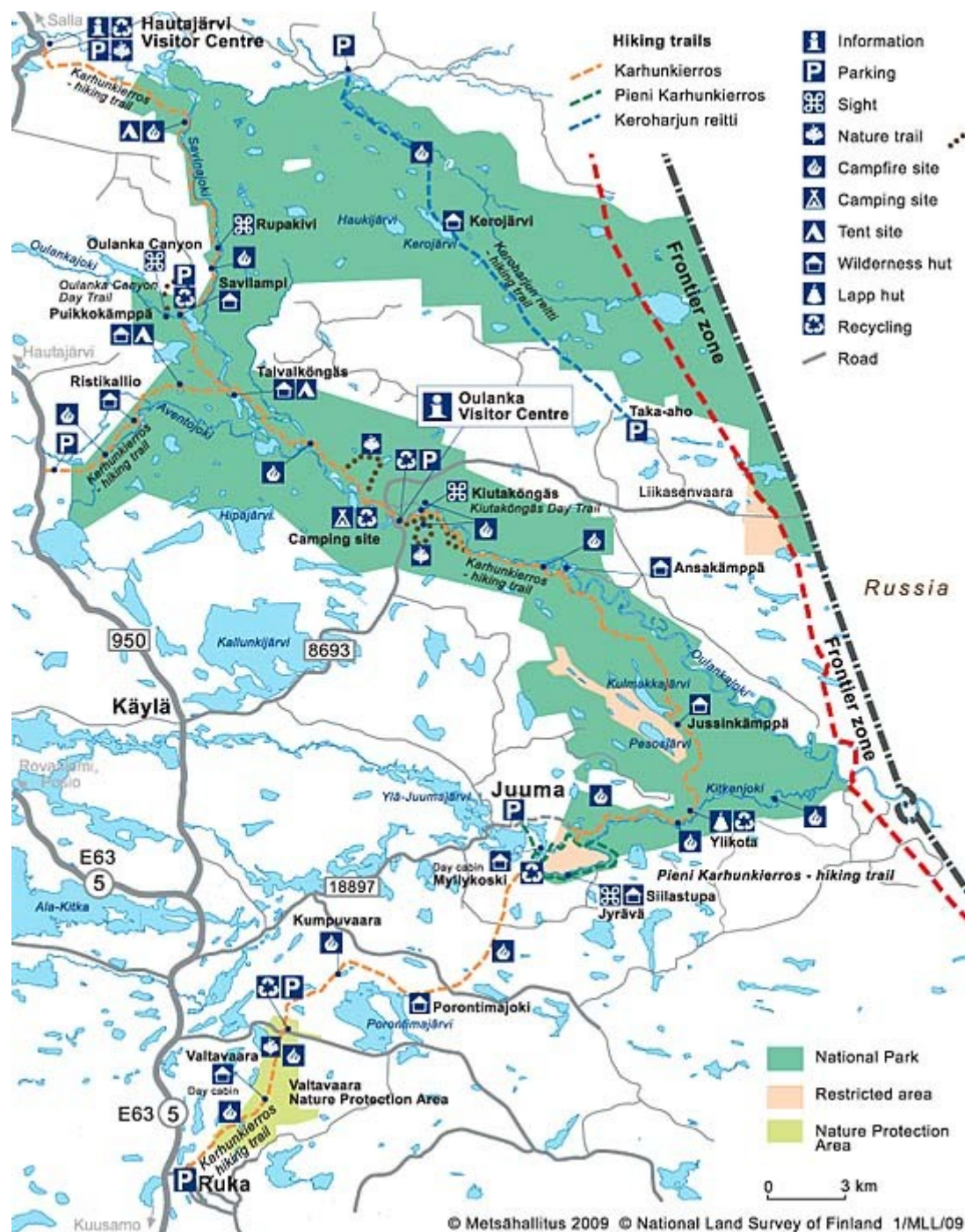
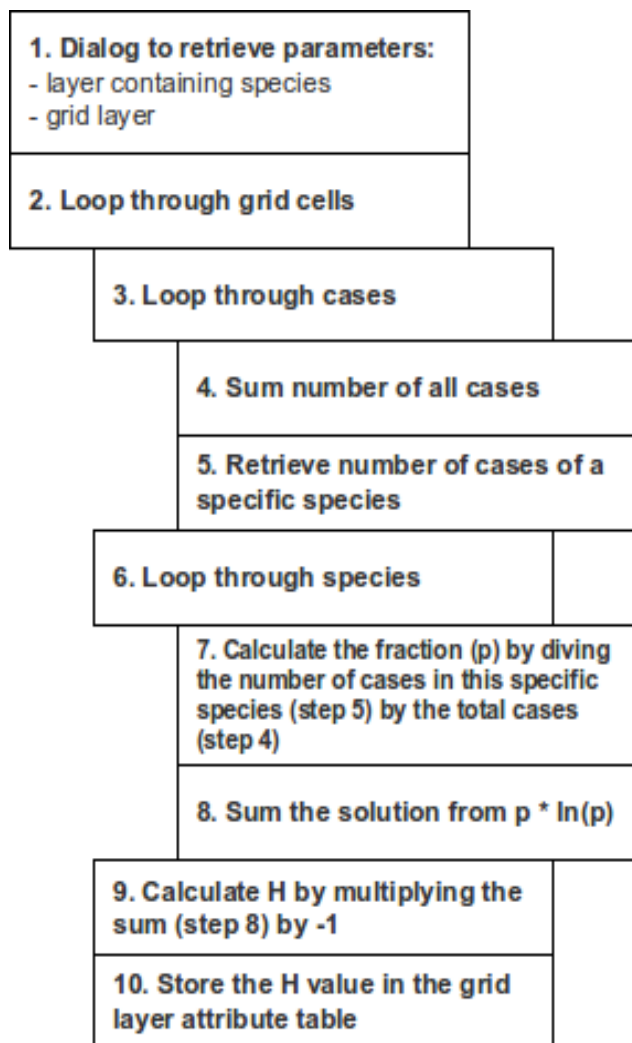


