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Vernd og orkunýting landsvæða

Attitudes of tourists and the tourism industry towards the proposed hydro power plant in Hverfisfljót river in Skaftárhreppur

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Preface

This report presents a research of the effects of a proposed hydro power plant at the river Hverfisfljót on tourism and recreation. It was conducted per the steering committee of the 4th phase of the Icelandic Master Plan for Nature Protection and Energy Utilization's request. I thank the Ministry for the Environment and Natural Resources for the financial support and special thanks to Herdís Helga Schopka, specialist at the ministry, for the cooperation. I also thank Guðrún Pétursdóttir, the chairman of the steering committee of the 4th phase of the Master Plan for the trust to lead this project, as well as my co-workers in Workgroup 2 Anna G. Sverrisdóttir, Einar Torfi Finnsson, Guðmundur Jóhannesson, Guðni Guðbergsson, Ólafur Örn Haraldsson, Sigþrúður Stella Jóhannsdóttir and Sveinn Runólfsson.

I thank all the travellers who gave their valuable time and shared with us their experiences and opinions, as well as all the tourism stakeholders in Skaftárhreppur and Reykjavík who taught us a great deal about tourism in the area.

Finally, I thank Guðrún Valdimarsdóttir who translated and transcribed the interviews with the tourism industry and made language revisions. Additional thanks to Þorkell Stefánsson who created the excel figures and assisted with descriptive statistics. Edita Tverijonaite carried out the bulk of the work of this project. She went on two hiking trips in the area with tourists, spread out questionnaires among them and conducted interviews with them. She furthermore made the maps and wrote the report in cooperation with Rannveig Ólafsdóttir and the project manager. The undersigned project manager conducted the interviews with the tourism stakeholders.

Anna Dóra Sæþórsdóttir
project manager

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Highlights

- Very few travellers visit the area around the proposed Hverfisfljót hydro power plant as it is isolated by large rivers as well as due to the limited infrastructure.
- According to tourists and tourism operators the main attraction of the area is the pristine, wild and diverse nature.
- The area is of especially high value for the most purist visitors who prefer unspoiled nature with no or very limited infrastructure and few other visitors.
- The proportion of purist visitors in the area is much higher compared to other natural areas in Iceland.
- The demand for tourism infrastructure in the area is very low.
- Energy development in the Highlands is perceived as negative by the majority of visitors in the area, the attitudes are more positive towards energy development in areas of Iceland that are already more developed.
- Visitors state that the proposed Hverfisfljót hydro power plant would reduce their interest in travelling in the area and would negatively affect their experience.
- The tourism operators using the area think that the construction of the proposed Hverfisfljót hydro power plant would negatively affect their businesses and that they would stop using the area for their tours as it would destroy their main product – the wilderness.
- Some of the accommodation providers see the power plant development as an opportunity since it would increase the accessibility of the area for their customers.
- According to most of the participants the value of the area for tourism will increase if it remains undeveloped.

1 Introduction

This report presents a research that aims to evaluate the potential effects of the proposed Hverfisfljót hydro power plant on tourism and recreation. The research is conducted as part of the 4th phase of the Icelandic Master Plan for Nature Protection and Energy Utilization. The general aim of the Master Plan is to categorize proposed power plants in Iceland into either an energy utilization category or a protection category. Expert committees in each phase of the Master Plan evaluate the various aspects of the utilization of natural resources. One of them, i.e. committee two, focuses on the use of natural resources for tourism and recreation, as well as agriculture, fishing and hunting (Ministry for the Environment and Natural Resources, n.d.-b). The first phase of the Master Plan started in 1999 and ended in 2003 and the second phase lasted from 2004 to 2010. The recommendations of the second phase resulted in a proposal for a parliamentary resolution and was passed by the Icelandic Parliament in 2013. The third phase of the Master Plan started in 2013 and ended in 2017 and the fourth phase started in 2017 and is due to be completed in 2021 (Ministry for the Environment and Natural Resources, n.d.-a).

In the Master Plan the power plant proposals that cannot be appropriately categorized into either energy utilization or protection are grouped into a third category named 'needs further research', which was the case with the proposed Hverfisfljót hydropower plant, both in the second and third phase of the Master Plan. This study aims to provide the knowledge needed for further decision-making regarding the impact that Hverfisfljót hydro power plant could have on tourism and recreation by i) assessing the value of the area around the proposed Hverfisfljót hydro power plant for tourism and recreation and ii) evaluating the impacts of the proposed Hverfisfljót power plant on tourism and recreation, based on its description from the third phase of the Master Plan (R3115A). The research questions of the study are as follows:

1. What are the main attractions of the area for tourists, how do they perceive the area, how satisfied are they with their visit and what activities do they choose in the area?
2. What are the main attractions of the area according to the tourism industry, how do they use the area, and how would they like to use it in the future?
3. What is the value of the area according to tourists and the tourism industry?
4. What infrastructure do tourists and the tourism industry prefer in the area?
5. How can tourists in the area be categorized into groups on the so-called Purist Scale according to their preferences on naturalness?
6. What is the opinion of tourists and the tourism industry when it comes to the proposed Hverfisfljót hydro power plant?

7. How would the proposed Hverfisfljót hydro power plant affect tourism in the area and its possibilities in the future?

The study is based on a questionnaire survey and interviews with visitors in the area around the proposed Hverfisfljót hydro power plant, as well as on interviews with the tourism industry, i.e.: tourism operators, accommodation providers, and other tourism stakeholders in Skaftárhreppur municipality and in Reykjavik. The next chapter discusses how people perceive power plant constructions in natural areas. In the following chapters a description of the research area is provided, along with an account of the methods that were employed and the data processing. The results provide an analysis of the visitor survey, as well as the interviews with tourists and then the interviews with the tourism industry. Finally, the main results are discussed in the wider context.

2 Nature based tourism and hydro power plants

Low carbon energy, such as hydroelectricity, is generally well received among people as a renewable alternative to energy sources like fossil fuels (e.g. Klöpper, 2008). Nevertheless, it is inevitable that power plants and other infrastructure necessary for the harnessing of hydroelectric energy alter the surrounding landscape.

Infrastructure accompanying a hydroelectric power plant includes buildings, dams, canals and reservoirs. Every power plant requires a manner to transfer the energy harnessed from the site of production to the demand site, which makes transmission lines a fundamental part of the infrastructure. Their effect on landscape perception and place attachment is considerable because of their size and visibility. Power plant construction is generally followed by road development. The effects of roading are twofold: firstly, roads visually impact the landscape, furthermore, improved accessibility can lead to an increased number of tourists, as well as change the type of tourism in the area (Johnson, Hall, & Cole, 2005; Tverijonaite, Ólafsdóttir, & Thorsteinsson, 2018). Other side effects of hydroelectric power plants include a reduction of water volume in waterfalls and rivers or even their disappearance, along with changes in the turbidity of rivers and in the appearance of canyons.

Nature-based tourism locations are commonly considered less attractive after the arrival of a power plant and the accompanying infrastructure (Tveit, Ode, & Fry, 2006). Accordingly, disapproval of power plant development is generally more fervent in natural areas with a high-quality landscape (Nadaï & Horst, 2010), than in areas already impacted by other developments (Devine-Wright & Batel, 2013). It has furthermore been illustrated through several studies (Frantál & Kunc, 2011; Johansson & Laike, 2007; Pasqualetti, Gipe, & Righter, 2002; Smardon & Pasqualetti, 2017; Wolsink, 2007, 2010) that people's disapproval of renewable energy is mostly due to the visual impact of the accompanying infrastructure, which appears to greatly reduce their wilderness experience.

Not all tourists have the same preferences when it comes to the "naturalness" of tourist destinations, some prefer more infrastructure and man-made commodities, while others are most appreciative of unspoiled wilderness. A common method for distinguishing tourists' preferences (Fredman & Emmelin, 2001; Hendee, 1968; Ólafsdóttir, Sæþórsdóttir, & Runnström, 2016; Vistad & Vorkinn, 2012) is the Purist Scale, a model that groups tourists into the categories of purists, neutralists and non-purists based on their approval of qualities and sceneries in different nature destinations, including wilderness areas. Non-purists value good facilities and pay little attention to

crowds and changes to the natural landscape, while purists prefer isolation, unspoiled landscapes and do not mind a lack of facilities.

In Iceland studies conducted in nature destinations concluded that tourists are fairly negative to pending power plant constructions despite the harnessing of low carbon energy. This includes transmission lines (Stefánsson, Sæþórsdóttir, & Hall, 2017), wind farms (Sæþórsdóttir, Ólafssdóttir, & Smith, 2017), and hydroelectric and geothermal power plant proposals (Sæþórsdóttir & Saarinen, 2015). On the other hand, a study conducted at the existing Blanda hydro power plant at the edge of the North Central Highlands of Iceland reveals that with the exception of transmission lines, the power plant infrastructure does not seem to disturb the experience of the majority of tourists coming to the area. Furthermore, tourists at Blanda are also more positive towards power plants than at locations where there are no power plants but where they have been proposed. The effect of reservoirs in a landscape can also potentially be positive, as they can resemble natural lakes (Sæþórsdóttir & Hall, 2018). In Walden, Henry David Thoreau (1854) declared: "A lake is the landscape's most beautiful and expressive feature. It is earth's eye; looking into which the beholder measures the depth of his own nature." Nonetheless, the areas that disappear under a reservoir are often vegetated, which results in a drastic change to the landscape and the ecosystem. Moreover, the fluctuating surface of reservoirs can be less than attractive when it is low and covered in silt, which in turn can be an aggravating factor in land erosion.

3 Settings and the research area

3.1 Tourism in Skaftárhreppur municipality

The Hverfisfljót river is situated in Skaftárhreppur municipality in South Iceland (Figure 1). According to surveys conducted by the Icelandic Tourist Board (2016, 2017), the South is the second most visited region of Iceland after the Capital area. In 2015-2016 around 70% of tourists visited the Southern Region during the summer season and 55% in winter (Icelandic Tourist Board, 2017). Many visit the South as a daytrip from Reykjavík, but over 50% (Icelandic Tourist Board, 2016) stay overnight in the region. Thus, it receives a large proportion of all international tourists visiting the country.

Although Skaftárhreppur municipality is the second largest municipality in Iceland (NLSI, 2018), its population is very small. On the 1st of January 2018 the municipality had 560 inhabitants (Statistics Iceland, 2018b). Over the last five years the population in Skaftárhreppur municipality has been growing. The number of Icelandic residents has been rather stable during this period, fluctuating between 410 and 440 people, the number of foreign residents, however, rose rapidly from around 20 people in the third quarter of 2013 to 170 people in the third quarter of 2018 (Statistics Iceland, 2018b). This increase is most likely due to the growth of the tourism industry in the municipality and its increased demand for workers (Sæþórsdóttir & Stefánsson, 2017).

Figure 1. The location of Skaftárhreppur municipality and the South (based on data from the National Land Survey of Iceland IS50V geodatabase).

Visitor composition based on nationalities is very similar in Skaftárhreppur municipality, the South and the whole of Iceland (Figure 2), which indicates that Skaftárhreppur receives the general tourist flow and not a specific market. The biggest group of overnight tourists in Skaftárhreppur in 2017 came from the U.S. (15%), almost 12% of visitors were Germans, 11% were Icelanders, 9% were French and 8% came from the United Kingdom (Statistics Iceland, 2018a).

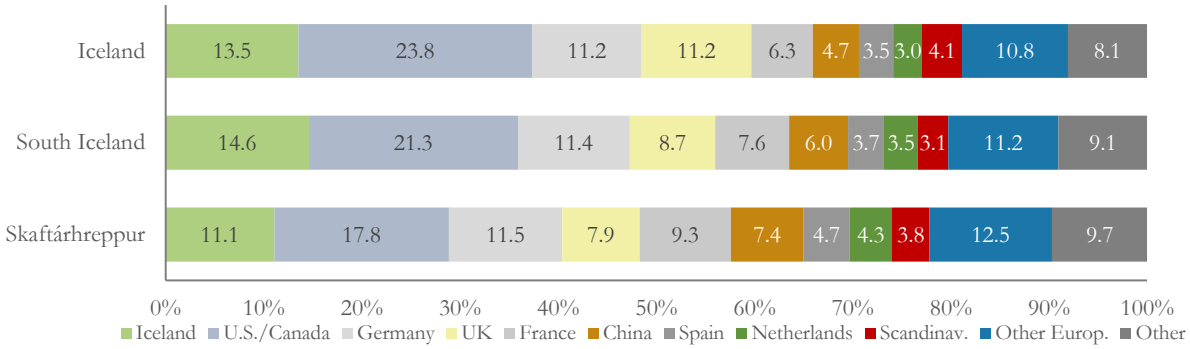

Figure 2. Nationalities of overnight visitors in Iceland, South Iceland and Skaftárhreppur municipality in 2017 (Statistics Iceland, 2018a).

The number of overnights in Skaftárhreppur municipality varies greatly depending on the season (Figure 3). In 2017 47% of the overnight stays were in summer, 21% in autumn, 19% in spring and 13% in winter (Statistics Iceland, 2018a). The length of overnight stays in each accommodation establishment in Skaftárhreppur municipality does not differ much between the seasons.

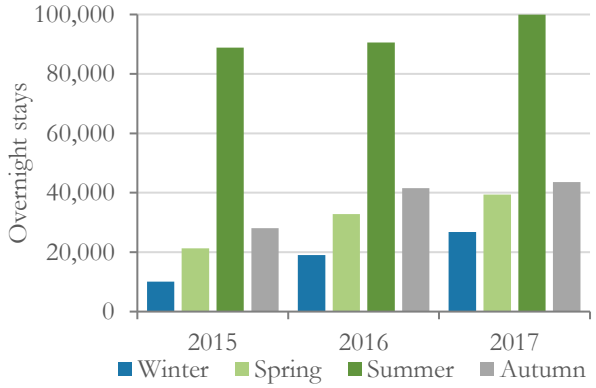

Figure 3. Overnight stays in Skaftárhreppur municipality by season 2015-2017 (Statistics Iceland, 2018a).

In 2017 around 23% of overnight stays in Iceland were spent in the South, thereof 11% in Skaftárhreppur municipality (Statistics Iceland, 2018a). The average number of overnights per tourist spent in one accommodation establishment was about 1.35-1.38 in the South and in Skaftárhreppur municipality, which was somewhat shorter than in Iceland as a whole, where it was about 1,65 overnights (Figure 4). That indicates that most tourists do not spend a lot of time in the

municipality and that the accommodation establishments in Skaftárhreppur, and overall in the South, are used mostly as stops on the way while visiting the South or driving the Ring Road.

