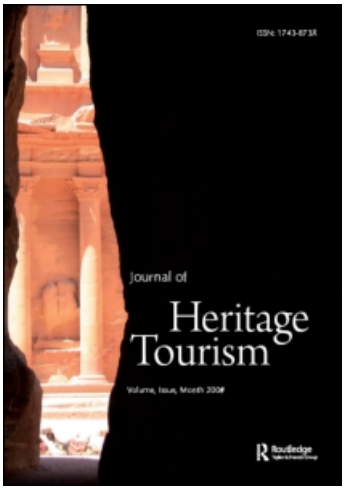

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Nature tourism assessment in the Icelandic Master Plan for geothermal and hydropower development. Part I: rapid evaluation of nature tourism resources

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The Icelandic government is currently carrying out a project called Master Plan for geothermal and hydropower development where all major potential hydropower and geothermal power plant projects in Iceland are being evaluated and ranked. One part of the project is to evaluate the effects of the power plants on tourism and recreation. In this paper, the method developed for this purpose is presented where the value of tourist destinations is evaluated. The country was divided into 57 tourism regions. A group of 8 specialists was asked to evaluate 43 attributes that were considered important for tourism and recreation and rank the tourism regions. The relevant regions have very different properties which make it difficult to select attributes that are relevant in all regions. This was overcome by using a large common set of attributes, but only taking into the total score in each region the score for the attributes that get the highest scores. In this way, the attributes important in each region are identified and compose the score for the present value of each tourism region.

Keywords: nature tourism resources; wilderness; evaluation; power plants; highlands; planning

Introduction

Because of its focus on the attribute of naturalness, nature tourism is an active user of land and is often in competition with other intensive land users (Gössling & Hall, 2006). Natural resource management requires decisions on complex matters where economic, environmental, social and political affairs are linked (Hall, 2010a). For nature tourism destinations that depend on a high-quality natural environment, a carefully worked out land-use plan may help the sector to develop in a desirable sustainable way (Hall & Page, 2006). But the relationship between tourism and natural environment is multifaceted. There are many stakeholders and their interests as well as the spatial dimensions of their activities may be diverse. Therefore, systematic evaluation and planning of tourism development is complex especially when combined with other sectors (Holden, 2008). Hall (2008) points out that although tourism planning is not a cure-all solution, it may help minimise negative impacts, maximise economic returns and contribute to positive attitudes in the

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local community. Appropriate planning frameworks can help us to avoid unnecessary impacts, duplication and loss of opportunities in the future.

Iceland is rich of renewable natural resources. From the beginning of settlement, the rich fishing grounds and the pasture land have been utilised. In recent decades, rivers and geothermal areas have been harnessed to produce electricity, which is now the basis of 24% of the country's exports. Waterfalls and hot springs are also major natural attractions of the growing tourism industry, which provides about 13% of the value of exports (Statistics Iceland, 2010). However, in recent years, land-use conflicts have increased between power production and nature conservation interests, resulting in public demonstrations, sabotage and court action (Benediktsson, 2008; Thórhallsdóttir, 2007) which are costly and time-consuming.

The Icelandic tourism industry has complained about being ignored when it comes to serious decisions regarding land-use planning and utilising natural resources, and that its economic and social significance were being overlooked (Iðnaðarráðuneytið, 2008). It is furthermore difficult for both the power production companies and for the tourist industry to operate in an unstable and unknown business and policy environment where they do not know which resources they can use in the future.

The Icelandic Government led by the Ministry of Industry, Energy and Tourism in co-operation with the Ministry for the Environment reacted to this situation by starting in a project called Master Plan for geothermal and hydropower development (Rammaáætlun um nýtingu vatnsafls og jarðvarma), where all large potential power plant projects are being evaluated and ranked (Steingrímsson, Björnsson, & Adalsteinsson, 2007; Thórhallsdóttir, 2007). The aim is to reduce unnecessary environmental, social and economic costs and improve the planning process by identifying weaknesses and deficiencies in decision-making at an early stage in the planning process. Most of the work was carried out in four workgroups, one of them, Workgroup 2, evaluated the impact on tourism, outdoor activities, agriculture, fishing and hunting (see further description of the Master Plan in Sæþórsdóttir and Ólafsson (2010c)).

