



# **Visitors' Satisfaction of Recreational Trail Conditions in Thingvellir National Park, Iceland**

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30 ECTS thesis submitted in partial fulfillment of a  
*Magister Scientiarum* degree in Environment and Natural Resources

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**Visitors' Satisfaction of Recreational Trail Conditions in Thingvellir National Park, Iceland:**

A case study about visitors' satisfaction and their perceptions of environmental degradation caused by horse-riders and hikers in Thingvellir National Park, Iceland

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# Abstract

Nature-based tourism plays an important role for Iceland as a tourist destination. Its unique landscapes and pristine nature attracts visitors from all over the world. Hiking and horse riding are among the most popular tourism activities in Iceland. Such recreational activities in fragile natural areas like Iceland can however cause negative impacts on the environment. This thesis presents a case study carried out in Thingvellir National Park in southwestern Iceland. The overall aim was to determine visitors' satisfaction level concerning condition of recreational trails within the national park as well as their level of environmental awareness. A questionnaire survey among hikers and riders within the national park was carried out in the summer of 2013. Additionally interviews with managers in the national park as well as riding tour operators were conducted to assess options towards sustainable trail management. Results show that the overall satisfaction level amongst riders and hikers within Thingvellir National Park is very high. The park's recreational trail network is shared by many different visitors with diverse intentions and needs, no signs of conflicts of interest or other problems between the user groups were noted. As a main dissatisfaction the visitors' survey identifies insufficient labeling and signposting along the trails. In terms of visual disturbances trail erosion, trampling effects of horses and secondary trails are the three most disturbing issues. Other issues such as leaving the trail or scarcity of sanitary facilities within the trail network are also noted. Knowledge about the environmental code of conduct furthermore seems to be limited. A general demand for more educational material on environmental topics, as well as signs with reminders of environmental code of conduct is emphasized by most interviewees. Potential improvements on the trail system include construction and widening of the trails. Such actions do however ask for careful weighing of needs, because on the one hand is the wish for smoother trails strong, but at the same time do visitors praise the naturalness of the trails, which they want by all means kept alive.

# Útdráttur

Náttúrutengd ferðamennska gegnir mikilvægu hlutverki fyrir Ísland sem áfangastaður ferðamanna. Einstakt landslag og óspillt náttúra eru þeir þættir sem laða að hvað flesta ferðamenn til landsins. Göngu- og hestaferðir eru á meðal vinsælustu afþreyinga meðal þeirra ferðamanna er sækja Ísland heim. Á viðkvæmum svæðum eins og Íslandi getur slík afþreying hins vegar valdið neikvæðum umhverfisáhrifum verði álagið of mikið. Í þessu verkefni er sjónum beint að skynjun ferðamanna á ástandi göngu- og reiðstíga í Þjóðgarðinum á Þingvöllum. Meginmarkmið rannsóknarinnar er að meta annars vegar ánægju göngumanna og hestamanna með göngu- og reiðstíga innan Þjóðgarðsins og hins vegar að meta umhverfisvitund þeirra. Gerð var spurningakönnun meðal göngu- og hestamanna í Þjóðgarðinum sumarið 2013. Auk þess voru tekin viðtöl við starfsmenn Þjóðgarðsins og ferðaþjónustuaðila sem bjóða upp á hestaferðir um Þjóðgarðinn til að meta möguleika umhverfisstjórnunar til að efla sjálfbærni í stjórnun stígakerfisins. Niðurstöður rannsóknarinnar sýna að ferðamenn eru flestir almennt ánægðir með ástand göngu- og reiðstíga í Þingvallarþjóðgarði. Notendur stígakerfisins eru fjölbreyttur hópur, en engin merki eru um hagsmunaárekstra á milli þeirra. Svarendur eru óánægðastir með vöntun á vegvísu og upplýsingaskiltum við stígana. Þeir þættir sem skerða hins vegar hvað mest upplifun göngu- og hestamanna á svæðinu eru rof út frá stígum og margir samhliða stígar. Enn fremur eru merki um að ferðamenn halda sig ekki inni á stígunum sem skerðir upplifun sumra ásamt skorti á hreinlætisaðstöðu. Niðurstöður viðtalanna undirstrika þörf á auknu fræðsluefni og skiltum um umhverfismál. Mögulegar umbætur á stígakerfinu fela meðal annars í sér að bæta og breikka stígana. Slíkar framkvæmdir krefjast hins vegar nákvæmrar greiningar á þörfum þar sem óskín um gott aðgengi með góðum og breiðum stígum stangast á við óskir um að ferðast um óraskaða og villta náttúru.

### *Dedication*

*I dedicate my Master thesis to all my Icelandic riding friends. First and foremost, I want to express a special feeling of gratitude to Lárus Kristinn Viggósson and Ása Ólafsdóttir, without whom I would never have gotten to know the wonderful Icelandic spirit of horsemanship. I will always appreciate what they have done for me and will never forget our rides, conversations and a friendship that felt like family.*





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# Abbreviations

EAI	Environmental Agency Iceland
HBT	Horse-based tourism
ITB	Icelandic Tourist Board
NBT	Nature-based tourism
TNP	Thingvellir National Park
UNESCO	United Nations Educational, Scientific and Cultural Organization



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# 1 Introduction

## 1.1 Tourism Development in Iceland

Nature is a popular interest amongst travelers globally and for Iceland it has long been the primary reason for being chosen as a travel destination (e.g. Icelandic Tourist Board, 2013; Sæþórsdóttir, 2010). Nature based tourism (NBT) is generally defined as travel to natural areas, where the main motivation is the enjoyment of the scenery and appreciation of nature (e.g. Sæþórsdóttir, 2010), however an exact definition of the concept is still being debated (e.g. Fredman and Tyrväinen, 2010; Mehmetoglu, 2007). With increased tourism to Iceland, demands for greater variety within the different sub-fields of nature-based tourism has been increasing. In order to ensure economic prosperity through tourism and preserve the country's nature and environment, increased management and structuring of its national parks and other important sites is essential.

The number of foreign tourists visiting Iceland has more than doubled since the last millennia and reached 739.000 in 2013, the highest number yet registered (Icelandic Tourist Board, 2013). Assuming the same rate of increase, foreign visitors to Iceland are set to reach one million per year within the next few years. This increase is a boost for the Icelandic economy, and according to Johannesson et al. (2010) tourism has now become a central pillar of the country's economy and been adopted as an economic development option in public discourse. Concerns about the constantly growing number of visitors are thus more centered on the natural environment itself, such as the pressure on natural resources, rather than on economic terms. Several studies (i.e. EAI, 2013; Ólafsdóttir and Runnström, 2013, Sæþórsdóttir, 2012; Sæþórsdóttir, 2013) have shown that some of Iceland's most popular tourist destinations are already experiencing ecological degradation due to the current visiting intensity. Of all the visitors who came to Iceland during the summer months of 2013, a total of 79.7 percent named nature as their major travel reason (Icelandic Tourist Board, 2014), which underlines the importance of sustainable management of the country's nature as a resource. According to the Icelandic Tourist Board (2013), horse riding activities accounted for 17.3 per cent of all activities purchased by tourists in summer 2012. There are no numbers for the years prior to 2011, as the statistics did not yet specify horse-based tourism (HBT) as an individual activity sector. This fact indicates the growing importance of HBT in Iceland, which is also increasingly discussed in literature. Helgadóttir (2006) highlights the rising awareness of the importance of riding in Iceland as a cultural, as well as nature-based experience. Statistics for the "most memorable aspect of visit" conducted by the Icelandic Tourist Board (2013) indicate that riding scores were 8.2%, a difference of only 0.1 per cent in comparison to hot springs/geothermal, which scored 8.3%, making riding very important amongst Icelandic tourist activities.

Trampling effects caused by recreational riding are unfortunately a contentious issue that can cause different user groups dissatisfaction (Newsome et al. 2004). The topic of environmental degradation due to horse riding is of growing importance to the Icelandic environmental management (EAI, 2013). It is therefore crucial to assess recreational trails as they are both a necessary infrastructure for horse based tourism, as well as a visual landscape feature occurring in a variety of ecosystems throughout the country. If not well maintained, the degradation of the environment adjacent to the trails is likely to bring along unwanted side effects such as disturbances to ecosystems and visually noticeable deterioration. The main ecosystem disturbances caused by horse riding is trampling, which can cause water run-off on trails, soil degeneration and wind- and water erosion, undermining the functioning of the ecosystem. Negative visual side-effects often come with such degradation, and this reduction of aesthetic value can have a major impact on park users (Newsome et al., 2008).

Riding activity is particularly condensed in Thingvellir National Park (TNP), which is the area of study for this research. TNP is situated about 45km northeast of Reykjavik and is one of Iceland's most important cultural and historical settings (e.g. Helgadóttir, 2011). In 2004 TNP became the first Icelandic site designated as a UNESCO World Heritage site of cultural value (UNESCO, n.d.). Often referred to as the Icelandic National Shrine (e.g. Icelandic Act no. 47/2004; Helgadóttir, 2011), TNP allows people to closely experience important cultural and historical events, related to the foundation of the Icelandic parliament, established in year 930, by wandering through a landscape with remains of the assembly ground and the booths for those who attended the gatherings (UNESCO, n.d.). Additionally, the geology of TNP features a worldwide important phenomenon, where literally two continents, namely the Eurasian and North American tectonic plate, meet (e.g. Thingvellir National Park, n.d.). Many visitors come to enjoy nature and wildlife and perform a large variety of outdoor and recreational activities such as fishing, bird watching, hiking or horse-back riding (Icelandic Act no. 47/2004). Helgadóttir (2011) explains that amongst all of these activities, riding belongs to one of the oldest and most traditional at Thingvellir. However, hiking is by far the most commonly practiced activity (Thingvellir National Park, n.d.). Consequently, most of the recreational trails within TNP are thus of multi-use purpose, meaning that hikers, cyclists, as well as horse riders are allowed to use them equally (Thingvellir National Park, n.d.). Large parts of the trail network through the core section of the TNP are shown in Figure 1-1, the recreational trails are displayed in orange and the roads for cars in black.



Figure 1-1 Recreational trails, highlighted in orange, and main roads in black, through TNP. The localities, in red, represent major intersections. (Source: [www.thingvellir.is](http://www.thingvellir.is).)

Over the past 30 years TNP has experienced several changes, such as its enlargement in 2004, and newly built infrastructure and renewal of the existing multi-use trails, including their repositioning and -replacement (Thingvellir National Park Management Plan 2004-2024). The park's head ranger and responsible contact person for trail maintenance Guðrún Kristinsdóttir, considers the banning of riding in Almannagjá in 1982 to be one of the biggest changes to riding activities in the park to date (Guðrún Kristinsdóttir, head ranger TNP, personal communication 01.11.2013). This change was made in an attempt to reduce and control traffic in the park. She reported that the intervention caused a lot of frustration amongst many horse riders, but was inevitable from an environmental point of view. In order to prevent environmental damage caused by trail users within TNP, which might trigger larger environmental degradation concurrent with rising visitor numbers, it is of vital importance to assess and analyze the current trail conditions and thereby help ensure that future hiking and riding activities will not be negatively influenced by today's bad practices.