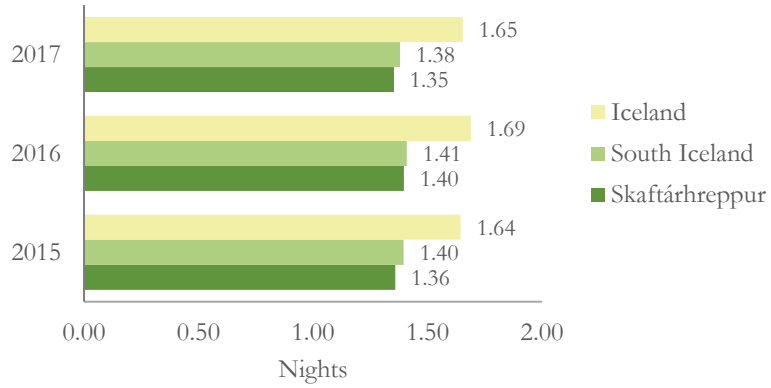

Figure 4. The length of overnight stays in one accommodation establishment in Iceland, South Iceland and Skaftárhreppur municipality 2015-2017 (Statistics Iceland, 2018a).

3.2 Tourism in the Highlands of Skaftárhreppur municipality

The vast majority of tourists in Skaftárhreppur municipality travel along the Ring Road, while relatively few visit the interior Highlands which make up a large part of the municipality's territory. The most popular of the Highland areas is the volcanic fissure Eldgjá visited by around 10,600 people in 2017 and Lakagígar (the craters of Laki), that received around 8,800 visitors (Þórhallsdóttir & Ólafsson, 2018).

A few big glacial rivers flow from the Vatnajökull glacier southwards to the ocean and create hindrances for those who want to travel between the east and west of the municipality's Highlands (Figure 5). One of those rivers is Hverfisfljót with the proposed power plant and another is Skaftá. Eldgjá is located on the west side of Skaftá and Lakagígar are on the east side. Bridges are only available on the Ring Road, consequently travellers must go the Ring Road if they want to travel between the two areas.

The research area includes the area where the infrastructure (e.g. reservoirs, canals and the power plant) of the proposed Hverfisfljót hydroelectric power plant would be located, its nearest surroundings, that would be directly affected by the infrastructure, as well as Hverfisfljót and Hellisá rivers, the water volume in which would be reduced due to the power plant. Thus, it stretches west of Blængur hut, south of Miklafell hut, east of Hverfisfljót river and just south of Síðujökull, as well as along the Hverfisfljót river (Figure 5). Both the research area and Lakagígar have limited accessibility, as they are both located in the Highlands between the two big glacial rivers, Skaftá and Hverfisfljót. Almost all travellers who visit Lakagígar drive on a mountain road (dirt road) which stretches some 50 km north from the Ring Road into the Highlands. It is only passable by 4WD vehicles as it contains some unbridged rivers that need to be crossed. The

research area is located few kilometres east of Lakagígar and the areas are connected by an even smaller dirt track which continues south to the Ring Road past the farm Þverá. Two mountain huts are located in the research area: Blængur to the north and Miklafell in the southern part. In 2007 two traffic counter devices were set up on the road between Laki and Blængur and between Þverá farm and Miklafell. They revealed that 310 vehicles (around 1000 people) went the track leading from Laki to Blængur and 438 vehicles (around 1480 people) between Þverá farm and Miklafell (Sæþórsdóttir, Ólafsdóttir, & Ólafsson, 2007). At that time, i.e. in 2007 about 8500 travellers visited Lakagígar, hence the research area is obviously far less visited. More recent data on the number of travellers in the research area is not available.

Vatnajökull National Park is west and north of the proposed power plant (Figure 5). It is by far the largest national park in Iceland and covers the entire Vatnajökull ice cap and extensive areas around it, including Lakagígar and Eldgjá.

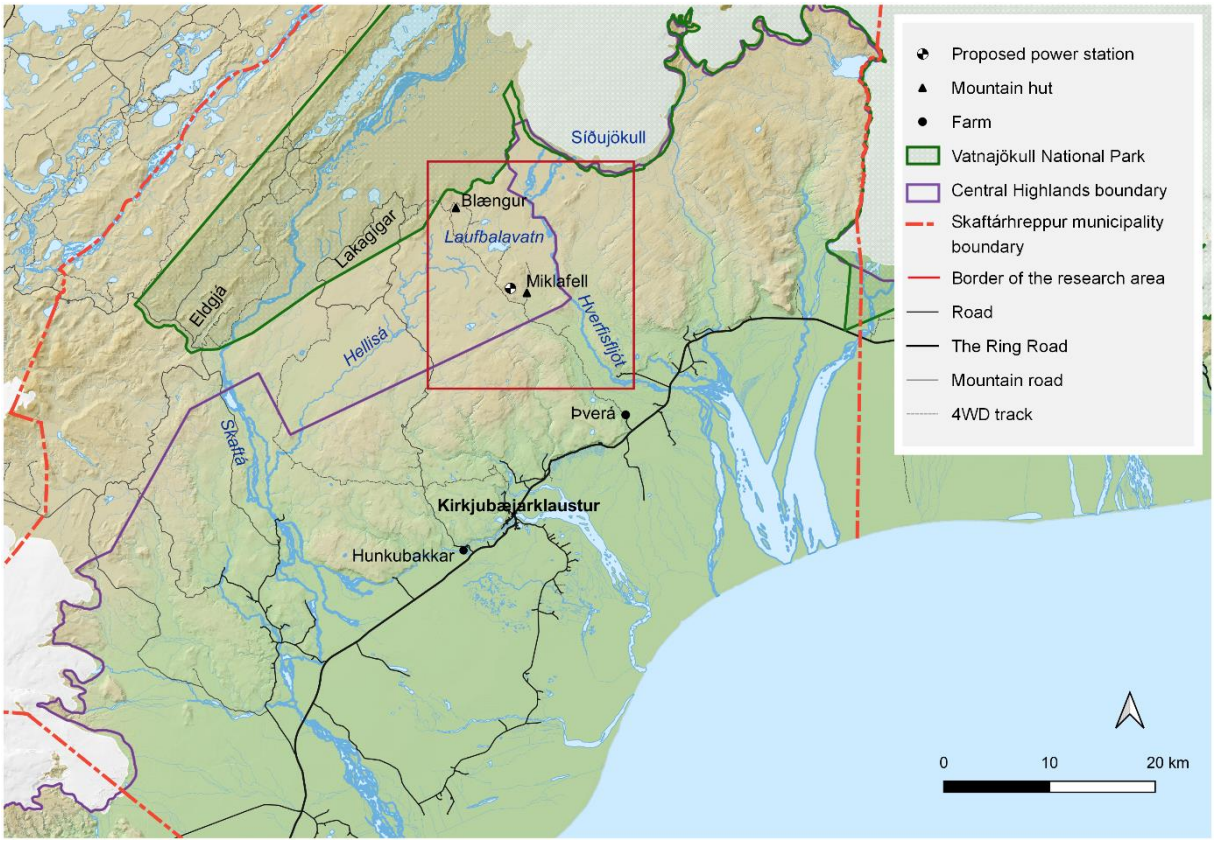

Figure 5. Skaftárhreppur municipality and the research area (based on data from the National Land Survey of Iceland IS50V geodatabase).

Despite the few visitors in the research area and its surroundings, it has a lot to offer to those who do visit. The landscape is diverse, shaped by glaciers and glacial flows, fresh water springs, rivers and lakes, as well as volcanic eruptions. The most recent eruption that strongly impacted the area was the eruption in Lakagígar, also called Skaftáreldar, which occurred in 1783-1784 and is one of

the biggest basaltic flood lava eruptions in Iceland observed in the historical period (Thordarson & Self, 1993). The eruption produced a 27 km long vent system consisting of around 140 craters stretching from the south-west to the north-east and creating a 565 km^2 lava field called Eldhraun. The mountain Laki, from which the name of the eruption derives, was created during an older subglacial eruption and divided the fissure into two segments of similar length. The landscape in the area was affected by the lava flowing from the north-eastern segment of the fissure (Thordarson, Larsen, Steinþórsson, & Self, 2003). According to various chronicles, after reaching the Hverfisfljót river the lava dried up the water of the river and advanced down the river gorge towards the lowlands (Thordarson, 2003). Various landforms can be observed in the Eldhraun lava field created by the eruption in Lakagígar and the lava field is now covered with a thick layer of green moss. In the Hverfisfljót valley, east of Laufbalavatn lake there are complex systems of lava tubes with over 200 caves. Water sinks located next to the lake cause water to cascade into the caves. In the Iðrafossar lava tube cave such water flow creates spectacular water curtains (Kiernan, Wood, & Middleton, 2003). The Lakagígar eruption affected only a part of the research area, another part is covered by the lava originating from the eruptions of Rauðhólar (the red craters) that took place around 3800 BC (Thordarson & Self, 1993). The line of red craters going from the south-west to the north-east can be observed in the area. The rest of the area is made up of the relatively young bedrock created by the interglacial lava flows, extrusive rocks and sediments, and mountains created during the subglacial eruptions (Hjartanson & Sæmundsson, 2014).

3.3 Hverfisfljót hydro power plant

According to the description from the third phase of the Master Plan (Orkustofnun, 2015), the proposed Hverfisfljót hydro power plant (R3115A) is intended to harness the rivers Hverfisfljót and Hellisá (Figure 6) to produce 42 MW. Existing plans assume that an underground power station will be built south of the mountain Miklafell (Figure 6). The water to the power station will then be delivered from the reservoirs via a 3.2 km long underground tunnel (see I in Figure 6). Four dams would be constructed for the power plant: two at each side of Löngusker (see II in Figure 6), one in Laufbalavatn (see III in Figure 6) and one to the west of Miklafell (see IV in Figure 6). The water for the power plant would be collected in three reservoirs. The size of the reservoir near Miklafell (see V in Figure 6) would be 8.6 km^2 at its highest water level and 5 km^2 at its lowest, the reservoir west of Laufbalavatn (see VI in Figure 6) would be 2.2 km^2 at its highest water level, and the reservoir north of Langasker (see VII in Figure 6) would be 11.4 km^2 at its highest water level and 5.5 km^2 at its lowest. The reservoirs would be connected via water channels, with a total length of 3.1 km. According to the plan, a part of the road currently going through the area would be

flooded by the reservoir, tourists would thus not be able to access the destinations Blængur and Lakagígar with the current road. A new road would be built to the construction area along Þverá, it is not clear yet whether a bridge would be built to connect the separated areas (Orkustofnun, 2015).

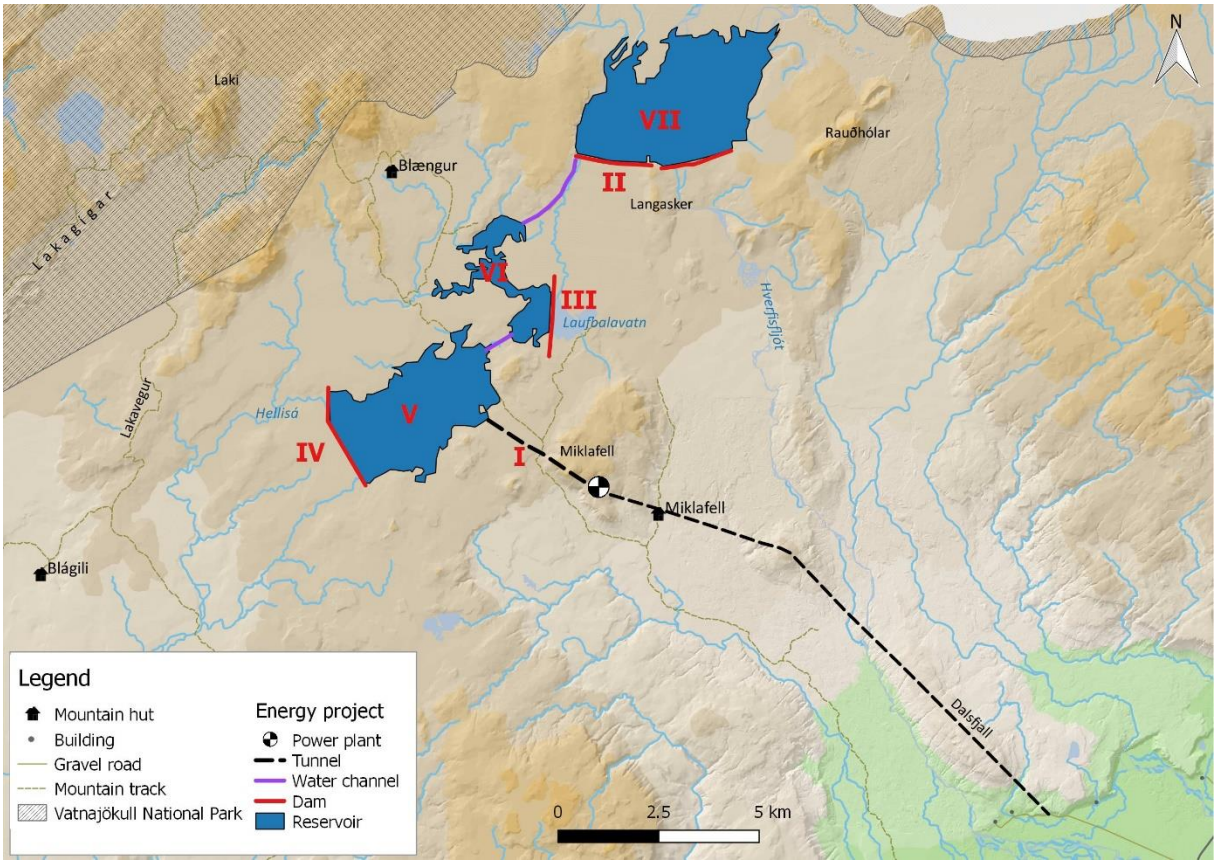

Figure 6. The research area with the proposed Hverfisfljót hydro power plant and accompanying structures (Orkustofnun, 2015). Red roman numbers refer to the text describing the proposed power plant above.