In this paper, the work of Workgroup 2 will be introduced with the focus on tourism and outdoor recreation. The aim of the paper is to introduce the methodological framework developed by the group to evaluate the value of nature tourist destinations. As the majority of the proposed power plant projects are in very natural surroundings, the focus is on nature tourism. The final results from the workgroup – that is, the evaluation of the effects of power plants on tourism and recreation and ranking of the proposed power plants according to their impact – are described and discussed in a separate paper (Sæþórsdóttir & Ólafsson, 2010c).

Nature tourism in Iceland

Iceland is an island with an area of 103,000 km^2 and a population of about 320,000, of whom 63% live in the capital area in the southwest corner of the country and most of the rest live along the coastline. Iceland is one of the most volcanically active countries in the world and its diverse geological phenomena are a part of a unique nature. The volcanic zone goes right through the middle of the country and stretches over the largest part of the so-called Highlands. The Highlands are a high plateau, over 400 m above sea level, in the interior of the country and covers about 40% of the country. The landscape there is diverse and in many ways unique, characterised by wide open spaces, with vast lava fields, sandy or stony deserts, mountains of various types, large ice caps and geothermal areas. The Highlands are uninhabited and are often called, or considered to be, wilderness,

and so far, there is little visible evidence of human influence except for primitive gravel roads, mountain huts for travellers, old shepherd's huts and in certain areas, power plants that have been built during the last 30 years. Most of the existing hydro power plants are at the edge of the Highlands, except the newest (which started operation in 2008) and by far the largest, Kárahnjúkavirkjun, which is in the heart of the north eastern Highlands. So far, all the geothermal power plants are situated in the Lowland areas.

Wilderness is defined in the Icelandic Nature Conservation Act nr. 44 (1999) as a pristine area ≥ 25 km^2 where solitude and proximity to nature can be experienced and where visible human constructions are at a distance of at least 5 km. Even though not all the Highland area is wilderness by this definition, some parts are (Ólafsdóttir, submitted for publication). Visitors in the Highlands consider unspoilt wilderness to be the most important component of their experience there. They accept that an area can have mountain roads, mountain huts and hiking trails without the concept losing its meaning, but not power plants, restaurants or hotels (Sæþórsdóttir, 2004; 2009a; 2009b; 2010a; 2010b).

According to the Icelandic Tourist Board, about 40% of all foreign visitors to Iceland in the summer visit the most popular tourist destination in the Highlands, called Landmannalaugar. The Highlands are of special interest to the market segment that stays many days in the country, as 51% of those who stay more than 15 nights in the country visited Landmannalaugar. Nature is the main reason for that over 70% of foreign visitors comes to Iceland, and nature tourists are by far the most important market segment for Iceland. About 60% of foreign visitors participate in some kind of nature-based recreation such as organised nature hikes, horseback riding, glacier climbing, snow scooter trips and whale watching (Capacent Gallup, 2008).