## **1.2 Research Aims and Questions**

The overall aim of this research is to determine visitors' satisfaction levels concerning the condition of recreational trails within TNP. It uses a visitor survey to assess the perceived level of visual disturbances experienced by the hitherto two most common user groups: hikers and horse riders. Its specific aims are to:

1. Identify visual disturbances that affect the hikers' and riders' experience.
2. Assess visitors' level of awareness and implementation of the environmental code of conduct.
3. Assess environmental management options for sustainable trail management in TNP.

In order to achieve these aims, the following three research questions were formulated:

1. What do hikers and riders experience as the main visual disturbances on the natural environment adjacent to the recreational trails and are there any differences between the two user groups?
2. What is the visitors' level of awareness regarding best environmental practices? Do visitors perform off-trail activities and are there any differences between hikers and riders?
3. What changes and/or improvements would lead to better visitor experiences without degrading the natural environment in which the recreational trails are located?

By investigating the visual environmental disturbances visitors experience during their hikes and rides and by assessing visitors' and park managers' cognition of potential environmental damage and aesthetic harm, this research further seeks to promote environmentally responsible decision making for future tourist activity management in protected areas like TNP. It is important to conserve Iceland's vulnerable natural environment and by evaluating people's perceptions of the current conditions and determining their satisfaction levels, it will be easier for future conservation actions to be well targeted, justified, effective and initiated.

## **1.3 Thesis Structure**

This thesis is divided into five chapters. After this introduction a literature review follows in chapter two, first dealing with the topic of recreational impacts of NBT and HBT. Second the issue of how visitors' satisfaction levels can be assessed through the conduction of targeted surveys is discussed. Potential trail degradation and other impacts related to HBT are further explored and set in the context of riding in protected areas internationally as well as in Iceland. The third chapter introduces the study area and the applied methodology, and chapter four presents the results of the research. In the fifth and last chapter the study's conclusions are presented and critically discussed.

## 2 Theoretical Background

### 2.1 Environmental Impacts of Nature Based Tourism

Nature based tourism is highly popular globally and National Parks have experienced a considerable rise in visitor numbers since the second half of the 20th century (Eagles, 2002). Along with the increased in visitors the pressure on nature as a resource has also grown (e.g. Fredman and Tyrväinen, 2010). Accordingly much research has been directed at assessing and monitoring tourism impacts. Negative environmental impacts are an inevitable consequence of recreational activities in natural areas (Leung and Marion, 2000). Even though the action might be unintentional, every visitor leaves footprints and thereby causes alterations to the ecosystem in some way. A compilation of common environmental impacts of recreational activities as outlined by Leung and Marion (2000) is shown in table 2-1.

*Table 2-1 Common forms of recreational impacts in wilderness according to Marion and Leung (2000).*

	Ecological Component			
	Soil	Vegetation	Wildlife	Water
<b>Direct effects</b>	Soil compaction  Loss of organic litter  Loss of mineral soil	Reduced height and vigour  Loss of ground vegetation cover and fragile species  Loss of trees and shrubs  Tree trunk damage  Introduction of exotic species	Loss and alteration of habitats  Introduction of exotic species  Wildlife harassment  Modification of wildlife behavior  Displacement from food, water and shelter	Introduction of exotic species  Increased turbidity  Increased nutrient inputs  Increased levels of pathogenic bacteria  Altered water quality
<b>Indirect/ derivative effects</b>	Reduced soil moisture and pre space  Accelerated soil erosion  Altered soil microbial activities	Composition change  Altered microclimate  Accelerated soil erosion	Reduced health, fitness and reproduction rates  Increased mortality  Composition change	Reduced health of aquatic ecosystems  Composition change  Excessive algae growth

The problem of recreational trail degradation due to overuse is recognized worldwide and studied by many researchers (e.g. Cole, 1986; Leung and Marion, 1996; Marion, Leung and Nepal, 2006; Tomczyk and Ewertowski, 2011). In Iceland, land degradation has been considered one of the most severe environmental problems (Arnalds, 2005), which contrasts to the impression of the country's often marked "pure" and "unspoiled" nature (Sæþórsdóttir, 2010). The first to measure the change in vegetation cover, the vegetation resistance to trampling and to study changes in soil properties on selected hiking trails at several popular tourist sites in Iceland was Gísladóttir (2001, 2003a, 2003b, 2006). Many studies about the recreational impacts of various recreational activities ranging from hiking, mountain running and -biking to horse riding (e.g. Aradóttir et al., 2003; Helgadóttir, 2006; Ólafsdóttir and Runnström, 2013; Sæþórsdóttir, 2013) followed in the last 15 years.

## **2.2 Horse Based Tourism and its Recreational Impacts**

Described as a special form of tourism that varies from cultural to adventure tourism, horse based,- or equestrian, tourism presents an increasingly important matter for National Park management and planning. Not only a local recreational activity, but also a tourist attraction, horse riding tours and treks are very popular and widely marketed in Iceland (Ollenburg, 2005). HBT plays an important role in Iceland, as it is a major leisure activity and sport for local people. Horse riding also presents an excellent opportunity for visitors to experience Icelandic culture and nature at the same time (Helgadóttir and Sigurðardóttir, 2008). HBT accounted for 17.3 % of all purchased activities by tourists in summer 2011 (Icelandic Tourist Board, 2012). Helgadóttir (2006) points out that equestrian tourism is more commonly considered to have cultural character than to be a form of adventure tourism in Iceland. Helgadóttir (2006) argues that horsemanship in Iceland is very special because of its traditionally rooted practices and cultural importance. The relationship between horsemanship, breed, equestrian arts and travel are therefore very unique. The Icelandic horse helps in promoting Iceland as a tourist destination, which is of great importance to the entire Icelandic tourism sector, and especially rural tourism (Helgadóttir and Sigurðardóttir, 2008). More and more farms that used to be mixed operation farms, doing agriculture and breeding, have become small tourism businesses focusing on horse breeding, training and tourist accommodation (Helgadóttir and Sigurðardóttir, 2008).

Riding in natural areas such as local open spaces, nature reserves and national parks is seen by many as a legitimate activity, but as the ecosystem is often under a lot of pressure from a variety of recreational interests, natural area management is presented with the difficult task of achieving conservation objectives with multi-purpose trails (Newsome et al., 2004). HBT is managed very differently internationally, and depending on the locality regulations and restrictions in National Parks range from riding with a free running herd, riding freely with only one horse per rider, riding on designated bridle paths or multipurpose trails, or the prohibition of riding. In Iceland, similar to the USA and Canada, horse riding is a common activity within the country's National Parks. No specific research has been conducted on the topic of environmental degradation caused by riding activities in Iceland on regular trails, in protected areas or in National Parks. However the Environmental Agency of Iceland (EAI) has recognized the impact as a potential threat to certain areas

(EAI, 2013). Trampling effects caused by recreational riding is a topic of growing importance for the Icelandic environmental management. It is acknowledged that assessing riding trails is crucial to the country's long term environmental planning as riding trails represent both a necessary infrastructure for HBT, as well as a visual landscape feature, present in a variety of ecosystems throughout the whole country. If not well maintained, the degradation of the environment adjacent to the trails might bring unwanted side effects such as disturbances of ecosystems and visual deterioration with it. The latter can also be described as a reduction of aesthetic value and is often identified as major impact on other users (Newsome et al. 2008).

Research in the field of environmental impacts of horse riding is growing internationally. The USA (e.g. Newsome et al. 2004, DeLuca et al., 1998) and Australia (e.g. Abbott et al. 2010; Newsome et al. 2004; Newsome et al. 2008) are the countries with most studies and even though research is focused mainly on localities, results and conclusions can be applied to a global scale (Newsome et al. 2004). Manure on trails, trampling effects, root exposure and tree damage, as well as defoliation through grazing are horse-specific impacts that have to be added to the recreational impacts listed in table 2-1. Also problematic is soil compaction and reduced water infiltration (Newsome et al. 2008), which can be traced back to the additional weight impact a horse has on a trail. Trail degradation was found to vary according to the season of use, vegetation type, rainfall and topography, with particularly high degradation during growing seasons or after rainfall. While steep slopes suffer more from erosion or water runoff, even grounds are more sensitive to rainfall, which leads to muddiness and subsequently to trail widening (Hill and Pickering, 2009). As pointed out by Wilson and Seney (1994) trails used by many different user groups are particularly sensitive to heavy rainfall, which can cause the detached soil particles to be transported by the water runoff, especially on steep slopes. They also found that horses and mountain bikes have a greater negative impact on trails than other nature sports (Hill and Pickering, 2009). The formation of secondary trails, which can be described as "scars" of approximately 30cm width through the vegetation, usually generated by repetitive riding or cross passing by foot, is one of the biggest problems.

Social impacts of horse riding are very often related to the shared use of one single trail by hikers and riders, where one user group dislikes the others' presence on the trail for various reasons. Visual trampling effects, horse faeces and the flies that are attracted to it, as well as the sheer presence of large domestic animals in conservation reserves (Newsome et al., 2004) cause problems from the hikers' point of view and are often the trigger of social disturbance and trouble between the different user groups. Another potential conflict is the common statement made by non-horse-riders that the erosion caused by horse riding exceeds any that is caused by other user groups such as hikers or bikers (Newsome et al., 2004). Riders on the other hand argue that they also have the right to use reserved areas (Newsome et al., 2004) and are often unwilling to hold back on speed to make sure pedestrians are not run-over. Whenever multiple user groups are performing a variety of activities on shared grounds, associated actions and problems arising from these performances can irritate the other users respectively and harm not only the physical environment, but also people's experiences and the recreational sensation of the park.

## 2.3 Visitors Perception of Trail Degradation

Multi-use trails are particularly sensitive to erosion (Wilson and Seney, 1994) and maintenance and repair costs are very high (Hill and Pickering, 2009). So far no studies have been undertaken that focus on visual environmental degradation caused by hiking and horse riding within the TNP or on visitors' perception of the conditions of the park's recreational trails. To date the only study related to the topic seems to be a Bachelor thesis in geography at the University of Iceland from 2012, where social trails were assessed and mapped and the related erosion evaluated (Halldórsson, 2012). As an important step towards addressing this research gap, it was decided to conduct this study focusing on visitors' perception and satisfaction level of environmental condition of the park's recreational trails.

In addition to the recreation impacts listed in table 2-1 improper visitor behavior, littering, alteration of geological regimes, overuse or overcrowding, air and- noise pollution and last but not least trampling effects of horses can have severe implications on the physical environment. Not only do they have a negative effect on the ecosystems (Table 2-1), but they influence visitors experience of nature and thereby satisfaction levels. In order to combat behaviors such as misuse or vandalism, which are often rooted in dissatisfaction (Hornback and Eagles, 1999), it is essential to promote visitors satisfaction. Different kinds of users often perceive their impacts on the environment differently and the same level of destruction can be seen very differently by an outdoor recreationist depending on the type of setting. For example wilderness tourists are generally more sensitive to evidence left behind by other users than visitors in more developed areas (Hammit and Cole, 1998). Even within the same user groups, there may be large differences in perceptions of the degradation of the natural environments depending upon the visitors' recognition of the impact and the impacts form (Deng et al., 2003). Evaluation of visitors' perceptions on trail condition is one important aspect of trail assessment and monitoring. Furthermore, visitors' management is very important for the sustainable development of protected areas. Visitors' perception of possible environmental impact on wildlife and vegetation is considered critical for decision making and the planning of future regimes (e.g. Leung and Marion, 2010, Spanou et al. 2012). To predict the impact of certain actions or to provide useful suggestions about improving existing facilities or creating new ones, visitors' perceptions are necessary. Further, the investigation of the level of environmental awareness by means of a visitor survey is an excellent tool to first identify problems, address them and finally to help direct the management of the protected area to become more sustainable.