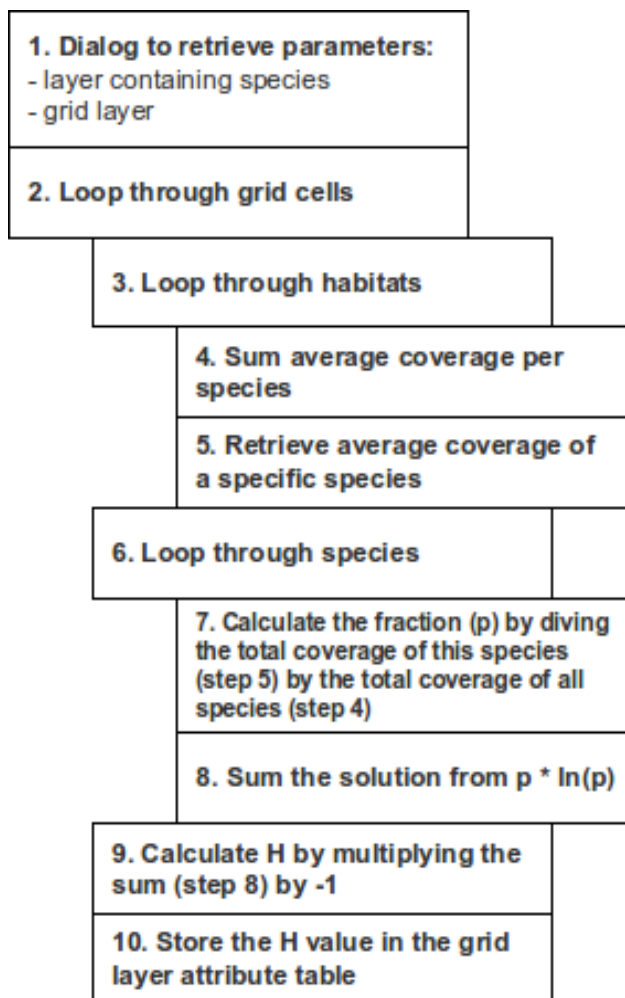
Figure 7.1: Map Oulanka National Parks and surroundings (Outdoors.fi, 2009b)