Nature tourism or nature-based tourism relies on nature, either as the central component of the experience, as for example, viewing landforms, flora and fauna, or for creating the settings of activities (Hall & Boyd, 2005; Mehmentoglu, 2007; Priskin, 2001; Valentine, 1992). Nature tourism covers all kinds of adventure tourism in nature, wilderness tourism, ecotourism and some aspects of cultural and rural tourism. Nature tourism depends more on the quality of the environment than other types of tourism (Boyd & Butler, 1996), and regions with a natural appearance are among the most important in the tourist experience (Selvig, 1992). Nature tourism is a significant part of the international tourism industry (Buckley, 2003; Pickering & Weaver, 2003) and nature has become a major attraction in its own right (Hall, 2006; Saarinen, 2004). Nature tourism also provides a significant economic justification for biodiversity conservation, either through the creation of national parks and reserves or through other measures (Buckley, 2009; Fredman, Friberg, & Emmelin, 2007; Frost & Hall, 2009; Reinius & Fredman, 2007). However, by their very nature, islands, such as Iceland, are more vulnerable to anthropogenic-induced change to natural biodiversity (Hall, 2010b). Changes, such as the introduction of invasive species or the reduction of naturalness as a result of human development, are also potentially being amplified as a result of climate change, thereby leading to increased concern over the need to conserve the ecological integrity of wilderness areas (Hall, 2010c).

Nature tourists cannot be considered as a single group as their activities and hence profiles may overlap with other forms of tourism. Lindberg (1991) identified a broad spectrum of nature tourists and categorised nature tourists based on the amount of time they spend in nature, the type of nature experience and the means of travel to a destination. Hard-core nature tourists include scientific researchers, or members of tours specifically organised for education, removal of litter or similar purposes, while dedicated nature tourists include people who travel specifically to see protected areas and who want to understand

local natural or cultural history. Tourists in these categories are more likely to travel longer distances to their destination than mainstream and casual nature tourists who visit destinations primarily for the sake of an unusual trip or experience nature incidentally as a part of a broader trip.

Regardless of the nature-based tourist activity practised, or the type of tourist, some infrastructure, such as transport, accommodation and specific visitor facilities, is required to complement or enhance the natural attraction for nature tourism. In some cases, infrastructure may even be provided so as to reduce environmental impacts. At the 'soft' end of the spectrum, nature-based tourists may prefer hotels and motels, but those at the 'hard' end choose to 'rough it' by camping in the wilderness. Visitors have therefore different wishes and expectations towards the natural features in the areas in which they travel. Some tourists are not so sensitive to human-induced changes, whether they are buildings, roads or information signs. However, such changes can ruin the experience of nature for those who enjoy a natural environment only if it is completely free of human interference. Therefore, tourists have different opinions about what facilities and services are desirable, and it is obviously not possible to please everyone at a single location (Buhalis, 2000). To reflect this, the North American derived Purist Scale Model (PSM) (Fredman & Emmelin, 2001; Hendee, Catton, Marlow, & Brockman, 1968; Stankey, 1973) and the Recreation Opportunity Spectrum (ROS) (Brown, Driver, & McConnell, 1978; Clark & Stankey, 1979; McCool, Clark, & Stankey, 2007) have been used when planning land use in some national parks and wilderness areas. ROS involves zoning outdoor recreational areas from developed to undeveloped in order to provide the tourists with a range of opportunities. The ROS model, therefore, looks at what type of experience can be offered to the tourist in each destination, while the PSM reflects what types of tourists visit the various destinations. Sæþórsdóttir (2010a) has shown that in Iceland the composition of tourists classified according to the PSM varies considerably between nature destinations. The research shows that tourists with purist attitudes form the majority of the visitors in the very remote destinations in Highlands as they are very satisfied with the primitive conditions there and want little development and service. On the other hand, in the more accessible destinations, one-third of the visitors are urbanists who want more facilities.

The tourism industry in Iceland has not put forward any plans or wishes for land use nor decided which target groups it wants to attract to various areas (Jóhannesson, Huijbens, & Sharpley, 2010; Sæþórsdóttir, 2007, 2010a). This is a reflection of how hard it is for the industry and the policy-makers to develop appropriate policies that suit the diverse nature of recreation and tourism and the multiple interests involved, but such a policy is nonetheless very important (Hall, 2008). In the official Icelandic tourism strategy plan for the period 2006–2015, one can though find some indications about what the industry wants and what it regards as its resources. The primary objectives should be:

(1) Iceland's nature and wilderness, the nation's culture and a spirit of professionalism shall prevail in the development of Icelandic tourism.
(2) The competitive position of the tourism industry shall be ensured, with the goal of promoting maximum performance in the sector.
(3) The strain resulting from tourism shall be distributed evenly over the entire country and its inhabitants and shall remain within the tolerance limits defined through research.
(4) Iceland's image as a tourism destination shall be fortified and safeguarded.