## 3 Methodology

### 3.1 Study Area

Thingvellir National Park is situated in the southwest of Iceland, about 45km northeast of the country's capital, Reykjavik (Figure 3-1) (Thingvellir National Park, n.d.). The westbound park borders run from Kjósarheiði along Kjálkárdalur to Kjölur and then in a northeastern- direction up to Háasúla. From there the borders run straight to the east all the way to Lágafell and down south via Hrafnabjörg to Karhraun, where the park boundary goes towards the lakeshore of Thingvallavatn, including Arnarfell. The national park was established by legislation on the protection of Thingvellir in 1928 and comprises an area of about 237km<sup>2</sup> (Thingvellir National Park Management Plan 2004 - 2024). It's central and core feature is the Althing, an open-air assembly representing the whole of Iceland, which was established in the year 930 and continued to convene there until 1798 (TNP, n.d.). In 2004 Thingvellir was listed as a UNESCO World Heritage site based on the remaining assembly grounds and the evidence of booths, which reflect the unique medieval Norse/Germanic culture from its foundation in 980 AD until the 18<sup>th</sup> century. Greatly known through the Icelandic sagas from the 12<sup>th</sup> century and reinforced by the fight for Independence in the 19<sup>th</sup> century, the Althing and its hinterland, together with their powerful natural setting, have an iconic status as a shrine for the nation (e.g. Helgadóttir, 2011; UNESCO, n.d.; TNP, n.d.). From about 930 to 1271 the Althing, was the supreme legislative and judicial authority in the country. From 1271 until 1662 these powers were shared between the Althing and the king and in a third period, lasting until 1798, the Assembly at Thingvellir only had a judicial function (Þorsteinsson, 1987).

TNP also includes remains of agricultural use from the 18th and 19th centuries, the Thingvellir Church and adjacent farm, and the population of arctic char in Lake Thingvallavatn. The park shows evidence of the way the landscape was husbanded over 1,000 years. In addition to this remarkable cultural and historical importance, the TNP is a fissure zone, situated on the tectonic plate boundaries of the Mid-Atlantic Ridge. This unique geo- and biological system is referred to as a natural wonder of international scale (TNP, n.d.). The two continental plates of Eurasia and America are moving apart as the land between them rifts and subsides and the situation at TNP is the clearest dry land example of plate separation on an oceanic ridge (Thingvellir National Park Management Plan 2004-2024).



Figure 3-1 Thingvellir National Park: The study area. The black dotted line shows the national park border and the enlarged red names show localities that indicate exactly where the border lies. (Sources: [www.loftmyndir.is](http://www.loftmyndir.is); [www.thingvellir.is](http://www.thingvellir.is))

The trail network of TNP is composed of two types of trails: 1) designated hiking trails for pedestrians only, and 2) recreational trails shared by horse riders, hikers and bikers. The recreational trail network within the TNP consists of about 10 sections of varying lengths. The multi-use trails come to a length of almost 43km (Table 3-1).

*Table 3-1 Length of Recreational Trail Network Sections (Source: [www.thingvellir.is](http://www.thingvellir.is))*

<b>Trail name or section</b>	<b>Length in km</b>
Bolabás	2.82
Thingvallahraun	5.18
Langistígur	4.38
Vatnsvíkur leið	4.42
Thingvallaleið (from Kárastaðir to Skógarhólar)	6.5
Kárastaðir	1.67
Sandkluftaleið	6.6
Eyfirðingavegur	4.2
Leggjabrjótur	4.2
Brúsastaðaleið	2.5
Total length	42.47

According to Guðrún Kristinsdóttir, the TNP head ranger (personal communication 01.11.2013), there are four major intersections where horse riders usually take breaks (Figure 1-1). The first one, Skógarhólar Camp in the north, offers accommodation to both riders and horses that stay overnight at TNP. It is also a resting area with paddocks for day visitors. The second designated stopping area, Hrauntún, lies southeast of Skógarhólar on the Thingvallahraun trail and used to be a farm (Figure 3-1). The remains of the farm can still be seen on the large clearance in the woods of Thingvallaskógur. The third stopping area is called Skógarkot and lies further South on Thingvallahraun. Similarly to Hrauntún, Skógarkot used to be a farm site and is the largest point of intersection, not only for riding- or multi use trails, but also a large number of hiking only trails, which lead through or depart from there. Skógarkot is the most central point of junction and the trails are situated radially around it. The fourth stopping area is at Gjábakki, an abandoned farm at the south-eastern most edge of the park's boundary.

## 3.2 Questionnaire Survey

In order to meet the overall research aim, i.e. to determine visitors' satisfaction levels of recreational trail conditions within TNP, it is essential to obtain insight into hikers and riders opinions, preferences, annoyances and or disturbances. Conducting a visitor survey to assess visual disturbances experienced by the two user groups was chosen as the most appropriate research tool. Numerous studies (e.g. Spanou, 2012; Deng et al., 2003; Ouma et al. 2011) show that such an approach gives the best success in determining visitors' satisfaction levels. Not only is the interaction between the researcher and interviewees very important for catching certain sentiments and interpreting the general atmosphere during the data collection, it also helps to interpret the results appropriately (Saunders et al., 2009).

### 3.2.1 Design of the Questionnaires

The survey (cf. appendix I) consists of a total of 17 questions sorted by topic into 4 main sections. The first section, which includes questions 1 to 6, asks general information about the participants such as age, gender, nationality and the length of their trip. The second section starts with question number 7 and is in the form of a semantic differential scale, looking at people's general satisfaction with the multi use trails in the park. Participants can chose between: very satisfied, satisfied, indifferent, unsatisfied and very unsatisfied. Question number 8 is about encounters of any visual disturbances and only offers a yes or no choice. Question 9 asks about encounters with visitors from the same or other user groups and how many of which kind there were. Thematically linked to question number 8 about visual disturbances, are questions number 10 and 11. They have 7, respectively 8 detailed sub-questions designed to further investigate whether participants are really satisfied or whether they would answer differently when provided with examples of visual disturbances and impacts on the environment due to horse riding. Sometimes participants in surveys become tired when confronted with many questions. To prevent them from not answering at all, and to facilitate their answers, the method of offering choices is applied accordingly to suggestions in literature (e.g. Saunders et al., 2009). The level of disturbance is derived from participants' answers on a scale with the gradation: very much, a lot, a little, very little and not at all. The third section of the questionnaire is designed to give insight into visitors' previous knowledge about the environmental code of conduct (question 15) and investigates whether or not people leave the trails (question 12). In case visitors are already informed about the environmental code of conduct at the TNP, they have the option of adding information about their sources of information. Gathering this kind of information is very important for determining who the main informants are, whether and where there might be a lack of communication and finally to counteract potential ignorance of the environmental code of conduct (e.g. Cole et al., 1997; Duncan and Martin, 2002). This information is also very important for identifying and enhancing the pools of possible communication and information (Saunders et al., 2009).

Lastly, there are four questions in the fourth section. Question number 13 asks visitors whether they find the park to be lacking any facilities and question number 14 asks about their motivation for coming to visit TNP, offering 4 choices a) the park's historical and cultural significance, b) the unique geological setting, c) horse riding and finally d) other, where participants can name their motive(s). Question number 16 asks participants to mark

or draw on a given map all the trails, paths, routes and tracks they have hiked or ridden that day. This question was chosen for the survey because it shows where hikers and/ or riders most popularly go, where denser concentrations of visitors might be found and hence where there is a greater possibility of overuse, damage and or conflict of any kind. Research supports the choice of this rough-mapping methodology for example Deng et al. (2003) use a similar, yet further developed method to find so-called hot spots in their study. Finally, question number 17, an open question, investigates visitors' perceptions of the environmental conditions of a) the multi-use trails in the TNP and b) in Iceland in general. Additionally the participants have the option of stating their views on the topic of trail management and adding comments of any kind. The questionnaire focuses most on visitors' visual perception of the trail conditions and their general satisfaction, less weight was given to determining behavioral patterns concerning best environmental practices and visitors' suggestions regarding trail improvements.

### **3.2.2 Sampling Method**

In preparation for the fieldwork the author went to the TNP to hike and ride along all the trails included in the study area and to take pictures of striking issues such as broken wooden beams, rubbish or erosive patterns and trampling effects. The subsequent in-situ surveying was executed in a period of one week from August 2<sup>nd</sup> until August 8<sup>th</sup> 2013. After familiarizing herself with the schedule of departures the author studied the itineraries of all the public riding tours through TNP offered by Eldhestar in order to catch the different groups at Skógarhólar campsite at the right date and time to interview them. A total of 134 surveys were distributed and a total 123 full answered surveys were collected, 53 from hikers and 70 from riders. Only a few individual visitors (8.2%) were unwilling to participate, but the large majority (91.8%) took part in the survey. The riders and hikers who did not go on organized tours, i.e. who travelled privately, were intercepted at the main trail-network intersections and designated stopping areas of Skógarkot and Hrauntún (Figure 1-1). According to Guðrún Kristinsdóttir (head ranger, personal communication 01.11.2013) these intersections are the places where one would most likely meet hikers and riders because they offer the best resting features such as wooden beams to attach horses to, or grass patches and old farm ruins to sit on and relax before continuing to hike. During the day, the main target group were hikers, who were stopping at one of the previously mentioned intersections and in the evenings, riders who stayed at Skógarhólar overnight were targeted. This arrangement was decided upon so that riders had the opportunity to fill out the questionnaire without worrying about holding their horses, who, at night time were safely put in the grazing paddocks, and also because hikers travelling during the day might have left the area by the evening.

### **3.2.3 Data Analysis**

Response rates are generally very high and even reach 100% for some of the most important questions, namely the identification of visual disturbances (questions number 10 and 11) and the question about knowledge of the environmental code of conduct (question number 15). Other questions are less important in the sense that they do not directly answer one of the research questions, although they contribute to the overall understanding of the situation.