4 Methods

4.1 Research approach

This study uses mixed research methods, combining a questionnaire survey, semi-structured interviews, diaries and participant observation. Questionnaire surveys are very useful for gathering information on a visitor's socio-economic/demographic profile, travel behaviour (e.g. travel pattern, frequency, duration of stay), type of activity, level of satisfaction, other simple opinion questions and people's opinions and attitudes concerning environmental issues (McLafferty, 2010; Veal, 2006). Due to the research area's limited accessibility and wild character, the number of tourists visiting the area is small. This somewhat limits the use of quantitative data and statistical analyses. Therefore, and in order to get a deeper understanding of people's sense of the environment and their relationship with it, semi-structured interviews and diaries were also used. Thus, the research also builds on philosophies of existentialism and phenomenology (Latham, 2010; Palys, 2008). This leads to the data and its interpretation becoming to some extent subjective, as the experiences, values and opinions of the respondents are evaluated subjectively. Phenomenology rejects that nature can be studied objectively as everything is 'relative' and claims that absolute truth is not possible, since individuals always perceive reality within a particular template which varies between people, and therefore truth is contingent, shaped by time, culture and place (Demeritt, 2002). Phenomenologists recognize subjectivity and claim that in order to come to a deeper understanding of the world it is necessary to reflect on one's own consciousness. In their view the world exists for people only as a mental construction and only through the meaning it has to them.

Many researchers (i.e. Clifford, French and Valentine, 2010; Hall and Jenkins, 1995, 1998; Jennings, 2001; Veal, 2006) agree that a mixed method approach has certain advantages in providing a richness of detail and explanatory power in geographical/tourism research. It is desirable if each technique contributes something new to the research rather than just being repetitive of one another. Consequently, and due to the special setting of the research area combining quantitative and qualitative methods was assumed to give the most satisfactory results for the aims of the research.

4.2 Visitor surveys and participant observation

4.2.1 Design of the questionnaire

The questionnaire consisted of 15 single and multiple item questions which could be divided into the following categories:

1. Visitor satisfaction and perceptions of the area.
2. Visitor attitudes towards infrastructure related to energy development, as well as towards other infrastructure and the amount of use by other tourists.
3. The proposed Hverfisfljót power plant and the infrastructure accompanying the plant.
4. Demographic questions (nationality, gender, age).

In order to assist the participants in realizing what area was under discussion, a map (Figure 6) of the research area and the infrastructure pertinent to Hverfisfljót power plant as well as a brief description of the power plant proposal was handed out with the questionnaire. The questionnaire survey was available in English, French and Icelandic and it took the respondents 10–15 minutes to fill it out.

4.2.2 Sampling methods

In the summer of 2018 two tour operators organized tours in the area around Hverfisfljót river, trekking and biking tours. One of them, Icelandic Mountain Guides, had two five-day backpacking tours in 2018 that went through the research area (Figure 7). The first tour took place from the 1st to the 5th of July and the second tour from the 2nd to the 6th of August. The first two days of the tour the participants hiked along the river Hverfisfljót, the part that would be affected if the proposed Hverfisfljót hydro power plant would be built. The last three days the tour went further to the east, out of the research area, and ended at Núpsstaðarskógur. The tours furthermore offered the opportunity to continue to hike for another 4 days and end in Skaftafell. One of the research team members joined these two tours. She introduced herself at the beginning of the tour and explained that she was doing a study on tourism in the area. She asked the participants of the tours to write a diary, which they all agreed to and consequently they were given a notebook and a pencil. The diary keepers were asked to write 1–2 pages daily about their experiences in the area, the highlights of the day, any positive/negative experiences they might have had and the emotions that were aroused during the day. That would be called open-ended diaries (Latham, 2010).

At the end of the second day of the trek, when the participants had just gone through the research area, they were asked to fill out the questionnaire and subsequently a semi-structured interview was conducted with each participant.

Seven people participated in the first tour and eight people participated in the second tour. Thus, 15 interviews were conducted, 15 individuals filled out questionnaires and 15 diaries were received after the tours.

The other company that organizes tours in the research area is a local tour operator, Iceland Bike Farm. It is owned by two sheep farmers (husband and wife) and located around 15 km south

of the proposed power station. They offer mountain bike tours, both day tours and two-day tours, as well as glamping, or glamorous camping, by their farm. They have developed a quite extensive network of mountain bike trails in the area, that mostly builds on sheep tracks but which is also partly developed by them as a natural bike park. One of the research team members participated in one of the day tours and four filled out questionnaires were received from bikers.

In order to evaluate the amount of use of the area for tourism and recreation purposes further, one research team member spent 3 days, from the 27th to the 29th of July 2018 surveying and interviewing people using the road from Þverá to Laki via Miklafell and Blængur. The visitors driving on the road were asked to stop close to the Miklafell mountain hut (Figure 7) and fill out a questionnaire and participate in an interview. Four people in two cars visited the area in three days. All four visitors filled out the questionnaires and two visitors agreed to participate in the interview.

Finally, with the aim of enlarging the sample, at the end of July empty questionnaires were left in the Miklafell hut together with the map and the description of the proposed power plant and a cover letter explaining the study. The filled out questionnaires were collected on October 5th 2018, when nine questionnaires in total had been filled out by the visitors to the Miklafell hut.

Thereby, a total of 32 filled out questionnaires were used for the quantitative data analysis.

4.2.3 Analysing the data

The questionnaires were analysed using descriptive statistics. For the five-point Likert scale questions (for example, from 1=strongly disagree to 5=strongly agree) the proportions, as well as the means were calculated.

One multiple item question was asked with the aim to categorize the visitors based on the Purist Scale (Sæþórsdóttir, 2010a; Stankey, 1973). Using the five-point Likert scale the participants were asked how important, or unimportant, for them are various types of infrastructure, and being able to enjoy peace, unspoiled nature and not to see the impacts of other visitors. The 14 items were used for the segmentation of visitors. During the data analysis, for each answer characteristic to strong purists five points were assigned, and for each answer characteristic to urbanists one point was assigned. The participants with 60-70 points were segmented as strong purists, with 50-59 points as moderate purists, with 40-49 points as neutralists and with less than 40 points as urbanists.

Qualitative data analysis was carried out based on 17 semi-structured interviews conducted with the visitors to the area and 15 diaries. The analysis of the data regarding the environmental settings the visitors are seeking and the reasons why they decided to visit the area around Hverfisfljót river revealed that the answers are in line with the components of the wilderness experience, identified by Sæþórsdóttir (2010b): unspoiled beautiful nature, escapism,

religious/spiritual/historic learning, solitude and companionship, and challenge. Therefore, this classification was applied during the identification of the main reasons for visiting the area.

4.3 Interviews with the tourism industry

In order to provide a better understanding of the importance of the research area for the tourism industry face-to-face interviews were conducted with 15 tourism service providers (Table 1). A purposive sampling was used for selecting the interviewees. Most of the tourism industry stakeholders (11) were located in Skaftárhreppur municipality, while four were located in Reykjavík but organize or have organized tours into the area. Such sampling method allows the collection of the data most related to the research questions. At the same time, it can also lead to bias if the sample is not critically gathered. To avoid that, the sample selection criteria has to be consistent with the research aims (Palys, 2008). For this research tourism service providers who have a direct interest in the area of the proposed power plant and would be directly affected if the Hverfisfljót hydro power plant would be built were selected. They were the following:

1. The managers of the three tour operators organizing tours in the area: Icelandic Mountain Guides, that organizes backpacking tours, Iceland Bike Farm that organizes mountain bike tours and Secret Iceland that occasionally uses the area for its 4WD tours.
2. The managers of two touring and outdoor associations: Ferðafélag Íslands and Útivist. Neither one of them operated tours in the area in the summer of 2018, however they have had many tours in the area in the past and plan to do so in the future.
3. A representative of the Vatnajökull National Park (VNP) as the research area is at the edge of the park and some of its visitors travel through the research area.
4. Two managers/representatives of the mountain huts located in the research area, i.e. Blængur and Miklafell (Figure 7).
5. A total of seven accommodation providers were interviewed in Skaftárhreppur. They were selected from a total of 24 in the municipality. With the aim to focus on accommodation providers that have a potentially stronger interest in the research area, only those located within the 35 km range from the proposed power station were considered for inclusion in the sample, or a total of 16 accommodation providers (Figure 7). The managers of all the five hotels/guesthouses containing 39 rooms and more were interviewed. The managers of all the hotels/guesthouses containing 5 to 38 rooms (five guesthouses/hotels/cottage rentals) were contacted, two of them agreed to be interviewed. The very smallest providers were excluded from the sample (i.e. three guesthouses with less than five rooms, as well as three guesthouses that do not operate all year round).

Table 1. The interviewed tourism service providers.

Accommodation providers in Skaftárhreppur	**Tour operators and other stakeholders**
Blængur Hut	Iceland Bike Farm, Skaftárhreppur
Dalshöfði-Guesthouse	Skaftárstofa, VNP, Skaftárhreppur
Fosshótel Núpar	Ferðafélag Íslands, Reykjavik
Hotel Geirland	Icelandic Mountain Guides, Reykjavik
Icelandair Hótel Klaustur	Secret Iceland, Reykjavik
Klausturhof Guesthouse	Útivist, Reykjavik
Hótel Laki	
Lækjaborgir Guesthouse	
Miklafell Hut	

In order to ensure confidentiality of the participants their names and other personal information are not revealed in the report, instead more generic terms, such as "accommodation manager in Skaftárhreppur" or "a visitor from the U.K." are used.

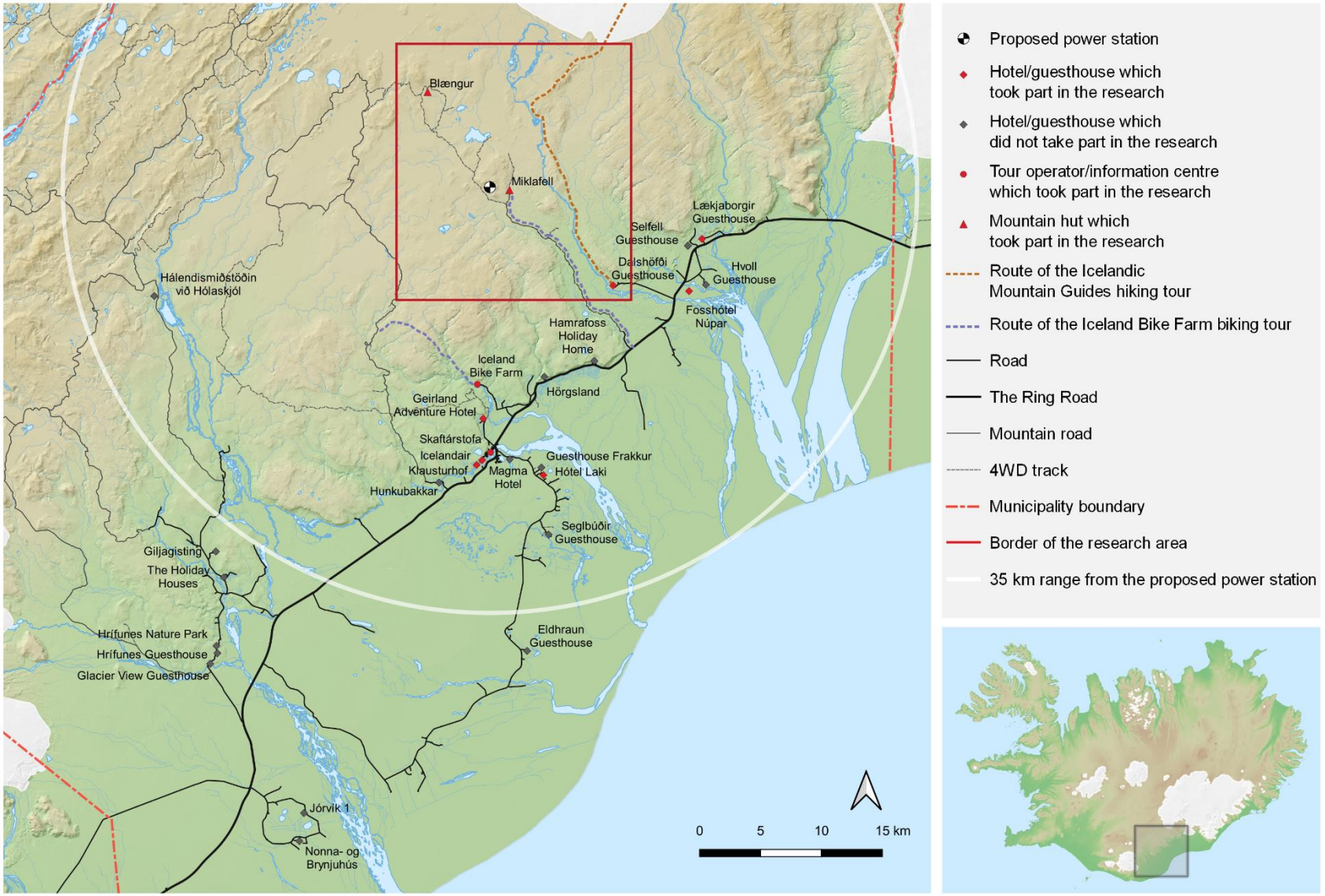

Figure 7. Tourism service providers sampling methods (based on data from the National Land Survey of Iceland IS50V geodatabase).

5 Results

5.1 Visitors to the area

5.1.1 Participants

A total of 32 self-completed questionnaires were collected in this research. Just under half of them were collected during two different hiking tours in the area, 9 were collected at the Miklafell hut during the summer, 4 were received during the visitor survey on the road from Þverá to Laki via Miklafell, and 4 were filled out by visitors participating in tours of Iceland Bike Farm. The sample included 19 males (59%) and 13 females (41%). The mean age of participants was 47.4 years, with the youngest being 14 years old and the oldest at 70 years of age. The most common nationality was Icelandic (13 people) and the second most common was American (9), while the rest came from France (3), Britain, Italy, New Zealand (2) and Australia (1).

5.1.2 Visitor perceptions and main attractions of the area

Participants were asked to describe the area using the five point Likert scale with opposing characteristics. A vast majority (93%) considers the area both very natural and quiet (Figure 8). A large majority (over 83%) also perceives the area as very impressive and beautiful. Respondents' perception of the accessibility of the area is less homogeneous, with just over half considering the area as somewhat or very accessible, while the other half considers it less accessible.