Furthermore, work shall be done towards the realisation of the following goals:

(1) The operating conditions created for the tourism industry shall be comparable to those reigning in Iceland's competitor countries.
(2) Iceland shall be in the forefront of environment-friendly tourism.
(3) The build-up of national parks shall be followed up with the promotion of tourism that integrates outdoor activities and nature conservation.
(4) The responsibility of travellers and tourism companies with regard to environmental affairs shall be increased (Alþingistíðindi 2004–2005 A 6, 2005, p. 4780).

Zoning is the most common method to separate 'desirable' and 'undesirable' land use (Hall, 2008) but has so far not been actively used in Iceland. In 1992–1999, a Central Highlands Regional Plan was made for the Highlands (Umhverfisráðuneytið & Skipulagstofnun, 1999). The general aim was to protect the area by limiting the level of development; so if structures needed to be built within the area, they should – to the extent possible – be built in defined structure belts so that they will not unnecessarily affect wilderness areas. Areas were also set aside for approved power plant developments as well as tourist destinations which were divided into main service areas and destinations with little and very little service. Hotels were not to be built in the Highlands and service areas with higher service level and were to be situated at the edge of the area.

Evaluating nature-based tourism destinations

Gunn (1972) introduced the concepts of inviolate belt and zone of closure (contiguous zone) with respect to destination planning. The inviolate belts are the immediate surrounds of a core or nucleus of an attraction or destination such as a national park. An inviolate belt occurs around the Icelandic Highlands in between the inhabited area in the Lowlands, characterised by grassland and cultivated land, and the Highlands with sparse vegetation and barren land. Crossing the region the roads get worse, the speed of the vehicle has to be reduced and the wild untamed nature takes over. This transition region is the inviolate belt. The zone of closure refers to the area immediately outside the inviolate belt. Ideally, facilities and services should be located in this area in order not to diminish the experience of visitors (Gunn, 1972). This is the concept behind the Central Highlands Regional Plan, where the aim is to have minimum infrastructure in the Highlands, but good service at the fringe of the Highlands, in the zone of closure (Umhverfisráðuneytið & Skipulagstofnun, 1999). However, by its very nature, planning needs to adapt to changing circumstances and government priorities. In order to do this, tourism resources are often assessed with respect to their relative values and there is a long history of such spatial planning methods being used in tourism (Hall & Page, 2006; Smith, 1995).

One of the first classifications of tourism resources was completed by Clawson and Knetsch (1963), who distinguished between recreational classes on the basis of location, size of an area, major use and the degree of artificial development. Under this system, recreation areas were placed in a continuum between user-oriented parks (e.g. city parks) and resource-based areas (e.g. national parks). Intermediate areas fall between the two aforementioned categories. Other approaches may provide various categorisations and reviews of destination resources as a planning aide (Ferrario, 1979; Priskin, 2001). For example, Ethos Consulting (1991) carried out a tourism resource evaluation in British Columbia and identified three main geographic characteristics of tourism: the biophysical environment and the human, and the natural resource factors. The biophysical factors were further divided into three sets of attributes: landforms, climate and vegetation. Human factors were divided into two elements: land status, and access; and natural resource

factors were divided into seven elements: forestry, mining, fish, wildlife, visual resources, local recreational use and cultural heritage.