The generated data from the survey was manually entered into Microsoft Excel, which built the basis for later analysis using both Excel and SPSS. Graphs and charts were created to display all the important background- and demographic information about visitors. This step is essential for gaining an overview and knowledge about the number of respondents, their nationality, age, sex and to distinguish numerically between the two user groups: hikers and riders. Participants were then grouped according to their nationality or larger geographical regions, when too few individuals of their country took part (Saunders et al., 2009). An exception was made for Iceland, which is often grouped together with other Scandinavian countries like Sweden, Norway and Denmark. In this case study, Icelandic participants build their own group, because the study area is located in Iceland and it is therefore of special interest to look at Icelandic respondents separately. The other grouping are as follows: Sweden, Norway and Denmark built together to form the group called Nordic Countries, Belgium and the Netherlands were paired up, because they are neighboring countries and there were not enough individual participants of each nationality to build their own group, the same was the case for Switzerland and Austria as well as Canada and the USA. Luxemburg, Australia and New Zealand build a group called "Others", as there were too few individual respondents from each nationality to group them separately. France, the UK and Germany each built their own group. Most of the Scandinavians chose to answer the English version of the survey, as did the Belgians, Dutch, Canadians, Americans, Luxembourgiens, Australians and New Zealanders. Some of the Scandinavians who were fluent in German, all of the Austrians, Swiss and of course Germans answered the German version.

The first research question asks about hikers' and riders' main visual disturbances on the recreational trails and seeks to determine where differences in perception lie. As an initial step and to answer the first research question, potential visual impacts are divided into three main impact categories: social, biological and physical as shown in table 3-3. These categories are analyzed together as well as separately and it is then determined whether differences between user groups are statistically significant. Breaking down the visual impacts into afore mentioned categories helps to analyze the cause of the disturbances in a broader context. All the physical characteristics affect the non-living environment and their presence might lead to visual deterioration. The biological ones affect the living environment directly, as they have a negative impact on basic ecosystem functioning. The social impacts are circumstances that potentially cause visitors dissatisfaction due to interaction with other visitors.

Table 3-2 Classification of visual impacts in order to analyze category-wise and calculate biggest impacts on satisfaction levels

Impact Category	Potential visual disturbances
Physical	Garbage Water accumulations Secondary trails formed by off-trail activities Damage of geological formations Trail width Broken items such as wooden beams, gates, fences, etc. Traffic Intersections Insufficient Labeling / Signposting
Biological	Trail Erosion Damaged Vegetation Trampling effects of horses alongside or off-trail
Social	Crowdedness with hikers Crowdedness with bikers Crowdedness with riders

The second research question about visitors' level of awareness and implementation regarding best environmental practices is partly answered by questions number 12 and 15, which ask about whether or not visitors have left the trail and whether or not they are informed about the environmental code of conduct. Response rates for this question are very high and only 1.6% of all participants did not give an answer. The answers are analyzed by running a Pearson's chi-square test on SPSS to see whether there is an association between the two categorical variables *Leaving Trail* and *Informed about Environmental Code of Conduct*. It is also tested whether the answers show statistically significant differences between the user groups. The additionally generated information about the source of information is grouped and analyzed in order to detect patterns or associations between the respective user groups and their answers.

The third and last research question is answered by the open question (number 17) at the very end of the questionnaire, which investigates what visitors would like to see differently in relation to recreational trail maintenance and management. Allowing the participants to answer freely has the advantage of giving them the opportunity to add extra thoughts about the multi-use trails, their condition, maintenance and or management. All desired changes, ideas, suggestions, potential improvements and other positive, as well as negative, remarks are collected through the survey in written form and additionally complemented by oral information from conversations and discussions with individual visitors. All comments derived from question number 17 are categorized into four different categories and analyzed. The first category, "very good", includes visitors comments that express great satisfaction with the trail management, the second category, "good", comprises answers of respondents who are quite satisfied with the situation, the third category, "ok", includes all comments that were neutral and the fourth category contains all answers that state, that

maintenance is needed. Finally the last category covers people who did not answer the question, or gave an answer not concerning the question.

### **3.3 Semi-Structured Interviews**

After the survey had been created, it became clear that a second step in the survey needed to be complemented with qualitative, semi-structured face to face interviews (cf. appendix II). First with people directly involved with the recreational trail management in the TNP (Type A) as well as people directly involved with horse riding activities in TNP (Type B) (Table 3-3). A combination of surveys and interviews as research methodology is often used in business and social sciences (Saunders et al., 2009), which is why it was chosen for the intended project. The choice of interviewees was primarily made according to their function at TNP and their degree of involvement in the park's planning, -management as well as maintenance of the trails. In order to enhance the study's credibility and significance it is necessary to collect as much information as possible about the ongoing processes behind the scene, any planned or intended changes in the near future and potential fields of conflict. As this specific information can only be provided by qualified experts, who work at or with TNP on a daily basis and who have important positions and powers, the choice of interviewees was quickly made (Table 3-3).

In total there are 5 experts, 3 of whom work at TNP and 2 who are involved with HBT. Chosen were TNP's director, Ólafur Örn Haraldsson, the interpretive officer, Einar Sæmundsen, and head ranger, Guðrún Kristinsdóttir. The strong focus on horse riding activity in TNP lead to interviews with two additional people, both actively involved in the riding tour business. First, Hróðmar Bjarnason, the owner and director of Eldhestar, one of the biggest riding tour operators in Iceland and the only one offering organized riding tours through TNP on a regular basis was interviewed. Second, Sveinn Atli Gunnarsson who is responsible for managing horse riders' accommodation at TNP and also the owner of a riding tour business was chosen. Both are interviewed so that their knowledge, experience and observation can be incorporated into the study's analysis and discussion.

The interview framework type A (cf. appendix II) of the semi-structured interviews is created for TNP staff members and comprises three main topics. The first part consists of administrative and general questions, the second part explores trail maintenance practices and the third part current management issues. To begin with it is established whether or not riding tour operators should have permits in order to enter TNP with their groups and whether they need to give prior notice of their coming. A later question explores whether TNP monitors visitor numbers, especially those of riding guests, and asks why there is so little information about managing HBT at TNP in the 2004-2014 management plan. Another question specifically asks whether TNP informs their riding guests about the environmental code of conduct. Finally, there is a question about trail monitoring and whether this is performed all year round or just seasonally. The second part seeks to gather information on the multi-use purpose of the trails and asks since when this regulation has been in action. Further there is a question about responsibility of trail building, who maintains them and with what kind of material. There is also a more specific question about signage. In addition to the questions on trail maintenance the interviewees are asked



to talk about future actions, plans and or ideas concerning the recreational trail network in TNP. The third part investigates whether there is any documentation from recent years on maintenance, use and general monitoring of the trails.

The interview framework type B of the semi-structured interviews is created for the two horse-riding business experts, -Hróðmar Bjarnason and Sveinn Atli Gunnarsson. It focusses first on information such as group size, preferred season and number of trips per season. Second is a question about preferred routes and whether they take free running horses on their trips. The third and last section includes questions about special contracts, permits, the entrance to a National Park and UNESCO World Heritage Site and last but not least, whether or not the riding businesses give information about the environmental code of conduct to their customers.

*Table 3-3 Participants who took part in semi-structured interviews (Types A or B) about TNP in general, the recreational trails' maintenance, planning and horse riding activities.*

	<b>Name</b>	<b>Position</b>	<b>Type of interview</b>	<b>Importance for study</b>	<b>Date of interview</b>	<b>Location of interview</b>
1	Ólafur Örn Haraldsson	Director of TNP	A	Oversees all actions at TNP,	01.11.2013	TNP: Almannagjá and Skógarhólar
2	Einar Sæmundsen	Interpretive Officer	A	Involved in planning	24.07.2013	TNP: Information Center Office
3	Guðrún S. Kristinsdóttir	Chief Park Ranger	A	Responsible for trail-management and maintenance	01.11.2013	TNP: Information Center Office
4	Hróðmar Bjarnason	Director of Eldhestar Riding Tours	B	Coordinates riding tours through TNP	24.07.2013	Eldhestar Office in Hveragerði
5	Sveinn Atli Gunnarsson	Responsible for Skógarhólar Campsite	B	Coordinates overnight stays at TNP	02.08.2013	TNP: Skógarhólar Camp



## 4 Results

### 4.1 Participants' Demographic Backgrounds

Amongst the 123 participants in the study 53 are hikers and 70 riders and they are of 16 different nationalities. German and Icelandic are the most represented in the sample. The number and user group of respondents varies greatly between nationalities. For example there are 28 Icelandic riders and only 4 Icelandic hikers. Variation among nationalities is greater among hikers than among riders (Figure 4-1 and Table 4-1).

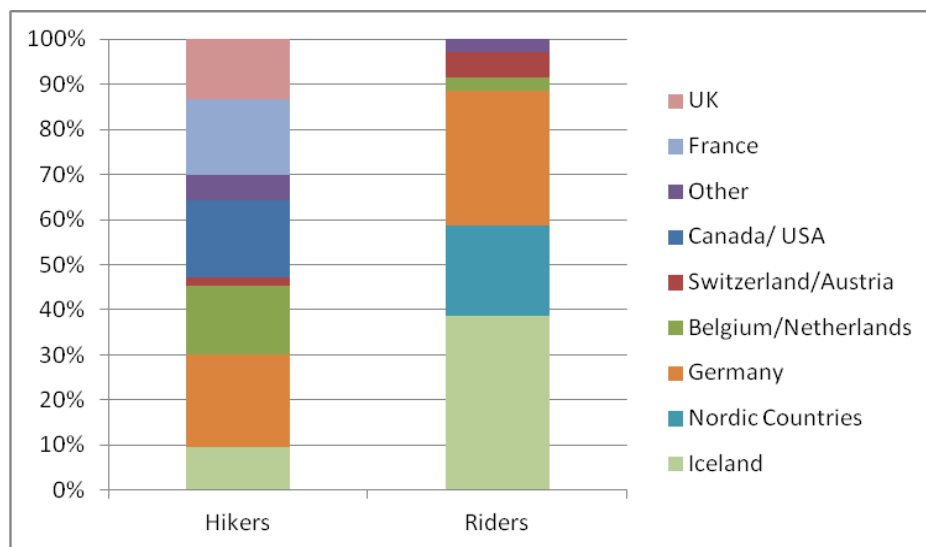


Figure 4-1 Countries of origin of participants

The largest group of hikers (39.6%) is aged between 25 and 34 years, while the largest group of riders (28.6%) is aged between 45 and 54 years. There are proportionally more young riders, younger than 25 years, than hikers (Figure 4-2). The average age for hikers is 39.7 years and for riders 39.5 years. The difference between the user groups for age is not statistically significant, however the difference in gender and nationalities between hikers and riders is statistically significant (Table 4-1).