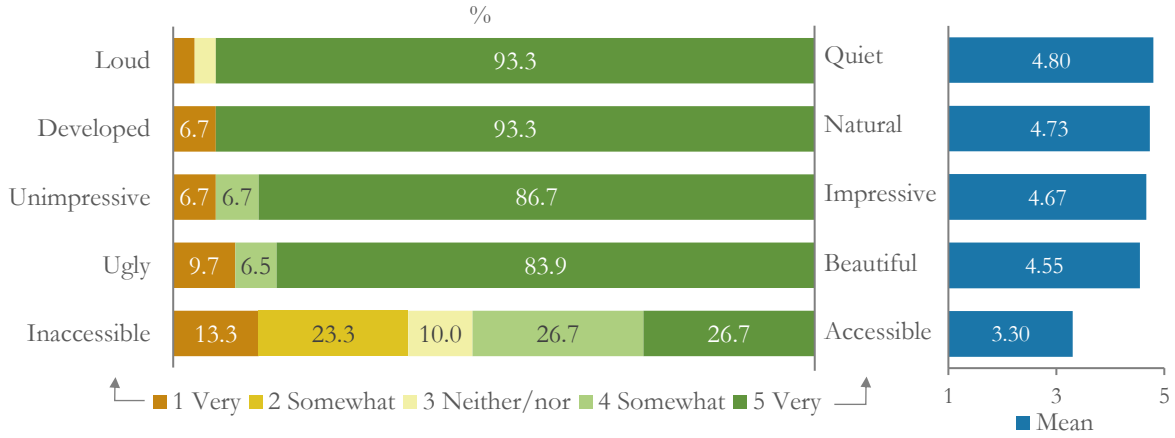

Figure 8. Perception of the area.

Generally, participants are very satisfied with both their stay in the area and the natural environment (Figure 9). Over 90% are very satisfied with the nature in the area and 81% are very satisfied with the stay in the area.

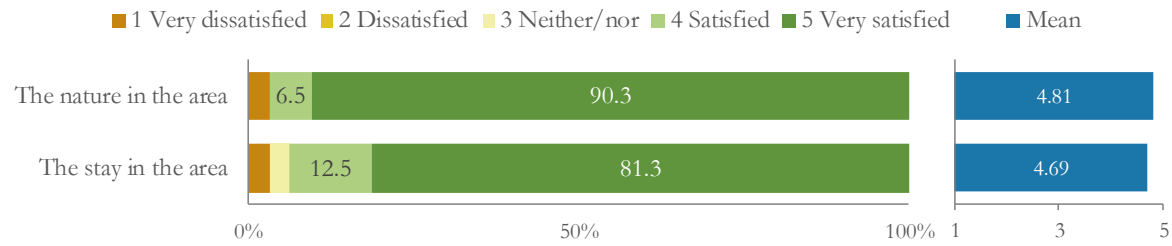

Figure 9. Satisfaction with the stay and the natural environment.

When asked in an open-ended question what fascinates visitors in the area, about one third of the participants state that it is wilderness and an unspoiled appearance (Figure 10). The same number of respondents are fascinated by the views, 29% by beautiful nature and landscapes, as well as by the geology of the area, and 23% by the diversity and Hverfisfljót river with its waterfalls.

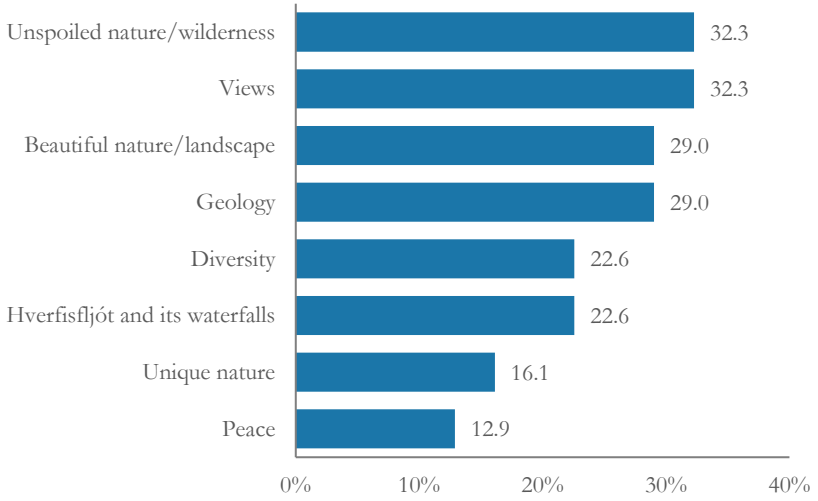

Figure 10. What fascinates you in the area?

These results are supported by the answers to a question asked during the interviews: what, in the respondents' opinion, is the main attraction of the area. The diverse landscape of the area, which includes, among other features, rivers, craters, lava fields, lava tube caves and a glacier was mentioned by many. In addition, an important part of the attraction of the area is the wilderness and the unspoiled natural beauty of it, and especially the vastness of the natural area unchanged by humans. A French tourist who participated in a backpacking tour in the area describes the main attraction as:

> … This depth as far as you can see around you, and you can see quite far, you cannot see anything else than nature, not any other groups, no one else. What's impressive is also that you can see that nature is catching up after the lava, after the volcano, it's black, but then it's green, different shades of green … I would say the perfect example was the last part of the trek today, where we were in this immensity of nothing just the action of Earth. All that you can see around was untouched, we were joking with some of the participants, you are putting the first foot on the

> moon, on Mars. It's quite impressive to find a place, where you have a feeling that you are the first one to be there, and that's quite fascinating.

Having big natural areas unmodified by human activity close to Europe is important to the interviewees. A couple from Italy say:

> … A huge area, horizon is very far, there is a variety of landscape all around, for kilometres and kilometres. And it's quite unique I would say, I don't recall such place in Europe. In continental Europe it's very difficult, there is a few left, but it's not that big, not walk for days and days without meeting anybody else and anything else. … And honestly, from our place it is about three and half hours flight, so it's quite convenient.

A wide natural area around Hverfisfljót river provides opportunities for various recreational activities (Figure 11). Asked whether they came to the area to do/see/visit anything in particular, 28% of the respondents answered that they came to do hiking, trekking or backpacking, almost 19% came for mountain biking and another 19% came for caving. Next to that 25% of respondents came to the area to see nature, almost 13% were interested in seeing the waterfalls of Hverfisfljót, around 9% came to experience wilderness, another 9% identified challenge as an important part of the experiences they were looking for, and the same percentage of visitors chose the area because of its volcanic landscape.

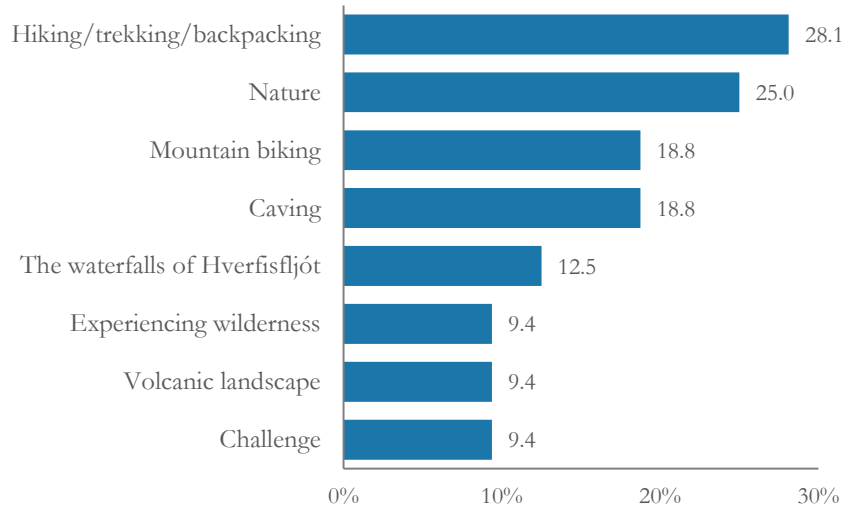

Figure 11. The reasons for visiting the area.

Over 80% of participants strongly agree with the statement *I go to places like this to be able to rest and recover ("recharge my batteries")* and about 84% strongly agree that they *go to places like this to escape the demands of daily life and to put their worries aside* (Figure 12).

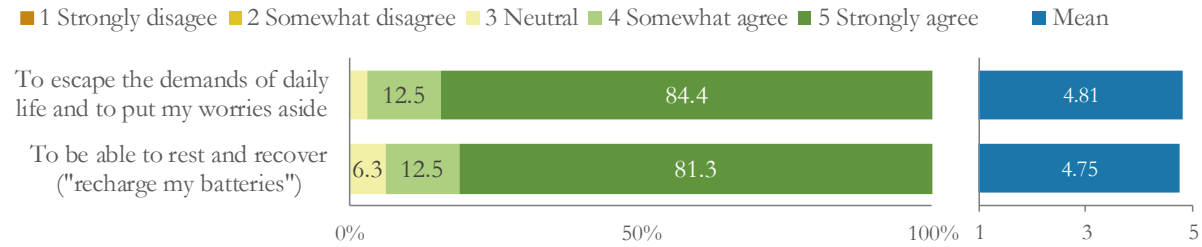

Figure 12. Escaping and recharging.

To further investigate the motivations of the participants to visit the area, during the interviews they were asked what attracted them to the area around the Hverfisfljót river and what environmental qualities they are seeking in a trip like this. The answers of the respondents show that visitors seek an environment that allows the experiences closely related to the components of wilderness experience: unspoiled beautiful nature, escapism, solitude and companionship, challenge and spiritual experience (Sæþórsdóttir, 2010b).

The answers of the interviewees show that natural beauty is an important part of their experience in the area and something they are seeking. Notably, for the visitors to fully enjoy the beauty of the surrounding landscapes it is important for them that the landscape is without any visible human constructions. An Australian visitor describes the environmental qualities he is seeking as *"natural, raw…"* and adds: *"so yesterday, I would describe yesterday in my journal as raw beauty, it's very natural, it's very rugged, it's very earthy, and that interests me. It's not cosmetic, it's not made up, it's not made to look beautiful…"* A French tourist emphasizes that she seeks *"no human impacts, or maybe there is, but I cannot see it…"* This is supported by a French man backpacking in the area: *"I would say the top would be if there is no trace of human activity at all…"*.

Escaping everyday life also seems to be important to the people that choose the area around Hverfisfljót river as their outdoor destination. A visitor from the U.K. explains that he chose the backpacking tour in the area *"because I was looking for some sort of hike to get away from my daily routine and to meet new people in somewhere that's natural with things to see"*. The interviewees mention that it is important for them not to have any phone service or internet. A French tourist says that he is seeking *"immersion in nature without facilities or tourists, the simple beauty of the landscape and no work"*. Peace and quiet are furthermore important qualities people are looking for during their stay in the area.

For some people an important part of the experience while visiting the area is challenge. A tourist from the U.K. describes why he chose the trekking tour in the area around Hverfisfljót river: *"Because I am always looking for new challenges and last year I have done a challenge in the heat, so this year I wanted to do cold"*. A visitor from the U.S. has similar reasons:

> I think the trip itself, it was getting out into untouched land, from what the itinerary told me it was just going to be something not everyone could do. You have to be a little bit athletically fit, it wasn't going to be something easy, and usually to obtain

> those good views it takes a few days to get to, that has been my experience, you cannot be just driven there by a bus and dropped off and then hop back on the bus.

An American couple say they chose the backpacking tour because *"it was the most challenging trek we could find that was extended, that was more than a day or two…".*

Solitude was also often mentioned as an experience the visitors are seeking. A French tourist says: *"I was looking for a trek where I would be out of the world basically … the idea was to be alone, not to see other tourists or other people than just you and connecting with nature".* An American tourist describes the environment he is seeking: *"Untouched by man, not a lot of crowds, I think that's one thing for me, (…) when you start getting large tour groups, it's such a turn off.*

Spiritual experience in unspoiled nature also plays an important role to the interviewees. A French tourist explains: *"My interest was to be in 100% nature where you can immerge yourself in it completely, where there is no infrastructure, no access for tourists or any commodification".*

When asked to rate the importance of the factors that comprise the Purist Scale, over 90% of participants consider it very important to be able to enjoy peace and unspoiled nature when travelling in the area around Hverfisfljót river (Figure 13). A large majority also thinks it is very important to be able to walk without seeing structures (other than mountain huts) and to see no trace of off-road driving in the area. Other important factors, according to participants, include seeing no trace of others having been there, having few other tourists around, and not being disturbed by air traffic. Over half of participants consider it important to be able to camp without noticing other travellers and just under half think it is important to be able to camp wherever they want within the area. Interestingly, all man-made factors including markings on places of interest, marked walking routes, campsites, footpaths, walkways and picnic places are considered not important by visitors in the area.

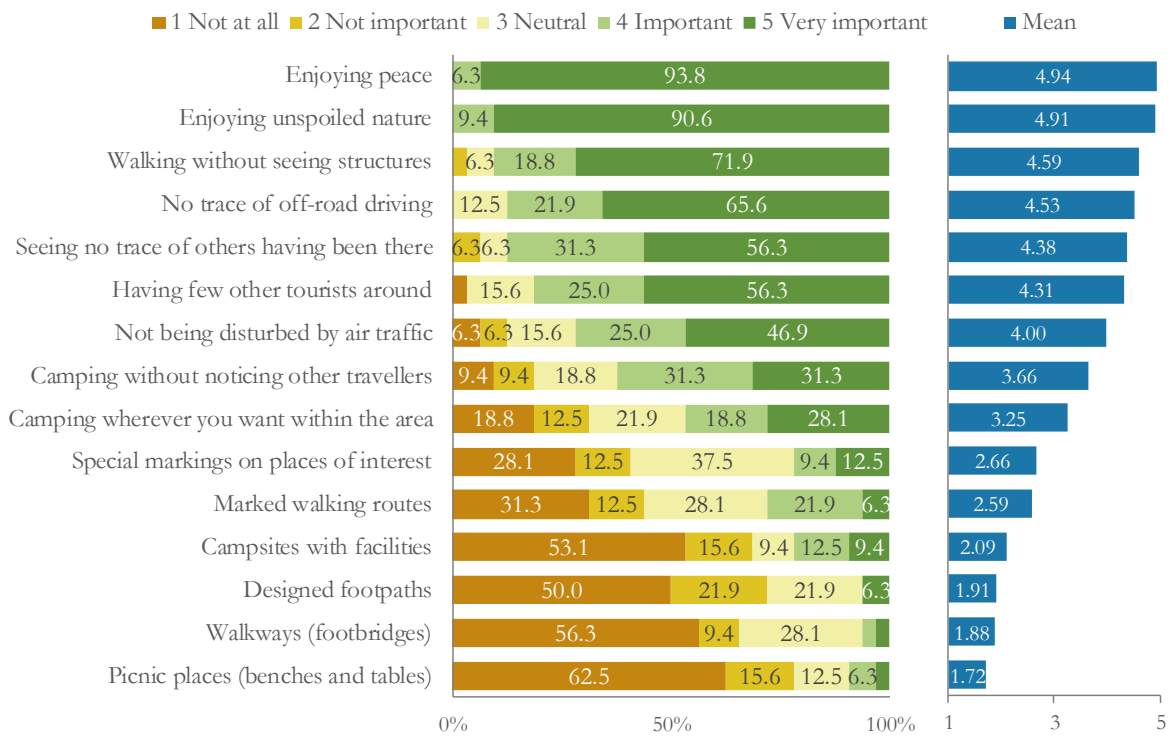

Figure 13. Important factors while travelling in the area.