Appendix III Design QGIS plug-ins

Steps taken in plug-in for method 1: indicator species



Steps taken in plug-in for method 2: habitats



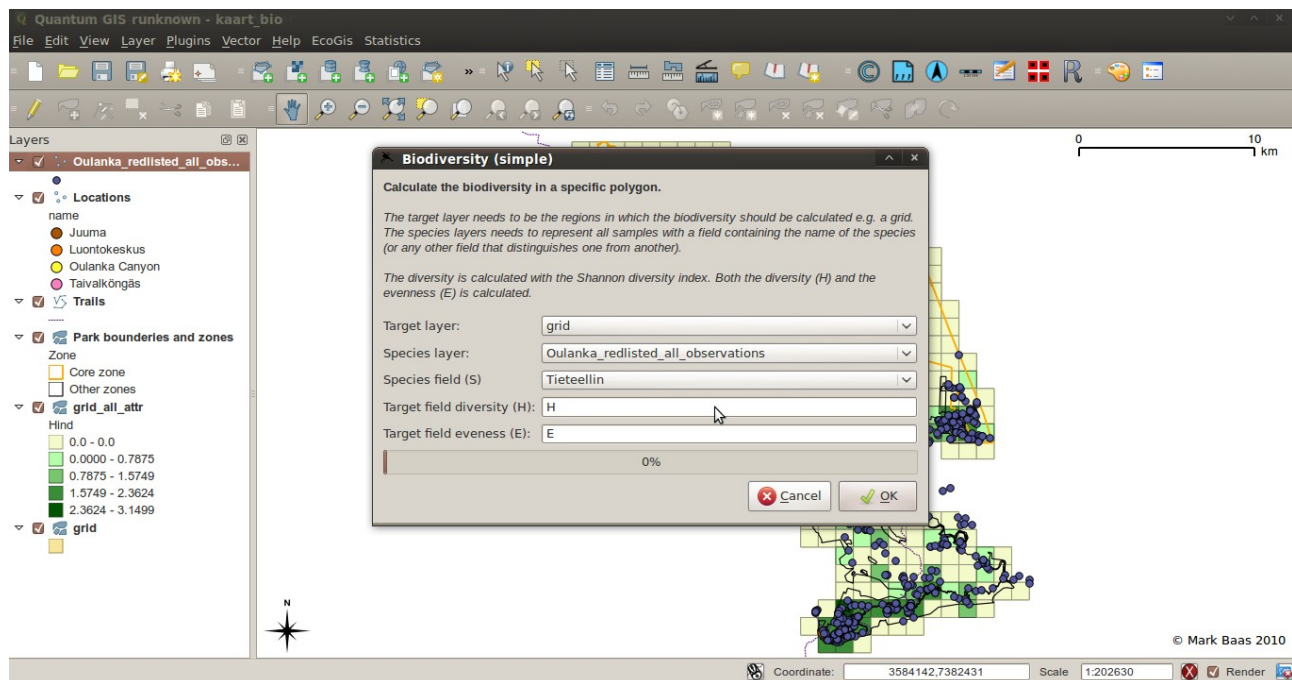
Appendix IV User-interface biodiversity plug-in QGIS**Figure 7.2: User-interface biodiversity plug-in QGIS**

TABLE 1. ITEMS INCLUDED IN THE NEW ENVIRONMENTAL PARADIGM (NEP) SUBSCALES

Appendix V Items included in the NEP

The following factors and items present the NEP scales used in Luo & Deng (2007).

Factor and Items

Factor 1: Humans over nature

- 2. Humans have the right to modify the natural environment to suit their needs
- 4. Human ingenuity will insure that we do NOT make the earth unlivable
- 6. The earth has plenty of natural resources if we just learn how to develop them
- 8. The balance of nature is strong enough cope with the impacts of modern industrial nations
- 10. The so-called “ecological crisis” facing humankind has been greatly exaggerated
- 12. Humans were meant to rule over the rest of nature
- 14. Humans will eventually learn enough about how nature works to be able to control it

Factor 2: Limits to growth

- 1. We are approaching the limit of the number of people the earth can support
- 3. When humans interfere with nature it often produces disastrous consequences
- 9. Despite our special abilities humans are still subject to the laws of nature
- 11. The earth is like a spaceship with very limited room and Resources
- 13. The balance of nature is very delicate and easily upset

Factor 3: Ecocrisis

- 5. Humans are severely abusing the environment
- 7. Plants and animals have as much right as humans to exist
- 15. If things continue on their present course, we will soon experience a major ecological catastrophe

Appendix VI *Extended set of categories leading to a negative response of wildlife*

These categories were suggested by Reynolds (2001).

- *Harvest/death*: caused by activities like hunting and fishing resulting in the immediate death of an animal.
- *Clearing of habitat*: activities like clearing vegetation when constructing facilities.
- *Changed plant composition*: the introduction of exotic plant species (by tourists) can cause into changes in the habitat.
- *Reduced plant production*: trampling for example can impact the plant production and into changes in the habitat.
- *Changed plant composition*: thinning of threes, mowing or other management action can result in a change in the attractiveness of wildlife.
- *Pollution*: the introduction of chemicals or other harmful components can be caused by tourism facilities constructed in the natural area or nearby.
- *Reduced animal production and reproduction*: stress and noise caused by recreants can result in a lower reproduction of the animal species.
- *Habituation*: due to the frequency of human presence animals can become unnaturally tame to humans.
- *Animal dietary distortion*: tourists feeding animals unnatural food sicken the animal.
- *Aberrant social behavior*: the frequency of animal and human encounters can result into negative effects e.g. bears approaching human in order to find artificial food.
- *Increased predation*: Disturbance of breeding animals can increase the risk of discovery of young by predators.
- *Modification of activity patterns*: The activity patterns of animals are generally a compromise between the need for feeding and avoiding predation. It is well known the hunting pressure can cause animals to become more nocturnal, so presumably excessive human contacts can do the same thing.