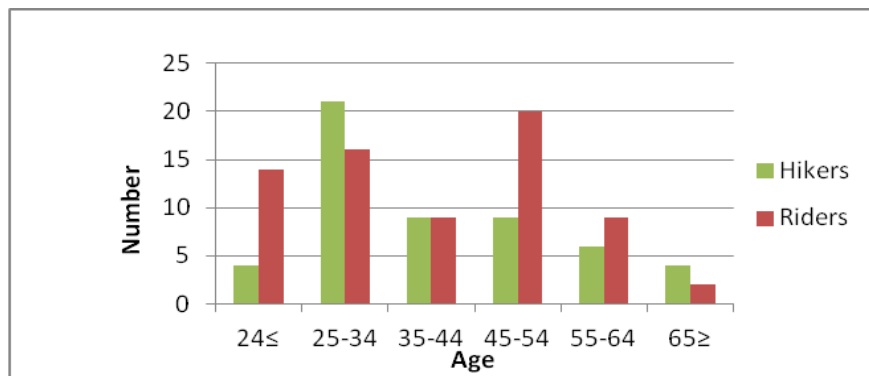


Figure 4-2 Number of hikers and riders per age class

Table 4-1 Demographic distribution of hikers and riders

Variable	Categories	Hikers	Riders	P
		n= 53	n= 70	
Gender *	Female	45.3%	78.6%	0.000 <sup>a</sup>
	Male	54.7%	21.4%	
Nationality *	Icelandic	2.65%	18.9%	0.000 <sup>b</sup>
	Nordic Countries	0%	9.8%	
	Germany	20.8%	30.0%	
	Belgium/Netherlands	15.1%	2.9%	
	Switzerland/Austria	1.9%	5.7%	
	Canada/USA	17.0%	0.0%	
	France	17.0%	0.0%	
	United Kingdom	13.2%	0.0%	
	Other	5.7%	2.9%	
Age	24≤ years	7.5%	20.0%	0.136 <sup>b</sup>
	25-34	39.6%	22.9%	
	35-44	17.0%	12.9%	
	45-54	17.0%	28.6%	
	55-64	11.3%	12.9%	
	65≥	7.5%	2.9%	

a = t-test, b= chi square test

\* statistically significant difference between user groups

## 4.2 Visual Disturbances

Overall satisfaction levels regarding trail condition within the study area are very high. Hence, the large majority of the respondents is either satisfied (45.5%) or very satisfied (42.3%) with the trails condition, very few (4.9%) are unsatisfied and only one is very unsatisfied. There is no significant difference in responses between the riders and hikers. None of the respondents are of the opinion that there are visual disturbances on or around the trails. However, when specifically asked to mark potentially disturbing features such as: erosion, crowdedness due to other visitors, poor information signs or garbage on trails, respondents have different opinions (Figure 4-7). The top five disturbing visual impacts for users are insufficient labelling, trail erosion, trampling effects of horses, secondary trails and water accumulations. Some of the impacts as for example secondary trails (Figure 4-5) or trampling effects of horses (Figure 4-6) are more noticed by hikers while broken items (Figures 4-3 and 4-4) are more noticed by riders. For 5 of the 14 listed visual impacts, namely garbage, broken items, water accumulations, secondary trails and insufficient labelling the differences between user groups are statistically significant. When looking specifically at the physical, biological and social impacts that are suggested in the survey, it becomes clear that visitors are least disturbed by social factors like crowdedness with other hikers, bikers or riders (all colored red in Figure 4-7), followed by physical (blue) and most- but still not significantly disturbed by biological factors (green).



*Figure 4-3 Broken woodbeams at Hrauntún  
(Photograph Charlotte Huber)*



*Figure 4-4 Remains of wooden beams at the  
northend of Hrauntún (Photograph Charlotte Huber)*



*Figure 4-5 Secondary trail east of Hrauntún  
(Photograph Charlotte Huber)*



*Figure 4-6 Trampling effects from horses alongside  
the trail (Photograph Charlotte Huber)*

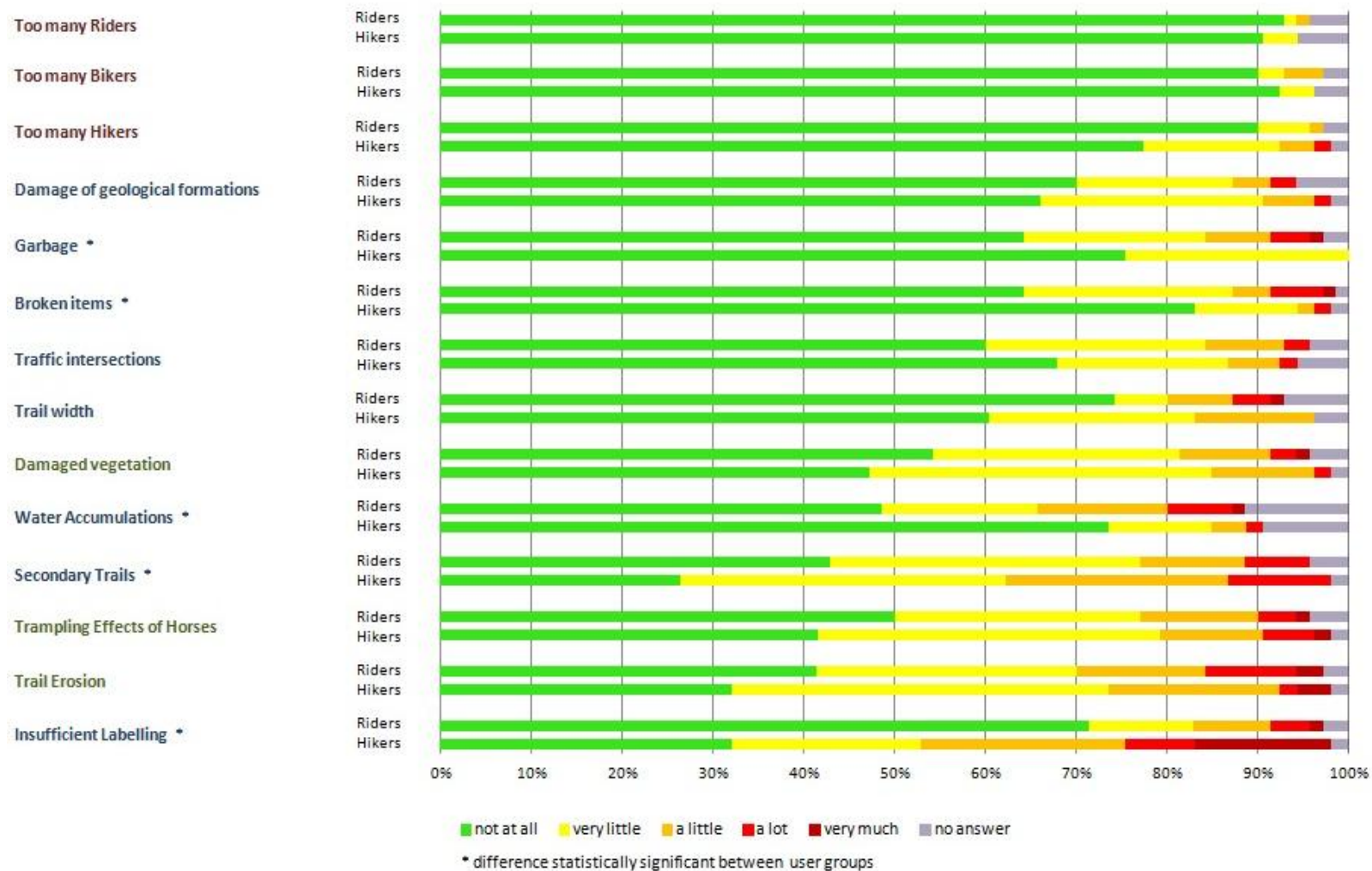


Figure 4-7 Level of disturbance with potential visual impacts. (\* statistically significant difference between user groups)

## 4.3 Awareness and Knowledge of Environmental Code of Conduct

The majority of participants (66.7%) answers that they were not informed about the environmental code of conduct. Only 31.7% were previously informed. 25.2% of these cases identifies the source of information from which they know about the code of conduct (Figure 4-9) while 6.5% do not add a source of information. The difference is not statistically significant between user groups.

A Pearson's  $\chi^2$  test, shows that for hikers there is a significant correlation between the two variables leaving the trail (Figure 4-10) and knowing about the environmental code of conduct, ( $\chi^2(4) = 27.26$ ,  $p < 0.001$ ). In contrast, for the riders, there is no significant correlation, ( $\chi^2(4) = 6.81$ ,  $p < 0.005$ ). 24 participants (19.5%) left the trail and 96 (78%) did not. From the 96 who did not leave the trail, 26 riders and 13 hikers (40.6%) were previously informed about the environmental code of conduct at TNP. Figure 4-8 illustrates very clearly that most visitors (52.8%) did not leave the trail even if they were not previously informed about the environmental code of conduct. A good quarter (25.2%) of all the visitors who knew about the code of conduct did not leave the trail. Only 6.5% of the respondents left the trail while knowing that they were not supposed to and 12.2% left the trail not knowing the code of conduct. There are no statistically significant differences between user groups.

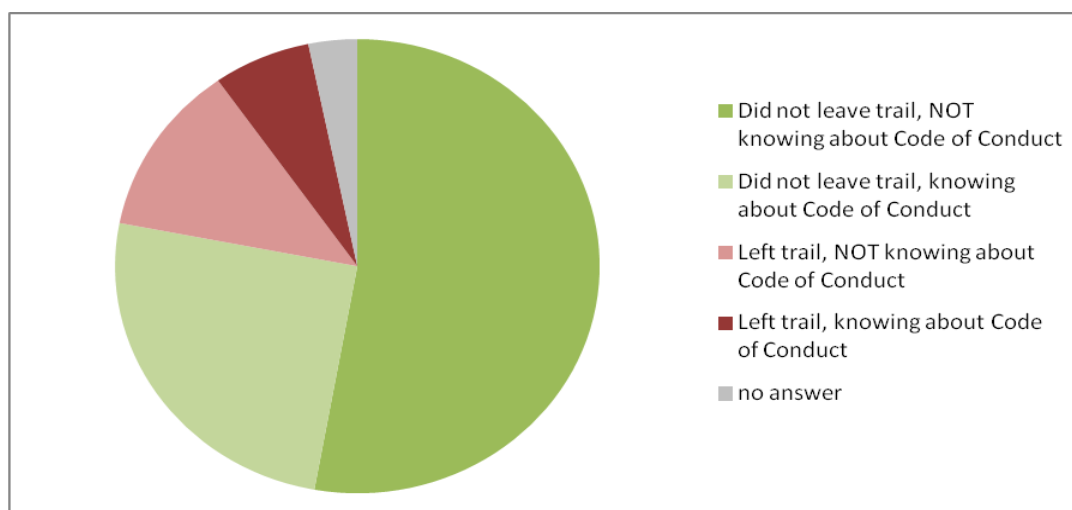
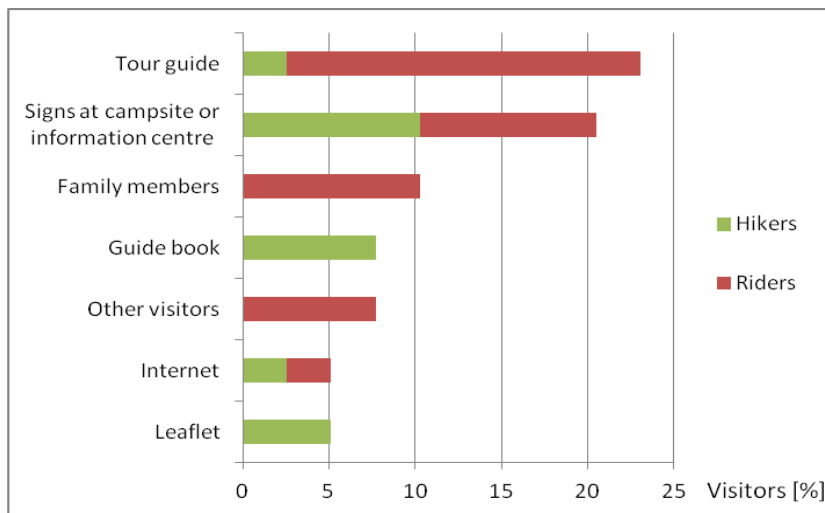


Figure 4-8 Portion of participants who didn't leave the trail (green) and participants who left the trail (red) knowing (dark green/red) and not knowing (light green/red) about the environmental code of conduct.