Based on participants' answers according to the Purist Scale, participants were categorised into four groups: 1) Strong purists, 2) Moderate Purists, 3) Neutralists and 4) Urbanists.

About 47% of participants are categorised as *strong purists* while 38% are *moderate purists* (Figure 14). Few participants are categorised as *neutralists* (13%) and only one participant is considered an *urbanist*.

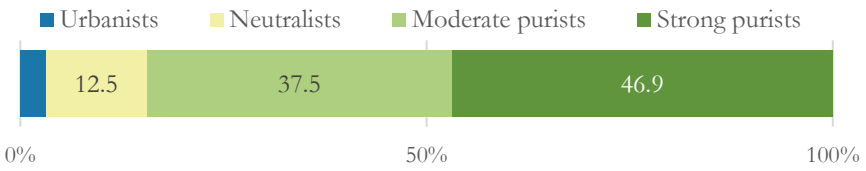

Figure 14. Participant categorisation on the Purist Scale.

5.1.3 Wilderness experience

About 97% of participants are visiting the area to experience wilderness and unspoiled nature, and everyone (100%) considers wilderness and unspoiled nature as a part of the attraction of the area.

More than half of the participants marked that no traces of human impact may be present in an area for it to be considered wilderness[1]. However, trails made by walkers and/or animals were considered by 78% not to spoil wilderness and a majority (63%) felt that mountain huts could be

[1] This was a multiple-choice question, where people were asked to mark more than one answer if appropriate.

present without spoiling the wilderness (Figure 15). Some are of the opinion that fences and tracks by vehicles are okay, while fewer think designed footpaths and visitor centres could be present in wilderness.

Participants' views on how structures that they know of, but cannot see, affect their wilderness experience are very diverse. That is, about one third say that structures that they know about but are not visible to them affect their wilderness experience little or not at all (Figure 16), while about 23% say that such invisible structures affect their wilderness experience to some extent, and 45% say that even though the structures are not visible, they still affect the wilderness experience if they know about them.

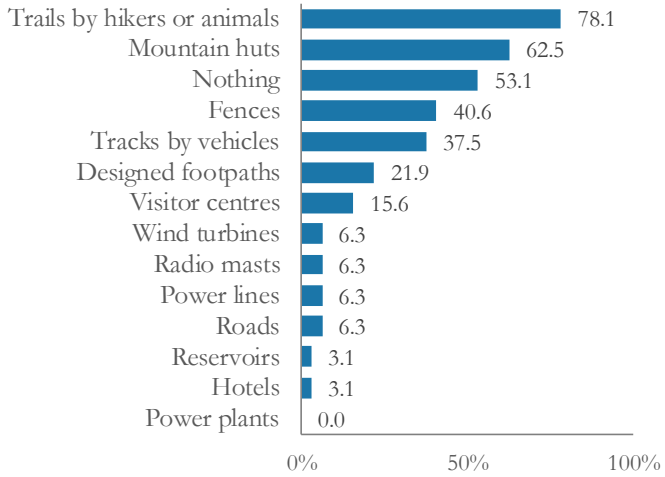

Figure 15. What may be present in wilderness?

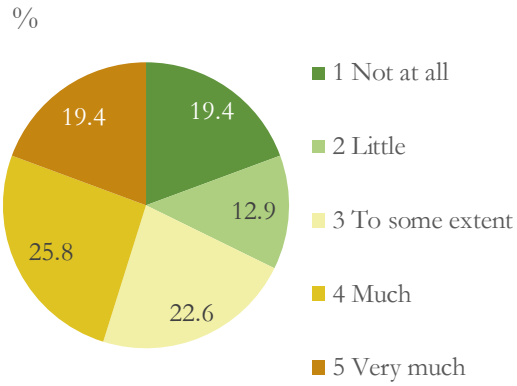

Figure 16. Do nearby structures you know of, but you don't see, affect your wilderness experience?

Asked what characterizes wilderness the interviewees identify the lack of infrastructure as one of the factors necessary for the wilderness experience. An American backpacker describes wilderness as: *"natural beauty, unspoiled, undeveloped. … No buildings, no power lines. Mountain huts are ok. But don't lead to overdevelopment of the area, that's the risk. You put a mountain hut there, and suddenly everybody will go there"*. The absence of human impact was mentioned by the interviewees as an important condition for wilderness: *"No trash left by others. No trace left behind"*. Another feature identified by the interviewees as a factor necessary for the wilderness experience is remoteness. An Australian tourist describes wilderness as *"Remoteness, hard to get to, hard to travel through, and requiring effort."* Some interviewees mention low number of people as an important condition for wilderness. An American backpacker states that using the natural resources of the area contributes to the wilderness experience: *"I am sitting, I am trying to find comfort on a rock, I am using hot springs to get clean, or I am drinking water from a spring, … everything I am doing is outdoors."* A tourist from New Zealand sums up the wilderness as *"the absence of human intervention, infrastructure or impact"*.

5.1.4 Attitudes towards man-made structures

When asked further about man-made structures and their desirability in the area, the only structures considered somewhat appropriate are gravel roads and mountain huts (Figure 17), while all other structures mentioned are considered less appropriate (mean values below 3.0). Almost all (93%) participants consider hotels very inappropriate in the area and similar views are held about shops and restaurants. Also considered very inappropriate are wind turbines, radio masts, power lines, hydro power plants, gas stations, geothermal power plants, reservoirs, cooked food for sale and asphalt roads.

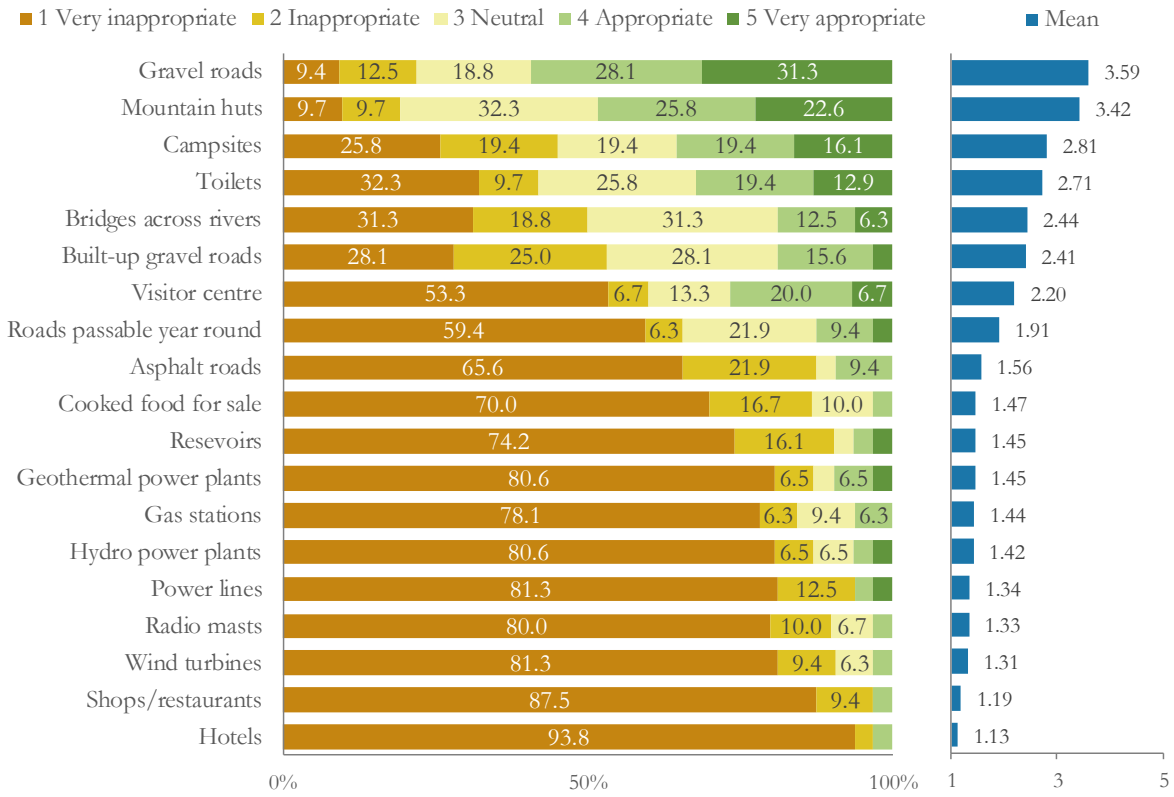

Figure 17. Appropriate structures in the area.

The interviews produced similar results. Asked what infrastructure would be appropriate in the area around Hverfisfljót river, around half of the interviewees answered that they would leave the area as it is, because these are the settings that they are seeking. A French tourist explains:

> For the trek I am doing right now I wouldn't add anything, because it is really that you are bringing your own equipment, that was kind of things I was looking for, … so I wouldn't do anything else. Could there be some infrastructure for some other kind of activities? Why not, but this part should be preserved so that we can continue to have such trek not seeing any impacts, that could be visible in another region. I think it's quite rare to find such place in a European country.

An Italian visitor supports this opinion and further states that *"There are plenty of other options on the planet already, there are far less options for people looking for no structures than for kept trails, I wouldn't feel guilty [if the area would remain undeveloped]",* and later adds: *"I think the wild areas like this one are fewer and fewer on the planet. So, it is precious to preserve them"*. According to a French visitor participating in a backpacking tour, building infrastructure in the area would remove the component of challenge: *"I prefer to wade a river rather than to walk across a bridge"*. Another interviewee points out that wilderness areas like this have intrinsic value and therefore should be preserved even if they are not used by people: *"I would leave it as it is, definitely leave it, because I think we need sort of wilderness even if nobody experiences it, I think we need it anyway"*.

Other participants prefer to have some infrastructure in the area. Among the most often mentioned were mountain huts, toilets and campgrounds. Few interviewees mentioned marked hiking trails and one thinks there could be a visitor centre built closer to the Ring Road. A few reasons for building infrastructure could be identified while analysing the interviews: firstly, the infrastructure would reduce the negative impact of tourists on the environment if the visitor numbers in the area would increase: *"… A mountain hut and a toilet would reduce the impact of people, so that would be a thing"*. Another reason is higher comfort for visitors of the area, especially when the weather is bad, on a rainy evening during the interview one participant stated: *"I think I would rather stay in a mountain hut tonight"*. A third identified reason is providing opportunities to experience the area to people who are not able or not willing to take multiday backpacking tours: *"… A lot of those people would love to come here, but they can't because they don't want to camp or can't camp or they can't hike a trail or can't read a map, and that shouldn't be denied"*.

Several interviewees supporting the development of a basic infrastructure in the area expressed awareness that building infrastructure might affect the wilderness experience, therefore such developments should be carried out extremely carefully. A visitor from the U.S. stresses:

> … They need to keep in mind the wilderness and make it a blend, so that they don't disrupt the beauty and the wilderness that's here, but certainly if you bring more people in you do have to think about toilets, you need to think about huts and those type of things, but making sure that it's used correctly, and the people are mindful of how they utilize the system so that the beauty remains and is not destroyed. In the U.S. they allowed it to happen and then had to fix it. It would be nice to do it correctly from the beginning, then you don't have problems that arise from too many people coming into an area.

The dangers of overdevelopment and exceeding the carrying capacity of the fragile ecosystems of the area due to overuse as a result of new infrastructure was also pointed out by the interviewees:

> If you develop this up, then you are going to run a risk of damaging. This environment does not repair itself. Nothing grows here, so I would say you don't want any infrastructure in this environment here. If you put in trails someone will

say: if you have a trail it will help to preserve the environment, people just wouldn't wonder all over the place, but trails will have more people, right now you don't have a lot of people coming through here.

5.1.5 Attitudes towards power plant infrastructure

Participants were asked about their views on further development of several types of power infrastructure, both in the Highlands and the lowlands. All power infrastructure is considered having less of a negative impact if it is in the lowlands, rather than the Highlands (Figure 18). The least negative attitudes are towards wind farms in the lowlands. Views on other power infrastructure in the lowlands are rather negative, especially on reservoirs and power lines. Attitudes towards power infrastructure in the Highlands are more negative, especially towards further construction of power lines and reservoirs, followed by the three types of power plants, wind, geothermal and hydro.

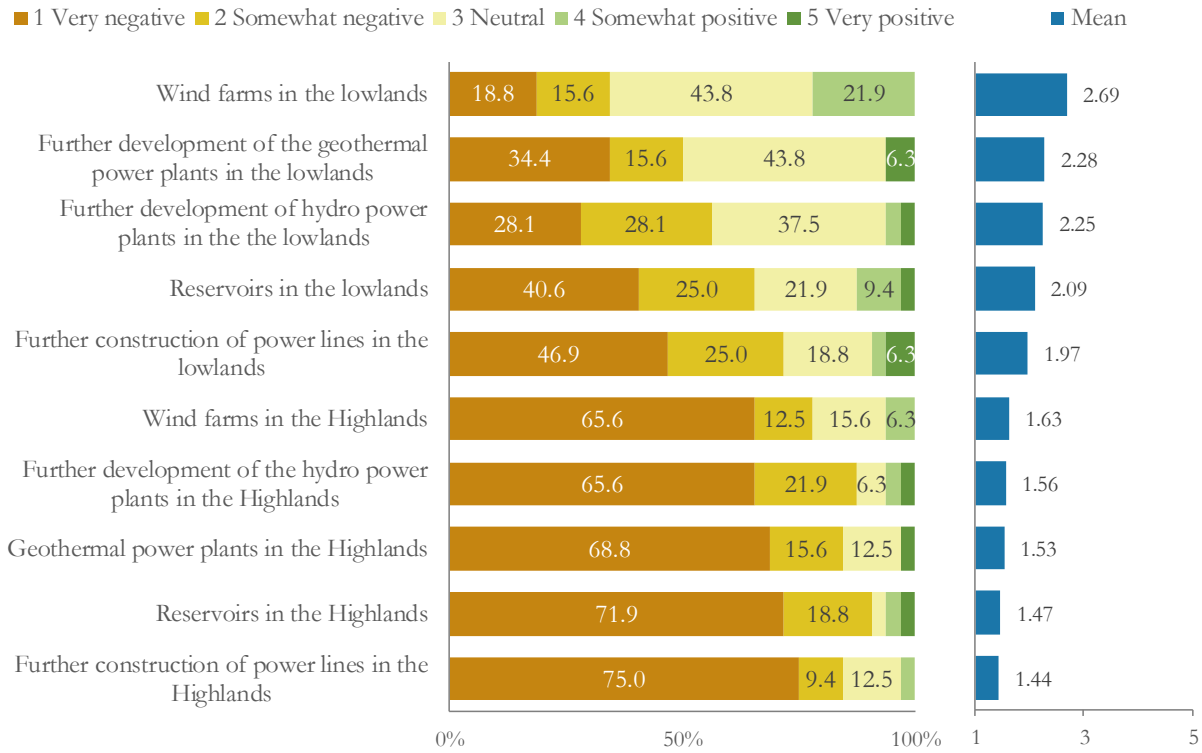

Figure 18. Attitudes towards further power infrastructure development.

Respondents were also asked about the proposed Hverfisfljót hydro power plant and its accompanying structures. All power infrastructure related to this power plant would clearly reduce participants' interest in visiting the area. Over 90% marked that the structures would either reduce their interest in visiting the area *very much* or *somewhat* (Figure 19). The answers for each component are very similar but, on average, the dams were considered having the most negative effect,

followed closely by the power lines, canals, the hydro power station, reduced water flow in rivers and, finally, the reservoirs.

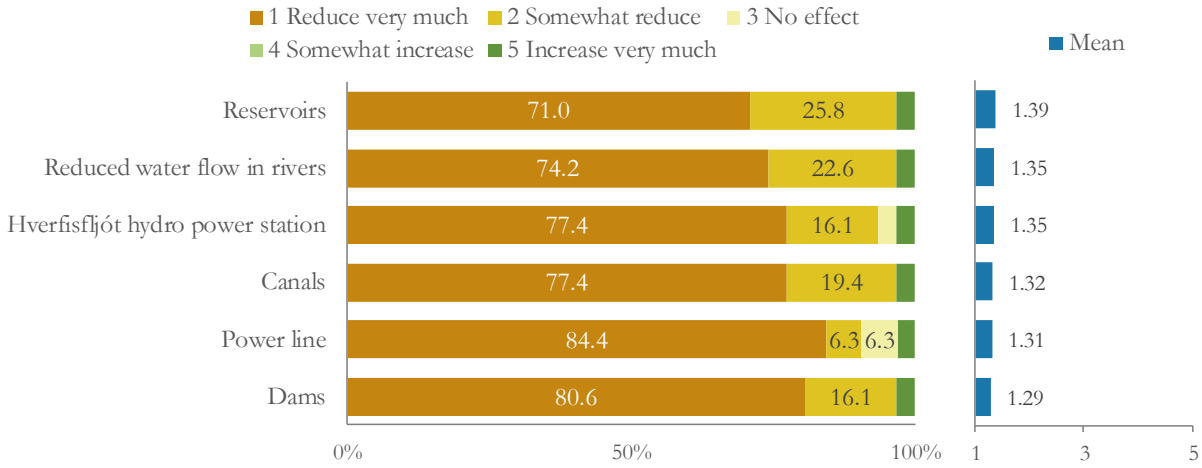

Figure 19. Hverfisfljót power plant's effect on tourists' interest in visiting the area.

To further investigate the attitudes of visitors towards the proposed Hverfisfljót hydro power plant, the visitors were asked several questions related to the proposed power plant during the interviews.

To the question regarding their opinion about the proposed idea to build the Hverfisfljót hydroelectric power plant in this area, most interviewees answered that it would ruin the landscape and thereby their experience. Some furthermore wondered whether it is necessary and whether there are other areas, where less damage to the environment would be done:

> Are there other places you guys can do it at? I just think Iceland is relatively small, isn't it? I'm not from here, I just think, if you have a little bit of nature, save it as best as you can, … but I understand if people have to work and have a living, but nature is just so, they are not building any more of it. I would just hate for the nature you guys already have, the environment, to get smaller, to be ruined.

A French tourist points out, that the impacts of such a power plant might be much bigger than expected since ecosystems are closely related and building a power plant might lead to further infrastructure development in the area and consequently higher environmental impacts:

> I think that this project would be destructive to the nature. The problem with a project like this is that we don't think about the long-term consequences, about the infrastructure, and the effects on the natural evolution of the lake and how everything is connected, all the ecosystems are connected. If you affect one, it will have an impact on another. … It is all interconnected in the long term, and it is important to resist the outsiders' financial powers that push for investments in projects like that.

According to some interviewees, a better option would be to build the power plant in or close to the areas that already have been developed:

> For me from what I saw yesterday, there must be other places that are already built up that could have a power plant near the city or some of the smaller villages, but

> when it's a whole natural area with nothing in it, I don't think there is any need to build.

However, several interviewees admit that their answers are subjective, since they don't have enough information about the economic situation in the country, the actual need for more electricity, possible advantages of the power plant and its benefits to the local communities:

> If you ask us as tourists, we definitely say we don't want to have the plant, we don't want to have the dams, we don't want to have the reservoirs, but we don't have enough information to evaluate why they are considering this construction, what will be the major advantage of having this.

To the question whether the interviewees would visit the area if the proposed hydro power plant would be built a wide range of answers was received. Some interviewees answered that they would not visit the area, some stated that the trip would not be as high on their list and they possibly would opt for another more natural area, few interviewees would try to collect more information about how invasive the power plant is and how it affected the experience of previous visitors, and part of them would not visit the area.

5.2 Tourism industry

5.2.1 Main attractions of the area and its future value

Knowledge on the area around the proposed Hverfisfljót power plant and the river Hverfisfljót varies considerably among the tourism industry stakeholders depending on the type of tourism services they are providing, location of the business, the length of stay in the municipality and personal interest in outdoor activities. Thus, the opinions about the attractiveness of the area and its main attractions differ strongly. Some accommodation providers state that the main strength of their location is that they are *"… close to many of the main tourist attractions on the South Coast of Iceland like Skaftafell and Jökulsárlón"*. As one hotel manager states *"We are just a hotel in a convenient location for sleeping considering the distances, that is why we are here. It's not because there are any gems right around here"*.

However, tourism operators and most managers of the accommodations located closer or within the area of the Hverfisfljót river state that the area is unique and has a lot to offer to its visitors. The main attractions could be grouped into several categories. Most of the interviewees familiar with the area emphasize the diversity and uniqueness of the nature in the area:

> In this area we have this balance between spring water because of all the lava and the glacier rivers. … In Laufbalavatn we have these fabulous springs, kind of unique thing, because the spring water comes into Laufbalavatn and the river coming out of the lake falls into a cave few hundred meters away. So, it's quite unique, the whole area. And the river Hverfisfljót went further east in the autumn 1783, so part of the river bed is only 200 years old. … It's very wild, there is no use of this land except for little bit sheep grazing and a little bit of tourism, but the whole nature

> there, this balance between the lava from 1783-1784 and the older lavas, and the rivers and the spring rivers, it's kind of unique, it's different from what you see in other places of volcanic areas in Iceland, so it's unique in Iceland as well, and that's the beautiful character of the whole area.

According to the interviewees, another important attraction of the area is the wilderness which serves as a source of unique experiences:

> First and foremost is the fact that the area is untouched and unspoiled and hardly anyone is there except for the birds overhead. But there are some mountain huts in the area. It's unspoiled and there is that wilderness quietude, the wasteland serenity. It's an experience for anyone to go there, there are certain areas that you enter, and you get that experience, and this is one of them.

One of the tour operators describes the impressions of their customers in the area and explains why their customers appreciate such wilderness experiences:

> … It is a very unique area. What our people say the most is that there is nothing. There is nothing man-made or artificial here, the tracks that run through here are just in the landscape, downtrodden and hardly visible and rough which people consider a plus. There is no one else, you do not come across people on the way. … Our target group is the advanced purist who wishes to leave behind the regulated tourist locations. Where everything is man-made, lots of rules, marked walking paths and screaming guards here and there with signs prohibiting stuff. This you cannot see here. This is one of few areas where we do not see high voltage transmission lines, there is nothing.

The vast size of the wilderness, that the research area is part of, is also an important contributor to the attractiveness of the area, as it provides great opportunities for recreation:

> This area is unique in and of itself but if we discuss Hverfisfljót in a greater context then you can always connect this area both to the areas west and east of it, hence it could be considered a great vast continuous landscape area of unspoiled nature all the way from Fjallabak and to Langisjór and east to Skaftafell.

Many of the tourism industry stakeholders mention the history of the area as another important feature that makes the area interesting and adds touristic value. The landscape of the area is young, and it keeps changing. Asked about the main attraction of the area one of the stakeholders identifies the history of the volcanic eruptions that shaped the area in previous centuries and the glacier, which is creating the history of the area today:

> It's both the history with Skaftáreldar and everything that happened before that: Kambarnir and Eldgjá, and then of course the glacier, you just look at the glacier. I am no scientist in this field, but people are saying that when the glacier retreats it could be that Skaftá goes into Hverfisfljót. However, I think that the opposite can happen. … There are a lot of changes in the land, you see.

According to one interviewee, such a combination of attractions gives the area a very high touristic value, because it offers what the visitors with more purist attitudes are looking for:

> It is just what people want, to reach such an area. Either untouched, or with this great history, or the whole package. This is definitely one of the aspects people want to experience, the unspoiled nature and the sense of wilderness.

The interviews with the tourism industry reveal that the use of the area for tourism and recreation currently is very low. The majority of visitors passing through the municipality are not interested in exploring the interior Highlands and stick to the main tourist route along the Ring Road. According to one accommodation provider, most of their customers stay in their accommodation for one night and don't spend time learning more about the area:

> …60-70% just stay for a night. Those are people driving from Reykjavík who stay here, go to Skaftafell and return. Or sometimes they are taking the Ring Road and keep on going, … and maybe 30-40% stay for two nights but there are very few who stay for longer.

One accommodation provider explains that right now proportionally few tourists travel in the Highland areas compared to the rapid growth of mass tourism in the country: *"… Now you have to go to Iceland because it's a hot destination, and the mainstream is to go and see as much as possible in as short time as possible for the minimum money that you can"*. The same interviewee further explains, that the current popularity of Iceland does not reduce the value of the Highlands and of wilderness, and when the country becomes less in fashion it might become again more attractive to more purist visitors: *"Well, the assets still exist, and tourism is in hype as well, so if the mass is leaving, with less mass coming to Iceland others might come back and rise their numbers"*.

Thus, the Highlands of the municipality attract a specific market group of tourists, which is described by one of the tourism operators as following:

> Our target group consists of rather advanced tourists. These are tourists who know where they are on planet Earth. They want to know what they are going to look at. They are purists, i.e. they want to go into unspoiled nature and to get to where there is nothing.

According to some of the interviewees, the use of the area around Hverfisfljót river for tourism and recreation has decreased somewhat during the last years:

> I don't think we have done less than at least 15 different variations of trips that have all been in this area. A trip sometimes just lives for three years, and then somehow market changes or the niche market group you have been going for somehow changes, or you have just finished that part, if you could say so, until later. So last years we have only used it for backpacking, this area, but the potential is enormous.

The reason for that, as pointed out by the tourism operator, are the changing preferences of visitors of nature destinations:

> … I have more clients now that want to have a hut, a good hut, mainly when we did trekking in this area we did a lot of camping, we had some huts, but we also did camping. Now we have less and less clients that are happy with the camping …

The use of the area could be increased, according to the interviewee, by providing very basic infrastructure to the visitors of the area and connecting the patches of wilderness separated by the Skaftá and Hverfisfljót rivers by building pedestrian bridges: *"A handful of neat mountain huts in the right areas with maybe a couple of bridges for biggest rivers would be fine. It would make it very different"*.

Asked about the future value of the area the interviewees are sure that the value of such a wilderness area for tourism and recreation in the future will only increase, and for that there are several reasons. Some tourism industry stakeholders stress that with the decreasing amount and size of wilderness areas worldwide, by preserving its wilderness areas Iceland gets a chance to stand out due to assets not available in other countries:

> It is a treasure that globally is getting scarcer. With this Iceland's singularity could grow increasingly, through having more of these areas than other nations. Even though wilderness areas are under siege generally, we should try to protect them. I think that the modern human will seek and desire to experience unspoiled areas and untouched nature.

Moreover, another interviewee points out that the interest of Icelanders in the Highlands and in outdoor activities is increasing:

> … It is what Icelanders are seeking more and more. For the moment they are seeking it also out of the country because the krona has been strong, but when that goes down they will be even more focused inland. And I think also there is another thing in it, that the health of people in the older age is now much much better. … So, I think there will be a new wave of Icelandic interest in this area, as well as I think we have a potential in the future for foreigners.

5.2.2 Attitudes of the tourism industry towards the Hverfisfljót hydro power plant

The opinions about the proposed Hverfisfljót hydro power plant are also very mixed among the tourism industry stakeholders. Most of the interviewees, however, state that the power plant would negatively affect their businesses in various ways. Among the negative effects of the proposed power plant identified by the interviewees is the destruction of some of the most important attractions of the area:

> Well, first of all it would take the water out of the most impressive part of the river, all the waterfalls, all the new part of the river bed, plus here somewhere is one of the biggest waterfalls in the river, so all those will be dry most of the summer, or with very little water. Secondly, it would destroy the area around Laufbalavatn, which is remarkable for many things. I mentioned the cave where the river goes down. There is also more of lava tube caves than in many areas in Iceland. … So, I don't really know if they would stay dry or what would happen to the caves, but mainly it's just destruction of really really beautiful areas. And this part here, the Fremri Eyrar, it's lava with water, with ponds, with long tailed ducks and other

> highland bird life, it's very beautiful, it has absolutely stunning natural campsites, you are sheltered by the lava and you have spring rivers to take the water from, so for me it's a huge damage of incredible wilderness, and one of these wilderness that people in Iceland hardly know.

It is further pointed out by the interviewees, that the current wilderness area provides opportunities for unique experiences, which would be lost if the power plant would be built:

> I think the experience would change a lot. You would see maybe pipes and buildings, and also, we have sometimes gone on a night tour up to the caves where people have been in total darkness maybe for the first time in their lives, that they experienced total darkness, which is quite strange. And people talk about being there totally alone, and you never see a car or a person, which is quite rare, but maybe with the dams and everything there will be some traffic or at least some indications of not being alone.