The top three sources of information about the environmental code of conduct are tour guides (23%), signs at campsite or information centre (20.5%) and family members (10.3%) (Figure 4-9). The difference between user groups is statistically significant.





*Figure 4-9 Participants' source of information about the environmental code of conduct*



*Figure 4-10 Erosional degradation as a result of visitors. (Photograph Charlotte Huber)*

## 4.4 Environmental Management Options

Analysis of the open ended question of the questionnaire regarding perception and potential changes of the recreational trails show that participants' attitudes to the trail conditions are very positive. About one third is very satisfied with the trail condition and gives very positive comments. For example several visitors note that the recreational trails are easy to walk on, well maintained and or that the trails are well marked and yet not disturbed by disruptive signposting. About a quarter of all respondents answers in a generally positive manner, but still has some negative remarks. About 10% of all the participants feel that the situation is satisfactory and about 9% , all of whom are riders, feel that the multi-use trails needed maintenance. They suggest that the trail network should be enhanced and trails should be widened. they also all focus on the issue of removing stones in order to make the trails more attractive. About one fifth of all the participants did not answer the question. The differences between user groups are statistically not significant.

## 4.5 Managing Thingvellir National Park

TNP staff members Ólafur Haraldsson, Guðrún Kristinsdóttir and Einar Sæmundsen state in semi-structured interviews that trail maintenance and required courses of action in the near future were the most important issues for them. When asked, they said that monitoring of the trails was performed qualitatively and randomly, rather than systematically with quantitative measurements. Within the park's boundaries, maintenance responsibility for all the recreational trails lies in TNP's hands. The prolongation of the riding trails in outwards direction, however, is the local riding club's responsibility. They receive financial support to keep the trails in good condition and check regularly for damages. The interviewees report that gravel for building new trails or repairing existing ones within TNP comes mostly from the vicinity. When there are storms, floods or landslides, maintenance work is executed with those accrued materials. As riding has been a central activity at TNP throughout its history, all interviewees agree on the importance of balancing the necessity of keeping all recreational trails open to riders while dealing with the environmental degradation and trampling effects caused by their horses. The possibility of creating new infrastructure, i.e. opening up new recreational trails within TNP is not equally welcomed by all of the interviewees. Opinions differ a lot between the participants. While one is very open to the idea and even has concrete conception of implementation, others believe that the current trail network is enough to sustain the traffic and there is no need for further enlargement. In sum, all interviewees report that they are very excited about the future and the potential changes, although, as for now, it is uncertain what will happen within the next 3 to 5 years.

The research found that TNP does not issue any permits or allowances for HBT to be carried out on the park's infrastructure. Giving previous notice is not a requirement, although it is required, when an overnight stay at Skógarhólar Camp is planned. High season for riding guests is May and June, where as the season for hikers is much longer, spanning from May until the end of August. None of the interviewees state a known case of

conflict of interest between the user groups that resulted in a formal complaint. The only issue that repeatedly arises is the social issue caused by the drunkenness of riders. This issue is, however, between misbehaving riders and the park rangers or authorities and not between user groups. It is also stressed that incidents with drunk riders have been decreasing ever since Hotel Valhöll was closed in 2010. TNP does not issue any fines to visitors and the police have hardly ever had to make a case because of violation of the law. However, two problems have become repeating issues in recent years. Firstly, the herds become larger, while fewer riders are controlling them. This means that occasionally horses get lost or break free from the herd, -sometimes with their owner's realization and, sometimes without. Secondly some riders have been unwilling to follow the new rules introduced a few years ago. Some individuals do not accept that TNP has gone through changes that demand different regulations. TNP does inform guests about the environmental code of conduct at the information centre and all interviewees agree that the public is generally well behaved. They are also aware of the fact that visitors occasionally leave the recreational trails for a variety of reasons, including to take pictures, use the bathroom or simply to reach a nicer view-point. In general however staff members of TNP are satisfied with visitors' knowledge and implementation of the environmental code of conduct.

The interviews with Hróðmar Bjarnason, the head of Eldhestar Riding Tours, and Sveinn Atli Gunnarsson who manages Skógarhólar Campsite and owns a riding business called The Icelandic Horse, revealed that Eldhestar is the only business that take guests to TNP on organized tours. Other guests riding through TNP are, without exception, privately organized groups of various sizes that come between early June and August. The Eldhestar groups are between 10-12 people and 20 to 50 horses. The trips vary from 4 to 7 days and depending on the duration, there are more or less horses in the herd. The herds always run freely, meaning that all the riders need to manage the herd and take care that no horses run loose. One day of the trip is always spent at TNP and the directions in which the groups cross TNP are alternately north-west to south-east and the other way round. Although TNP does not provide authority of infrastructure, Sveinn Atli Gunnarsson is always notified about organized groups riding through TNP that are staying at Skógarhólar over night. Some private groups come unannounced, although this is generally not the case.

The environmental code of conduct is very strictly and consequently communicated to all the guests of Eldhestar. The responsible guide for each group instructs all visitors prior to departure that they absolutely may not leave trails, take anything with them or leave anything behind and must always stay behind the guide. When introducing the itinerary, it is further explained that the trip goes through a National Park and a UNESCO World Heritage Site. However, the guides do not tell the visitors explicitly that they are entering TNP.



## 5 Discussion and Conclusions

Maintaining the integrity of the ecosystems is a key to many processes and services in TNP and from an environmental perspective it is clear that the preservation of nature must be the ultimate motivation and goal behind safeguarding actions. Yet the touristic point of view is becoming increasingly important when describing motivations to preserve natural environments in Iceland. As Fredman and Tyrväinen (2010) stress, landscape quality is one of the pull factors of Nordic nature-based tourism and it is therefore important to understand people's experiences and perceptions of the holiday environment. The increasing demand for nature based tourism in Nordic countries (Fredman and Tyrväinen, 2010) asks for more research about the recreational benefits that visitors gain from their experiences in the natural environment. On this note, the assessment of visitors' satisfaction level of the recreational trail condition in TNP not only contributes to one of the highlighted future challenges but also exemplifies the rising awareness of ecological degradation caused by tourism in Iceland as discussed in the literature (e.g. Sæþórsdóttir, 2012, EAI, 2013; Ólafsdóttir and Runnström, 2013, Sæþórsdóttir, 2013). Visitors experiences need to be taken into account when creating management plans in order to achieve ecological well-being and high satisfaction levels.

Iceland is often described as one of the few places left on earth where visitors can still enjoy wilderness (Sæþórsdóttir, Hall and Saarinen, 2011) and Iceland's pristine natural image is a key marketing feature for the tourism market. More and more, this becomes a dangerous position for Iceland, as the country seems to rest on its laurels and relies on its green image (Sæþórsdóttir, 2010). Does Iceland's reputation precede it? Results of this study refute this statement, as visitors are very satisfied with the condition of the recreational trails and their overall experience at TNP.

### 5.1 Visitors' Satisfaction Levels

The most disturbing visual impact, insufficient labeling, is categorized as a visual impact because signposts are visual physical elements of a landscape and have the potential to disturb in a natural environment due to their artificial, man-made appearance. As this case study highlights especially all impacts due to horse riding or hiking, it needs to be pointed out, that even though it is categorized as such, insufficient labeling cannot be ascribed to neither of the two just mentioned recreational activities. If one took this most disturbing factor out of the equation, the results show that the top three negative visual impacts then are directly or indirectly related to horse riding and hiking. A study conducted by Wilson and Seney (1994) supports these results, by confirming, that recreational trails shared by different users, are particularly sensitive to soil erosion and trampling. The main actor in the generation and aggravation of secondary trails at TNP stays unrevealed, but in general, literature shows, that horse riding has bigger impact (e.g. Newsome et al. 2004, 2008; Pickering, 2008). For the situation in TNP, it would be crucial to get more detailed and especially quantitative data on the situation in order to counteract in any way.

Analysis of the survey showed further that there are small differences in perception of the recreational trails depending on the user group. Nature based tourism research often indicates that the type of recreation and the way in which an area is managed is largely responsible for visitor perception (e.g. Hammit and Cole, 1998; Leung and Marion, 2000). Hiking and riding are two very different types of recreational activities and it appears obvious, that the two user groups have a different take on certain conditions or circumstances. There were only statistically significant differences for five of the 14 tested visual impacts. The impacts: insufficient labeling; broken items; secondary trails; water accumulations and garbage had different levels of acceptance. Hikers had lower levels of acceptance for insufficient labeling and secondary trails, where as riders were less tolerant when it comes to broken items, water accumulations and garbage. The angle at which visitors experience the trails is likely to be responsible for differences in perception. In general horse riders have a greater overview of an area because they are situated higher above the ground. Garbage might be situated at places where only riders can spot it, for example behind the bushes next to the trail or hidden in or around the adjacent vegetation cover or geological formations. The participants who claimed to suffer from insufficient labeling were visitors from abroad, who do not know the area very well. This fact explains to a large part, why there are significant differences in the perception of insufficient labeling and signposting between the user groups. Icelandic riders don't feel such a strong need of signage, because they are familiar with the recreational trail network and foreign riders on organized tours don't need the signage because they are guided through the park. Hikers, almost all of whom are foreign visitors, however, are travelling privately and would like to have more informational and especially orientational signage. Additionally, it can be assumed, that the significant differences are also, to a great part, due to different expectations of park users. Riders often had much higher expectations concerning the physical trail conditions because they expect to be able to travel at a certain speed through the park.

While trying to reach high visitor satisfaction by considering various needs, it is very difficult to live up to everyone's expectations at the same time. Balancing hiker's, rider's and the environment's needs and yet keeping the places' naturalness and purity is a difficult task, that is also discussed and performed in other well visited Icelandic tourist sites in the central highlands (e.g. Sæþórsdóttir, 2014). Reaching such high satisfaction levels of visitors to TNP indicates that their expectations on experiencing Icelandic nature have in general been met. Besides, results show that crowdedness with other users, irrespective of the recreational type, was absolutely no issue for participants. Several studies about the carrying capacity and the environmental condition of popular tourist destinations in the Icelandic highlands (e.g. Ólafsdóttir and Runnström, 2013; Sæþórsdóttir, 2013) show that crowdedness and overuse are a critical problem, which needs a lot of consideration in sustainable environmental and tourism planning. In this study visitor concentrations did not exceed participants levels of tolerance. A survey of the Icelandic Tourist Board shows that 72% of all visitors to Iceland in the summer of 2013 visited the Golden Circle, including the destinations Thingvellir National Park, Gullfoss and Geysir, where as only 23.4% visited Landmannalaugar (Icelandic Tourist Board, 2014). This means that in total, a greater number of visitors travelled to TNP, yet there could not be registered any over crowdedness. Results from this survey suggest therefore, that infrastructure, as well as maintenance of the recreational trails live up to visitors' expectations. It can further be assumed, that visitors do not have the expectation to exclusively experience a certain place

on their own, i.e. alone, with fewest possible other visitors, as this would be the case in wilderness areas (e.g. Sæþórsdóttir, 2014). TNP is more considered to have cultural character (e.g. Helgadóttir, 2011), than adventure, suggesting that expectations concerning the solitude and wilderness experience are not the same as in the central highlands of Iceland.