According to some, a power plant in the Hverfisfljót river would cut in half a huge wilderness area:

> … We would have cut in the middle of an area that is now totally unspoiled all the way from Skaftafell and to Sigalda on the north part, so you have a continuous wilderness following the Vatnajökull glacier and then on following the Tungná river all the way to Sigalda, and the only human reminders are very few four wheel drive tracks and then when you come to the bent on the Tungná river. … Of course, one might argue that because it is hard to get over the rivers, … but Hverfisfljót would not be a very expensive river to bridge because there is plenty of places where the river bed is not very wide.

Thus, the area would lose its appeal to hikers if the Hverfisfljót hydro power plant would be built in the middle of it: *"It would just become a rather unattractive hiking route with the reservoirs and the open canals. There would be a lot of interference with the landscape"*.

The stakeholders organizing tours in the area claim that a power plant would make their tours impossible, because it would destroy the environmental qualities their customers are looking for on such tours: *"We would not go into an area that would have been disturbed in this manner. I think that is quite clear. … We want to go to areas that have wilderness characteristics"*.

Moreover, the power plant would affect the experience not only of the visitors to the area around Hverfisfljót river, but also of the people travelling to Laki, thus, the experience of the visitors of Vatnajökull National Park would also be negatively affected:

> When you drive to Laki from Hunkubakkar you look over the area. The reservoirs would be highly visible from the Laki road and then there is the [road] connection from the national park over to the area. We have horse riding groups and some hiking groups that go from Blágil to Miklafell. It's on the periphery of the national park, it would not impact the national park in and of itself, however, it would affect the experience. When you have driven here you feel like you are in the wilderness, but this would decrease the wilderness experience drastically even though it's not within the national park.

Several interviewees state that, instead of building the power plant, the area should be included in the Vatnajökull National Park, the border of which is currently stretching nearby:

> It would make sense to include the area in the national park, because of, for example, the lava caves. The biggest cave system in Europe. So, it's unique to go here in Laufbalavatnshellar. We have been there when it was a lot of water, and then it's difficult to reach, so I guess when it would be dammed it would go under water. So that's kind of sad. It would make sense to take them under the national park.

But, as pointed by one interviewee, such a decision would have complex effects that should be taken into consideration:

> It is a complicated issue, there would be a road and you would not have to cross a river to go from Þverá to Laki. Then you would not have to cross any unbridged river. Still, unbridged rivers are part of environment protection so maybe it's for the best to have them in some places.

Some managers of the high-end hotels/guesthouses believe that the road improvement following the construction of the power plant would bring positive changes to their business, because it would allow people to visit the area and thereby possibly extend their stay in the municipality. Some even think the power plant could become an attraction in itself:

> I am not certain that tourists can tell the difference between a lake and a reservoir. It's impossible to say, but this would at least open up the area. I think that would be positive, you come here, and I think a lot of foreigners would enjoy observing a power plant.

Another interviewee supports this idea, but emphasizes the importance of the design of the power plant, which should blend in with the surrounding environment:

> So, the value here is that a power plant project, as long as it is in a harmony with nature, it can be beneficial for tourism, because it opens up routes that were closed before, and you can control the flow, and you can develop and plan the project for tourism over there. Now it's just a wilderness, and you don't want people to go there because you cannot control what's happening there.

The same interviewee further adds, that the current power plant proposal does not seem to be beneficial for tourism due to its size and the effects it will have on the surrounding environment:

> What I was trying to explain earlier on is that I believe that a power plant project can be in harmony with nature and tourism if it's on a smaller scale and it's sustainable, not sinking any ground, not putting big lakes or reservoirs, more like it is the river itself that would just maintain the power.

Some of the interviewees who are against a hydro power plant project pointed out the need for improved accessibility to some parts of the area around Hverfisfljót river:

> … For example, there they have very beautiful waterfalls, people cannot reach them because there are no paths to follow. Sometimes ATWs go up there in the sand area, and it's a very nice area, many possibilities. … Some tracks could be built to

> make it easier for people to come to this area, you don't need heavy roads, just to make possible for people to come up to this area.

However, some other interviewees believe that the current road to the area is good enough to use for people who are really interested in seeing the area but protects the area from the masses which would cause damage: *"Those who mean to go there can make it on the roads we have today. I am also against the road being made apt for regular cars. I find it good enough as it is today"*.

Others add, that paving the road to such an area would cause various problems. One tourism operator notes: *"If this would be paved all the way up, it snows heavily sometimes up there, so paving this would be just a job for the rescue team. This would always be a mountain road, closed during the winter time"*.

Other interviewee identifies another issue that would follow improved accessibility:

> The charm of the area is partly how isolated and deserted it is. Still, the access is not too bad. In an alright 4WD vehicle you can get to Miklafell and from there it is not far to the lava caves by Hverfisfljót. Laufbalavatnshellar are a natural gem and the cave exploration society has been requesting that they be closed off and given protected status. If the access is improved it would cost more work in supervising. I don't think there are advantages to making this more accessible.

One interviewee concludes that the truth regarding the quality of the roads to the area is somewhere in the middle:

> There is a debate going on over whether people prefer good roads or bad. I have my own opinion on that. They must be half decent, I think a bad road causes more damage. … I am not saying that we must have paved roads. I just think it has to be decent.

While considering the benefits of the proposed power plant to the local community one of the interviewees states that in the long term it would be more economically beneficial to the municipality to use the area for touristic and recreational purposes instead of power production:

> I think they are asking for little in exchange for such a lot of interference. The inhabitants of Skaftárhreppur should not even consider this from a job creation perspective. Power plants like these do not create a single long-term job, there is no station manager. Even from the construction period there are no jobs for the municipality. … and the tax income from the power house is not all that much, especially compared with the real estate tax the tourism industry alone is paying in Skaftárhreppur.

Another important point made by one tourism operator is that technologies develop rapidly and certain sacrifices of natural areas that were done in the past could be easily avoided and would not be acceptable today. Thus, by applying the newest technology in a few years the same amount of energy can be received without destroying vast wilderness areas:

> Certainly, the future value [of the area] will be even greater, even more than that of this moment. It is maybe ours to protect. A tiny bit. Look, I am not against all developments. Some say: "Should we just stop everything? Should we just lie down

> and give up since everything is prohibited?" But, no, we just have to think a bit further. We would never go forward with the power plant developments of twenty or thirty years ago because things have developed. As with the Blanda reservoir, back in the day, when people just erected a power plant anywhere and there was uncontrolled flooding and growth since that was cheapest. Today people are more critical and think: "Well, it will be more expensive, and it will be deeper, but we will have more water and we are safeguarding larger areas".

According to some tourism industry stakeholders, the main business sector in the municipality is tourism, therefore the planning of the use of natural resources in the area should be in line with that fact. Wilderness areas in the municipality should be kept for tourism and recreation, also because, according to one stakeholder, there are not many other economic activities that can be undertaken here:

> Tourism is the heavy industry of the area. And unfortunately, with this area, it does not have much else to offer. Skaftárhreppur is not the most profitable area for animal farming, whether it be sheep or cow husbandry. There are areas in the country that are much better suited to that. So, I just say we should go with tourism, of course we have to be careful, but it will be the heavy industry of this area.

Various interviewees point out that the community strongly depends on tourism. Increased tourism in the municipality revived the community, therefore while planning the development of the nature areas the needs and preferences of preferred future visitors should be taken into account and decisions should be made accordingly: *"Everything was heading downwards but now we have a business called tourism. And we have to look to the future with that in mind. What are we going to offer? That's how I see it. If we can provide wilderness to the tourist who seeks it then that is of value to us"*.

Another stakeholder states:

> I would like to preserve the area east of Laki towards Skeiðarárjökull as wilderness, it contains a lot of wilderness that is easily accessible from the lowlands, yet it remains untouched. There is a great opportunity for the wilderness tourists to go into the area and I would think it is in our interest to preserve it. Then we have Fjallabak, of course, with more infrastructure, short distances between huts and there are a lot of people there. Here there are a lot fewer people, but it is a gorgeous area. Hence, I would like to preserve the wilderness from Laki to Skeiðárjökull if it were up to me.

6 Discussion

6.1 The value of the area for tourism and recreation

The area around the proposed Hverfisfljót hydroelectric power plant is characterized by powerful natural forces and pristine nature. It provides unique opportunities for visitors seeking wilderness experience, particularly for people who prefer to hike for days without seeing any infrastructure. On the classification system called Recreation Opportunity Spectrum the area would belong to the "primitive" class. This wilderness character is supported by wilderness mapping in Iceland delineating one of the largest non-glaciated areas free from anthropogenic influences to be in the Highlands of Skaftárhreppur municipality (Ólafsdóttir & Runnström, 2011; Ólafsdóttir, Sæþórsdóttir, Guðmundsson, Huck & Runnström 2016; Ólafsdóttir, Sæþórsdóttir & Runnström, 2016).

The results of this study show that the proportion of strong purists (47%) and moderate purists (38%) in the research area is higher than elsewhere in the Icelandic Highlands where similar studies have been conducted (Sæþórsdóttir & Hall, 2018; Sæþórsdóttir, Stefánsdóttir, & Stefánsson, 2015). The area's very basic infrastructure, low visitor numbers and limited human impact are settings greatly valued by purists. The results furthermore show that visitors' satisfaction in the research area is very high and demand for improved tourism infrastructure development in the area is low. Around half of the interviewed visitors prefer the area to remain undeveloped, while others would like to see some basic infrastructure, such as huts, toilets and campgrounds. With respect to the current marketing group visiting the research area, its major value lies in the low level of infrastructure development and low visitation providing experiences not obtained in more developed areas. These values can moreover be seen as an important asset for the tourism industry in Iceland as such and for Iceland as a tourist destination, since less developed areas are decreasing around the world and since there are not many places which provide that kind of experience that are as easily reachable from Europe.

It is noteworthy that most of the tourism industry stakeholders emphasize that the area's value and its importance for tourism will increase in the future due to two main reasons: firstly, globally growing interest in nature-based tourism and increased demand for recreation in natural areas due to urbanization, travel becoming available to more people, better health and longer leisure time; secondly, shrinking wilderness areas in the world. According to Watson et al. (2016), wilderness areas in the world have decreased by nearly 10% in the last two decades. In Iceland the main pressure on wilderness areas comes from the utilization of natural resources for energy

production and tourism development (Ministry for the Environment and Natural Resources, 2011; Sæþórsdóttir & Saarinen, 2015).

6.2 Effects of the Hverfisfljót hydro power plant on tourism and recreation

The results of this study reveal that the visitors of the area around the proposed Hverfisfljót hydro power plant have a more negative attitude towards infrastructure development compared to visitors of many other areas in Iceland (Sæþórsdóttir & Hall, 2018; Sæþórsdóttir et al., 2015). This includes both tourism infrastructure and constructions related to energy harnessing. According to this study, out of all the constructions that accompany the power plant the least acceptable are dams, and the second least acceptable are power lines. This is not fully in line with previous studies where power lines have been perceived by tourists as the most negative construction related to power plant development (Sæþórsdóttir & Hall, 2018; Stefánsson et al., 2017). Furthermore, visitors consider any construction of power lines, reservoirs, geothermal or hydro power plants and wind farms in the Icelandic Highlands to be highly undesirable, but more acceptable in the lowland areas that are already developed. These results are in line with numerous studies (e.g. Devine-Wright & Howes, 2010; Sæþórsdóttir & Hall, 2018; Stefánsson et al., 2017) that have identified that people are more negative towards infrastructure related to electricity production in pristine natural areas than in areas that are already developed. In addition, the conclusions of the research clearly show that the proposed power plant would reduce purists' interest in visiting the area. According to Stefánsson et al. (2017), purist visitors are not only more sensitive towards tourist infrastructure, they also have a more negative attitude towards constructions related to energy production and transportation, such as power lines.

Still, the results of this study indicate that tourists in the area understand and respect the need of locals for further electricity development, while they consider that such developments should be done closer to already industrialized areas. Therefore, pristine nature like that of the area around Hverfisfljót should be protected from energy development due to its high quality for the tourists' experience.

Some of the accommodation providers see the power plant development as an opportunity since it would increase the accessibility of the area for their customers. However, the tourism operators currently offering tours in the area state that building a power plant would make their tours in the area impossible, as this vast wilderness, one of the main attractions of the area to their customers, would be lost or negatively affected.

Most of the tourism industry stakeholders emphasize that the benefits of the proposed power plant would not exceed its social, economic and environmental costs. They consider the future value of the area for tourism development to be higher keeping the area in its current state, instead

of opting for power plant development. Moreover, the value of the area for tourism would only increase with time if the power plant would not be constructed, therefore the area should be protected from power plant development.

Any infrastructure development of wilderness areas will affect their appearance and depending on its scale, it will also impact visitors' experiences. At some point the developments will reach a point of no reversibility (Haraldsson & Ólafsdóttir, 2018). Therefore, for the municipality of Skaftárhreppur, where the tourism industry is one of the most important sources of income, it is of vital importance to carefully plan the development of natural areas, taking into consideration what tourism type and what marketing groups would be the most beneficial for the municipality's residents' wellbeing in the long run, and what environmental settings these marketing groups prefer.

7 Conclusions

With a growing need for renewable energy options and an increasing interest in nature-based tourism the demand for resources available in pristine natural areas is growing and will continue to do so in the future. Therefore, before conducting any developments in such areas it is important to evaluate how the developments will affect other business sectors competing for utilizing the same land. The present study shows that the proposed Hverfisfljót hydro power plant would strongly affect tourism in the research area by impacting the main product that attracts tourists to the area today – wilderness.

Based on the results of the present study regarding the potential impacts of the Hverfisfljót hydro power plant on tourism the following concluding remarks can be drawn:

- The area around the Hverfisfljót glacial river is unique because of its diverse nature rich in history, its vast wilderness and low current use for tourism. These environmental settings provide recreational opportunities for purist visitors.
- The majority of current visitors to the area are strong or moderate purists. This type of visitor prefers very basic infrastructure and low level of use in the area, therefore the demand for any infrastructure in the area is low.
- A vast majority of the visitors of the area state that a hydro power plant would reduce their interest in visiting the area and destroy their wilderness experience. Thus, the proposed power plant is not compatible with the current type of tourism in the area.
- Most of the tourism industry stakeholders state that the product their tours are based on is the wilderness of the area and the experiences it provides, therefore developing the area would negatively affect their businesses.
- As mentioned by some accommodation providers, the power plant would open up the area for tourists and might itself become a tourist attraction. As previous research in the country has shown (Sæþórsdóttir & Hall, 2018) this would change the type of tourism in the area, since it would most likely lose its attractiveness to the purist visitors, thus the range of recreation opportunities for purists would be reduced.