## **5.2 Visitors' Environmental Awareness**

Of the 20% of all participants who said they had left the trail at some point of their travels, most did so in order to relieve themselves. Knowing this, it can be assumed, that there was no intention to disobey the environmental code of conduct, but simply a consequence of missing facilities within the trail network. Of course the results only reflect a small portion of visitors' behaviour and misses out on participants who would leave the trail willingly to ignore the code of conduct. It can also be assumed that such visitors would not necessarily be willing to state their intentions or admit their disobedience in a survey.

Even though two thirds of all the participants claimed that they were not previously informed about the environmental code of conduct, results for not leaving the trail (78%) suggest, that in general, knowledge about right behaviour and best environmental practices must still exist. Therefore it cannot be generalized, that there is a lack of environmental knowledge. Many of the partakers in the survey who said they had not been informed previously added in the comment section that they were not specifically instructed about the environmental code of conduct at TNP itself, but they had been to other parks, reserves and protected areas before and claim to know about best practice. This information leads to the conclusion that, irrespective of the source of information, visitors are sensitized already. Studies about prevention through information (e.g. Cole et al., 1997; Duncan and Martin, 2002) show that education can result in increased environmental consciousness and thereby promote more respectful and responsible handling of nature. The most often mentioned source of information is tour guides, which is however only true for riding guests of Eldhestar, because there were no other riders or hikers on an organized tour with a guide. Ten percent of the visitors, all riders, were informed by family members, leading to the conclusion that broaching the issue of environmentally responsible acting on private communication grounds can bring success. There is still great potential in terms of information flow on many different levels. According to different interviewees, TNP is aware of the lack of information and it seems only to be a matter of time before additional instructional posters, signs or words of advice are introduced. This would, in consequence, also satisfy the wish for further education on the topic, expressed by many participants of the study. The putative lack of environmental knowledge of the participants found in this study might have to do with the potential neglect of environmental topics in Iceland, also discussed in literature (e.g. Johannesson et al., 2010, Huijbens and Jóhannesson, 2013) and underlines the need for more educative material. Making visitors understand the precarious state of the trails and explaining the impact that weather, climate and of course users have on the trails would most likely lead to better understanding and handling of the situation. Last but not least, when looking at TNP's responsibilities as Protected Area recognized by the IUCN (category II), is it the park's duty to promote not only recreation, but also education as main conservation objective (IUCN, n.d.).

The dialogue with TNP interpretative planner, Einar Sæmundsen, and the park's head ranger, Guðrún Krístinsdóttir, revealed a lot of interesting aspects concerning riders' environmental awareness and behavior in the National Park. In terms of environmental impacts of horse riding, TNP staff express surprisingly little concern. People only occasionally leave the trails and thereby cause harm to the natural environment due to trampling. The whole National Park area is vegetated with extremely dense shrub and low woodland, which certainly hinders people from leaving the trails easily. Only individual riders with at the maximum one additional horse would occasionally try to traverse the very difficult terrain of the National Park on secondary trails, and this did not occur often. As the survey results confirm again, horse riders who travel with herds most often stick to the bridle trails because it is rather hard and troublesome to get through the dense vegetation. TNP rangers and other staff members further mentioned problems of various kinds associated with riders not following the code of conduct. For one, there are occasionally riders who would rather drive their herds over the asphalted main road number 36 instead of taking the longer bridle trail which leads by Hrauntún. This obviously slows down car traffic on the road, blocking the way for travelers to the east and also causing danger to oncoming cars in the westbound direction. This incident reflects very well, what is meant by comments like the one mentioned earlier in the result section, saying, that there are too many restrictions for visitors. Certain riders, who used to know the old rules to the National Park, are apparently having a hard time adapting to the new rules. Another incident mentioned in the context of not following the code of conduct happened only recently. A group of riders who were trying to cut their route short cut down a sheep fence to get through to the other side in a more direct way. Luckily, events like these do not take place every day, -but the alarming findings are, that in recent years incidents have been increasing in number.

## **5.3 Sustainable Trail Management**

The open question about desired changes to trail management at the end of the survey had the advantage that it was non suggestive and entirely up to the individual to state their opinion. On the down-side, there were quite a lot of partakers who simply answered in one or two words, which at times could be very vague and incomprehensible. Like already discussed above do visitors suggestions mainly focus on the following three improvements: 1. improving the physical conditions of the trail, 2. enhancing sanitary infrastructure and 3. providing better education. All of these options have potential to upgrade the recreational trails without jeopardizing the naturalness of their appearance.

### **5.3.1 Trail Improvement**

The trail network in TNP is the basic infrastructure for visitors to enjoy nature and perform their recreational activities. In many ways, the trail's physical condition is jointly responsible for the enjoyment and satisfaction that visitors gain from travelling through TNP. As stated in the Thingvellir National Park Management Plan 2004-2024, Thingvellir represents a romantic sanctity for many Icelanders, related to nationalism and the campaign for independence that has by all means to be untroubled by any major change. The Thingvellir commission stresses the fact that it is highly unlikely that the Icelandic public would ever accept major development within the National Park to facilitate guests'



enjoyment however, they point out, that the public seems to be more open towards changes, as long as they do not exceed the limits of conservation (Thingvellir National Park Management Plan 2004-2024). The desired changes most often named by the partakers concerned the improvement of the trails by removing big stones in order for them to hike and ride more smoothly, widening and leveling the trails to make cross passing easier. Taking this action would however lead to follow-up problems such as more erosion. Then again, a consequence of erosion is often the progressive widening of the trail, as people tend to circumvent the wettest, muddiest and most instable parts of the trail. Decreasing soil stability, the main problem of removing anchor stones, is a topic that is well known in the international context (e.g. Newsome et al. 2004, Newsome et al. 2008). Besides the afore mentioned environmental impacts of removing rocks, this action would also lead to an increase in travelling speed of horse riders, as discussed earlier in chapter 5.1. This could not only potentially be dangerous to other users but also increase the erosion effects of horse trampling because more force is applied to the ground. In order to maintain the naturalness of the trails, which is highly appreciated and positively recognized by visitors, and to minimize soil destabilization, an option could be to displace only loose rocks. Where the terrain gets too difficult and rocky, there is the option of widening the trail manually placing a supportive underlying material such as gravel from the nearby surroundings. The complete avoidance of trampling effects, however, is neither possible nor desired. The outcome of many talks and the qualitative interviews with the staff of TNP clearly show that management strives to harmonically combine riding and hiking activities, and therefore it is essential that users are made aware of one another and educated about the cultural and historical importance of horse riding in TNP. By raising awareness and promoting the respective user groups' interests, the chances of reaching a higher level of tolerance rise and potential fields of conflict can be minimized. Even though the current state of the recreational trails is very good and visitors are generally satisfied, the situation might change very quickly in the near future with growing visitor numbers, longer tourist seasons and more intensive use. As the management board and Thingvellir Commission are not only aware of the fact, but already looking ahead and searching for optimal solutions, the results from this survey can serve as suggestive material on visitors preferences. Interestingly, one of the suggestions from visitors was the enhancement of the trail network, which is already under discussion in the Commission. At the moment it seems very likely that there will be changes to the trail network in the near future. Conditions vary over the park and especially in the northern part the conditions are not as good as further south. It will definitely continue to be a challenge to manage recreational trails in TNP, but at the moment, the balance between conservation efforts and pleasing all user groups is in a good stand. Moderate changes that do not interfere with the naturalness of the trails would include widening the trails slightly, where possible removing large, loose rocks that do not contribute to the trails entire stability and which would not allow for an acceleration of horse riders traveling speed.

### **5.3.2 Enhancement of Sanitary Facilities**

Parallel to the findings of this study, did also the Icelandic Tourist Board (2014) report that visitors to various Icelandic tourist sites lack public lavatories. As mentioned above, was leaving the trail to relieve oneself the case for most of the participants who answered, that they had left the trail. Not only does the wish for additional toilets show in the amount of people leaving the trail, but results for suggestions on possible improvements to the

infrastructure also identify enhancement of sanitary facilities as major point. The need for clean and organized sanitary infrastructure has to be weighed against the intention of keeping nature untouched by not disturbing the naturalness of a place. However, with rising visitor numbers and considering how frequently people answered that they left the trail to use the bathroom, it seems to be unavoidable for TNP to install additional facilities. By indicating the presence of these toilets on a signpost, visitors could be sensitized to not leave the trail whenever or wherever, but rather to wait until the major intersection. Keeping the facilities simple to ensure a minimal interference with the naturalness of the places is key to the right balance between safeguarding the ecosystem and offering visitors basic infrastructure.

### **5.3.3 Restrictions and Education**

Last but not least was the repeatedly expressed concern and high degree of annoyance about the restrictions on riding, for example, to Almannagjá and or, over the asphalted road. Riders' (no hikers mention any such concerns) argue that Thingvellir has always been a horse connected place and by taking horsemanship away from Thingvellir, it loses a lot of character and original charm, not to mention a big part of its historical significance. A lot of frustration was also felt in some peoples' voices, since for them the park is managed in favor of the wrong kind of visitors. Roads have been expanded, continuously maintained and changes have occurred. For horse riding to them it seems however, that more and more restrictions are about to be implemented. These rather harsh expressions were made by Icelandic riders who were on private tours through TNP. It is important to keep in mind, that even though results show to be fairly negative, it was only half the partaking riders who were so dissatisfied with the situation. The other half however, were guests on organized riding tours and did not mention any dissatisfaction with any restrictions to trail use at all.

When different interviewees were asked about their perception of this problem, they highlight the exact same situation. Horse riders in TNP can be distinctively categorized into two groups. On the one hand there are the riders on organized tours by certified horse based tourism businesses and on the other hand there are private riders who drive their horses to the summer pastures via TNP. The striking point is how these two groups of visitors differ in terms of their social behavior. The organized tour groups always follow the trails and the guides do not only function as caretakers of the group (i.e. the people) but are also in charge of managing the herding (i.e. the horses) and generally there are no offences against the National Park rules. It seems however, that private riding groups and their herds have caused quite a stir especially due to their social behavior. Since 2011 an increase in incidents has been observed. Excessive alcohol consumption has apparently led to people's inability to control their herds in an appropriate way and horses have been reported off track or even missing. Related to the herd controlling problem is also the fact that in recent years the number of horses have increased compared to the number of riders driving the herd. In addition to the earlier mentioned drunkenness, riders' general behavior has occasionally been quite worrisome. The unwillingness to follow the code of conduct has caused problems as riders refused to respectfully handle the environment and infrastructure. For example, Skógarhólar camp site has been found by the wardens with huge amounts of garbage lying around.