The current study shows that untouched wilderness is one of the main attractions of the research area. Since wilderness areas are becoming ever scarcer worldwide it is important for the policy-makers to ensure that the use of such areas is sustainable by evaluating all the possible positive and negative impacts the use of the resources will cause to the area. Moreover, the need for the protection of unique natural features present in the area pointed out by the participants of this study should be taken into consideration during the planning process.

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Appendix

Questionnaire and supporting material

Survey on tourism at Hverfisfljót

This survey is a part of a research on the effects of the Hverfisfljót hydro power plant on tourism in the area (see map and description). The research is led by the University of Iceland, and is a part of governmental project called The Master Plan for Conservation of Nature and Utilization of Energy. It takes approx. 10-15 min. to fill out the questionnaire.

Thank you very much for your participation!

1. How descriptive do you find the following words for this area?

	very	somewhat	neither/nor	somewhat	very	
1 Natural	❒1	❒2	❒3	❒4	❒5	Developed
2 Quiet	❒1	❒2	❒3	❒4	❒5	Loud
3 Accessible	❒1	❒2	❒3	❒4	❒5	Inaccessible
4 Beautiful	❒1	❒2	❒3	❒4	❒5	Ugly
5 Impressive	❒1	❒2	❒3	❒4	❒5	Unimpressive

2. What fascinates you in the area? _____

_____

3. How important are the following factors for you while travelling in this area?

	not at all important	not important	neutral	important	very important
1 Marked walking routes	❒1	❒2	❒3	❒4	❒5
2 Designed footpaths	❒1	❒2	❒3	❒4	❒5
3 Walkways (footbridges)	❒1	❒2	❒3	❒4	❒5
4 To enjoy peace	❒1	❒2	❒3	❒4	❒5
5 To enjoy unspoiled nature	❒1	❒2	❒3	❒4	❒5
6 Picnic places (benches and tables)	❒1	❒2	❒3	❒4	❒5
7 To have few other tourists around	❒1	❒2	❒3	❒4	❒5
8 That there is no trace of off-road driving	❒1	❒2	❒3	❒4	❒5
9 To walk without seeing structures (other than huts)	❒1	❒2	❒3	❒4	❒5
10 To see no trace of others having been there	❒1	❒2	❒3	❒4	❒5
11 Special markings on places of interest	❒1	❒2	❒3	❒4	❒5
12 Campsites with facilities (toilets, trash cans etc.)	❒1	❒2	❒3	❒4	❒5
13 To camp wherever you want within the area	❒1	❒2	❒3	❒4	❒5
14 To camp where you don't hear or see other travellers	❒1	❒2	❒3	❒4	❒5
15 Not to be disturbed by air traffic	❒1	❒2	❒3	❒4	❒5

4. Did you come to do/see/visit anything in particular in the area?

❒1 Yes, what? _____ ❒2 No

5. How satisfied or dissatisfied are you with the following?

	very dissatisfied	dissatisfied	neither/ nor	satisfied	very satisfied
1 Your stay in the area	❒1	❒2	❒3	❒4	❒5
2 The nature in the area	❒1	❒2	❒3	❒4	❒5

6. Would you consider it desirable or undesirable to improve roads in this area?

very desirable	desirable	neutral	undesirable	very undesirable
❒1	❒2	❒3	❒4	❒5

7. Do you think wilderness/unspoiled nature is part of the attraction of this area?

❒1 Yes ❒2 No ❒0 No opinion

8. Did you visit this area to experience wilderness/unspoiled nature?

❒1 Yes ❒2 No ❒0 No opinion

9. Do nearby structures you know of, but you don't see, affect your wilderness experience?

not at all	little	to some extent	much	very much	no opinion
❒1	❒2	❒3	❒4	❒5	❒0

10. In your opinion which of the following may be present in an area for it to be considered wilderness? *Mark more than one if appropriate*

❒1 Nothing
❒2 Mountain huts
❒3 Hotels
❒4 Roads
❒5 Tracks by vehicles
❒6 Fences
❒7 Visitor centres
❒8 Power lines
❒9 Radio masts
❒10 Power plants
❒11 Reservoirs
❒12 Wind turbines
❒13 Designed footpaths
❒14 Trails made by walkers and/or animals

11. What is your opinion on the following statements?

	strongly disagree	somewhat disagree	neutral	somewhat agree	strongly agree
1 I go to places like this to escape the demands of daily life and to put my worries aside	❒1	❒2	❒3	❒4	❒5
2 I go to places like this to be able to rest and recover ("recharge my batteries")	❒1	❒2	❒3	❒4	❒5

12. How strongly do you agree or disagree with the following statements?

	strongly disagree	somewhat disagree	neutral	somewhat agree	strongly agree
1 More and better infrastructure and services are needed in the area	❒1	❒2	❒3	❒4	❒5
2 Nature conservation limits the quality of recreation in areas like this	❒1	❒2	❒3	❒4	❒5
3 Hotels should not be built in this area	❒1	❒2	❒3	❒4	❒5
4 The value of an ecosystem only depends on what it does for humans	❒1	❒2	❒3	❒4	❒5
5 Only humans have value for their own sake	❒1	❒2	❒3	❒4	❒5
6 If humans do not manage nature, it becomes a threat	❒1	❒2	❒3	❒4	❒5
7 More infrastructure in the area would negatively affect my experience	❒1	❒2	❒3	❒4	❒5
8 Picking wildflowers and small rocks causes no harm in the long run	❒1	❒2	❒3	❒4	❒5
9 I consider the wild character and tough terrain to be the major challenge of the trip	❒1	❒2	❒3	❒4	❒5
10 Native plants and untouched nature are beautiful	❒1	❒2	❒3	❒4	❒5
11 Seeing wild birds and animals in nature gives me a magical feeling	❒1	❒2	❒3	❒4	❒5
12 I would pay more taxes to protect nature	❒1	❒2	❒3	❒4	❒5

13. Please rate your opinion on the following structures/facilities in the area:

	very inappropriate	inappropriate	neutral	appropriate	very appropriate	no opinion
1 Gravel roads	❒1	❒2	❒3	❒4	❒5	❒0
2 Built-up gravel roads	❒1	❒2	❒3	❒4	❒5	❒0
3 Asphalt roads	❒1	❒2	❒3	❒4	❒5	❒0
4 Roads passable year-round	❒1	❒2	❒3	❒4	❒5	❒0
5 Bridges across rivers	❒1	❒2	❒3	❒4	❒5	❒0
6 Hydro power plants	❒1	❒2	❒3	❒4	❒5	❒0
7 Geothermal power plants	❒1	❒2	❒3	❒4	❒5	❒0
8 Reservoirs	❒1	❒2	❒3	❒4	❒5	❒0
9 Power lines	❒1	❒2	❒3	❒4	❒5	❒0
10 Wind turbines	❒1	❒2	❒3	❒4	❒5	❒0
11 Hotels	❒1	❒2	❒3	❒4	❒5	❒0
12 Mountain huts	❒1	❒2	❒3	❒4	❒5	❒0
13 Campsites	❒1	❒2	❒3	❒4	❒5	❒0
14 Shops/restaurants	❒1	❒2	❒3	❒4	❒5	❒0
15 Gas stations	❒1	❒2	❒3	❒4	❒5	❒0
16 Toilets	❒1	❒2	❒3	❒4	❒5	❒0
17 Cooked food for sale	❒1	❒2	❒3	❒4	❒5	❒0
18 Visitor centre	❒1	❒2	❒3	❒4	❒5	❒0
19 Radio masts	❒1	❒2	❒3	❒4	❒5	❒0

14. Would the following power infrastructure affect your interest to visit the area?

	reduce very much	somewhat reduce	no effect	somewhat increase	increase very	no opinion
1 Hverfisfljót hydro power station	❒1	❒2	❒3	❒4	❒5	❒0
2 Reservoirs	❒1	❒2	❒3	❒4	❒5	❒0
3 Reduced water flow in rivers	❒1	❒2	❒3	❒4	❒5	❒0
4 Power line	❒1	❒2	❒3	❒4	❒5	❒0
5 Dams	❒1	❒2	❒3	❒4	❒5	❒0
6 Canals	❒1	❒2	❒3	❒4	❒5	❒0

15. Please state how positive or negative your attitude is to the following:

	very negative	somewhat negative	neutral	somewhat positive	very positive
1 Further development of hydro power plants in the Highlands	❒1	❒2	❒3	❒4	❒5
2 Further development of hydro power plants in the lowlands	❒1	❒2	❒3	❒4	❒5
3 Geothermal power plants in the Highlands	❒1	❒2	❒3	❒4	❒5
4 Further development of geothermal power plants in the lowlands	❒1	❒2	❒3	❒4	❒5
5 Wind farms in the Highlands	❒1	❒2	❒3	❒4	❒5
6 Wind farms in the lowlands	❒1	❒2	❒3	❒4	❒5
7 Reservoirs in the Highlands	❒1	❒2	❒3	❒4	❒5
8 Reservoirs in the lowlands	❒1	❒2	❒3	❒4	❒5
9 Further construction of power lines in the Highlands	❒1	❒2	❒3	❒4	❒5
10 Further construction of power lines in the lowlands	❒1	❒2	❒3	❒4	❒5

Demographic questions:

Nationality _____

Age ☐ years

Gender ❒1 Female ❒2 Male

Hverfisfljót hydro power plant (42 MW)

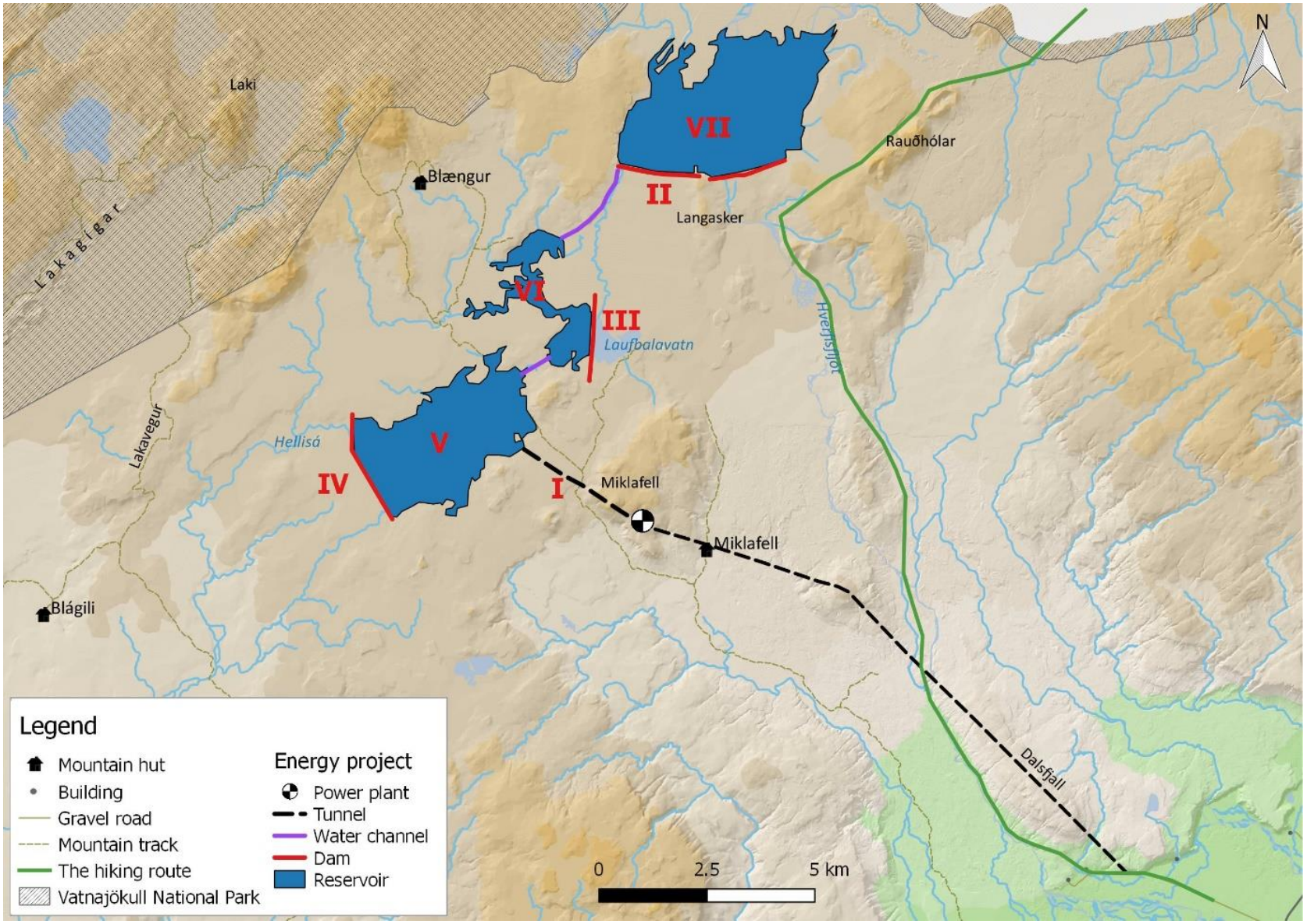
Description: The proposed power plant intends to harness the rivers Hverfisfljót and Hellisá.

Powerhouse: The power station would be underground, at the southern edge of the mountain Miklafell with water channelled from the reservoir through a 3.2 km tunnel (I).

Dams: Four dams would be constructed. Two at each side of Löngusker (II), one in Laufbalavatn (III) and one to the west of Miklafell (IV).

Reservoirs: Three reservoirs would be created. A reservoir near Miklafell (V) which would be 8.6 km^2 at its highest water level and 5 km^2 at its lowest. The second reservoir (VI) would be west of Laufbalavatn and would be 2.2 km^2 at highest water level. The third reservoir would be north of Langasker (VII) and would be 11.4 km^2 at its highest water level and 5.5 km^2 at its lowest. Water channels with a combined length of 3.1 km connect the three reservoirs. From the power plant, water flows through a 13.9 km long tunnel south into Selá, just to the north of road nr. 1.

Roads: A new road would be built along Þverá and to the construction area. The road to the north of Miklafell would disappear under the reservoir (V) making it impossible to drive from there to Blængur and Lakagígar.


N
Laki
Lakagígar
Blængur
VII
II
Langasker
Rauðhólar
VI
III
Laufbalavatn
Hvanngil
Hellisá
Lakavegur
V
IV
I
Miklafell
Miklafell
Blágili
Dalsfjall
0
2.5
5 km
Legend
Mountain hut
Building
Gravel road
Mountain track
The hiking route
Vatnajökull National Park
Energy project
Power plant
Tunnel
Water channel
Dam
Reservoir