To conclude on the issue of restrictions, it needs to be highlighted, that a) only a very small number of people feel disturbed or restricted and b) individual riders used this survey certainly to a big extend to give voice to their particularly frustrated view about changes that TNP has gone through over the years, but by no means reflects the majority of partakers' opinions. It is further very likely that future generations of riders won't feel disturbed by the current restrictions as they have grown used to today's handling and management of the park.

## **5.4 Limitations**

Due to the very short period on conduction of the survey and limited human resources, it was unfortunately not possible to reach out to a larger public. Small sample sizes can affect statistical analysis (Veal, 2011), meaning that the results of this study are potentially biased. In order to make more reliable statements and statistically meaningful analysis, a bigger sample, a longer period of survey distribution and collection and a more randomized method of distribution would be indispensable.

Future research on the topic of recreational trail degradation and visitors' satisfaction levels at TNP is preferably of qualitative and quantitative character. For the gathering of potential visual impacts, this survey presents a good option. To measure the level of environmental knowledge holistically and determine the degree of implementation however, it lacks important additional data and would also ask for more specified analysis. The results can however be interpreted with the additionally gained information through the qualitative interviews.

## **5.5 Concluding Remarks**

The following list of concluded remarks summarizes the most important findings of this case study as follows:

1. Visitors are generally very satisfied with the environmental condition of the recreational trails, as they live up to their expectations of Icelandic nature.
2. The three main visual impacts, caused by hiking and horse riding activity, on and adjacent to the multi-use trails are: 1. trail erosion, 2. the development of secondary trails and 3. trampling effects of horses.
3. No general lack of environmental knowledge was identified. What visitors were missing, however, was to be informed anew, from TNP, and in a more detailed, park-related form.
4. The majority of respondents who left the trail needed to relieve themselves. With the introduction of basic, near to nature sanitary facilities within the trail network, the situation could be improved a lot.

5. Potential improvements to the trails, without endangering their naturalness include moderate widening and removal of loose rocks. Enhancement of the network is another option being discussed by the managing board.
6. No conflicts between the different user groups were noticed, but a minor revolt of privately organized groups of riders who occasionally refuse to follow the code of conduct.

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# Appendix I: The Survey

## Riding Trail Conditions in Thingvellir Nationalpark

Survey conducted by Charlotte Huber  
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*Survey conducted under supervision of:*

**Rannveig Ólafsdóttir**, Senior Lecturer, University of Iceland, Engineering and Natural Sciences - Faculty of Life and Environmental Sciences  
**Anna Dóra Sæþórsdóttir**, Senior Lecturer, University of Iceland, Engineering and Natural Sciences - Faculty of Life and Environmental Sciences

This survey seeks to investigate visitors perceptions of the riding trail conditions in Thingvellir National Park. It is part of a Masters Thesis at University of Iceland in the program of Environment and Natural Resources. Please complete the following survey in order to help ensure environmentally responsible management and maintenance of the riding trails. Thank you for your time.

All information is treated confidential and cannot be traced back to the individual.

Age

\_\_\_\_ Years

Gender:

☐ female ☐ male

Nationality:

\_\_\_\_\_

### 1. How are you travelling?

☐ On horseback

☐ On foot

☐ By bike

### 2. What kind of trip are you on?

☐ Organized Tour by Horse Rental or Travel Agency

☐ Private

### 3. How long are you travelling for?

\_\_\_\_ Hours

☐ Half a day

☐ Day Trip

☐ Multiple day trip

—

\_\_\_\_ Days

**4. How much time of your trip have you spent here in Thingvellir National Park?**

\_\_\_\_\_ Hours

**5. How many stops have you so far taken within the park boundaries?**

\_\_\_\_\_ (Number)

**6. How many of the stops were in designated stopping areas (marked with wooden beams)?**

\_\_\_\_\_ (Number)

**7. How satisfied are you with the trails here in the National Park in general?**

☐ Very satisfied    ☐ Satisfied    ☐ Indifferent    ☐ Unsatisfied    ☐ Very unsatisfied

**8. Is there anything that visually disturbed your experience during your trip?**

☐ Yes    ☐ No

If yes, what? \_\_\_\_\_

\_\_\_\_\_

**9. Did you meet any other visitors while travelling through the National Park?**

	A few individual	Several individual	One other group	More than one group
Riders	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hikers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bikers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**10. Did you encounter any environmental damage while travelling in the National Park?**

	very much				not at all
Garbage	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Erosion in the trail	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Damaged vegetation	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Water accumulation	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Secondary trails formed by off-trail riding/ hiking/ biking	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Trampling effects of horses alongside or off-trail	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Damage of geological formations	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

**11. Did anything of the following make your ride unpleasant?**

	very much				not at all
Trail width	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Broken items such as wood beams, gates, fences etc.	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Too crowded with					
Hikers	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Bikers	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Other riders	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Traffic intersections	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5
Insufficient labeling/signposting	<input type="checkbox"/> 1	<input type="checkbox"/> 2	<input type="checkbox"/> 3	<input type="checkbox"/> 4	<input type="checkbox"/> 5

**12. Did you leave the trail at any point?**

☐ Yes ☐ No

If yes, why? \_\_\_\_\_

\_\_\_\_\_

**13. Did you feel there is any lack of facilities during your trip in the National Park?**

☐ Yes ☐ No

If yes, what? \_\_\_\_\_

\_\_\_\_\_

**14. What was your prior motive to choose Thingvellir National Park as destination?**

<input type="checkbox"/>	The Park's historical and cultural significance
<input type="checkbox"/>	The unique geological setting
<input type="checkbox"/>	Horse Riding was the main interest
<input type="checkbox"/>	Other, What _____
	_____

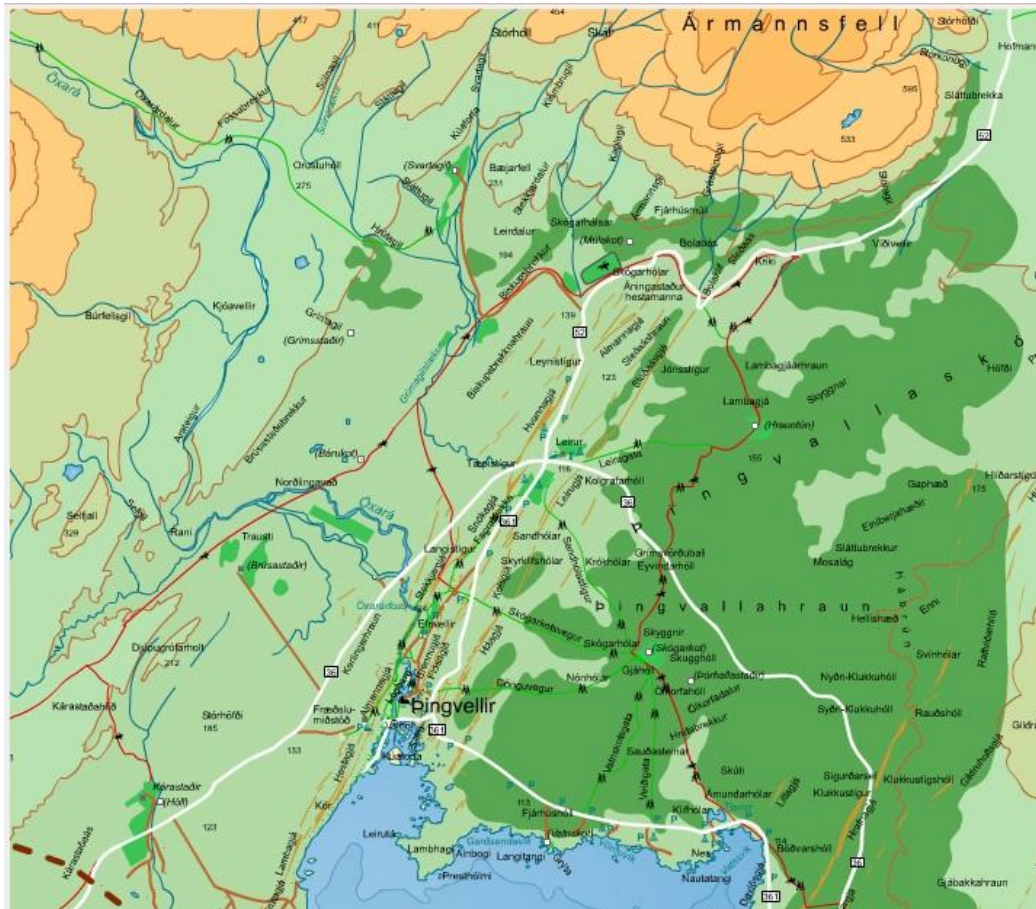
**15. Were you previously informed about the environmental code of conduct in the National Park?**

☐ Yes ☐ No

If yes, by whom?

\_\_\_\_\_

16. Please mark all of the trails and tracks you took on your trip in the National Park.  
(Also the ones which might not be indicated in the map as such.)



17. What is your opinion of the environmental condition of the multi-use trails in Thingvellir National Park?

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...and in Iceland in general?

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Thank you very much for taking the time to complete this survey. Your feedback is valued and very much appreciated!

# Appendix II: Semi Structured Interviews

## Type A

### Riding Trail Conditions in Thingvellir Nationalpark

Interviews conducted by Charlotte Huber  
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*Interviews conducted under supervision of:*

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*Anna Dóra Sæþórsdóttir, Senior Lecturer, University of Iceland, Engineering and Natural Sciences - Faculty of Life and Environmental Sciences*

#### Administrative

1. *Do riders have to give notice about their entrance into TNP?*
2. *Does TNP have any overview over riders numbers and/or horse numbers coming to TNP?*
3. *Do Horse Rentals have to have special contracts in order to take guests into TNP?*
4. *Do you ask people to follow a specific code of conduct when riding through TNP?*  
*If yes, what are your instructions?*
5. *In the management plan 2004-2014, very little is said about how horse riding activities are managed. Why is that?*

#### Trails, Maintenance and users conflicts

6. *The recreational trails may be used by both hikers and riders. Has this always been like that? Did the Thingvellir commission ever think about changing that?*
7. *Are there any conflicts between the riders and hikers who use the same trails?*
8. *Why are there no signs on the riding trails (also on the regular streets) whenever one enters the park area?*

- 9. Who is responsible for the trail building and maintenance?*
- 10. What material is used for the construction of the trails?*
- 11. Where does it come from?*

#### Management Plan

- 12. Does the Thingvellir Comission monitor the recreational trails in some way? Only seasonally or during the whole year?*
- 13. Is there any documentation from recent years available?*



## Type B

### Riding Trail Conditions in Thingvellir Nationalpark

Interviews conducted by Charlotte Huber  
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**Anna Dóra Sæþórsdóttir**, Senior Lecturer, University of Iceland, Engineering and Natural Sciences - Faculty of Life and Environmental Sciences

1. *Company's name*
2. *Position of Interviewee*
3. *In what period or season of the year do you offer tours that go through Thingvellir National Park (TNP) and when do you take most groups?*
4. *How often and how regularly does your company take guests to or through TNP?*
5. *How big are the group sizes usually that you take to TNP?*
6. *Do you have free running horses with you?*
7. *Do you always go on the same trails?*
8. *Please indicate on the map below how often you chose which trail and color it accordingly. (red: most frequented, yellow: sometimes frequented, green: least frequented)*