Other studies have sought to use the analytic hierarchy process (AHP) method to evaluate the relative values of tourism resources. Yang (1994) used AHP in a model that evaluated three major elements: resource value, scenic attributes and tourism conditions. Deng, King and Bauer (2002) developed a hierarchical structure for nature tourism in national parks and forest parks in Australia that built on the authors' experience and used AHP for evaluation. In their model, the value of each element of the structure is determined quantitatively to assist in the formation of a set of standards aimed at identifying and measuring a value for each element. One should not assume that each dimension will be of equal importance in contributing to a satisfying trip to a protected area – the various components fulfil expectations to different degrees, but only in combination can they lead to a satisfying experience.

Resource assessment has also become an extremely important part of the evaluation of wilderness values (Hall & Page, 2006; Ólafsdóttir, submitted for publication). Hendee, Stankey and Lucas (1990, p. 182) note that 'a fundamental objective of wilderness management is to maintain and perpetuate the distinctive qualities that define and separate wilderness from other land uses'. When rating the quality of a wilderness region as a recreational area, it must therefore be rated with attributes that are specially recognised as being important for the quality of wilderness. Helburn (1977) states that remoteness and primitiveness are the two essential attributes of wilderness. Lesslie and Taylor (1983) identified four indicators of wilderness quality: remoteness from settlement, remoteness from access, aesthetic primitiveness (or naturalness) and biophysical primitiveness (or naturalness). Hall (1992) demonstrated this using the wilderness continuum concept (Figure 1), which describes wilderness quality as a continuum of remote and natural conditions from pristine to urban.

Approach

Assumptions

Since there is no standardised method for evaluating areas for tourism and recreation, it was necessary in the work for the Master Plan to develop a method for this purpose. In that work, the workgroup was faced with some serious problems. Very limited research has been conducted on tourism and recreation in the regions that are under evaluation in the Master Plan, and what exists is not directly related to the work of the group. Nevertheless, the available material was gathered and used as background material. Due to this lack of data, it was decided to create a model whereby all the attributes involved were evaluated by the specialists in the workgroup.

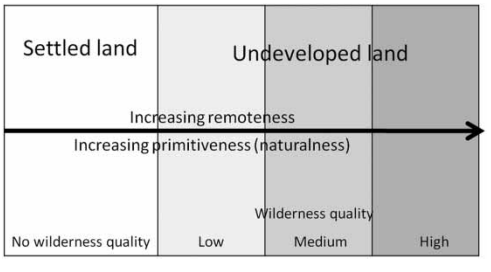

Figure 1. The wilderness continuum.
Source: Hall (1992).

One of the key factors that affect the capacity of tourism and natural resource assessments to be undertaken is the decision-making context in which it occurs. The period of time available for resource and destination assessments, and the selection of a methodology, does therefore depend on the overall planning and policy timetable. Therefore, a relatively rapid resource assessment may need to be undertaken in order to maximise the amount of information available to decision-makers in a relatively short period of time.

Workgroup 2 consisted of eight experts:

- An economist who has worked for decades in the tourism sector and is a member of The Icelandic Travel Industry Association;
- A geomorphologist, a mountain tour guide and the owner of a travel company that specialises in nature experiences;
- Two lecturers from the University of Iceland (both authors of this paper), one of them an associate professor in tourism studies and a former tour guide the other a physicist and chairman of the University of Iceland Regional Research Centres;
- A farmer and associate professor at the Agricultural University of Iceland;
- The president of the Icelandic Travel Association and warden of Thingvellir National Park;
- The Director of the Soil Conservation Service of Iceland;
- A high school geography teacher and former range manager; and
- An inland fisheries specialist from the Institute of Freshwater Fisheries.

All group members have travelled extensively in Icelandic nature, and most of them have also, at one time or other, worked within the tourist industry. The experience of the group members also covered all of the most common recreational activities practised in Iceland. The workgroup visited most of the proposed power plant sites under consideration and consulted a number of local experts.

One of the difficulties encountered when developing the method and evaluating the value of the tourism regions was that there is no preferred land-use and land management plan for tourism and recreation in Iceland. Another challenge the workgroup was faced with was that the areas under evaluation in the second phase of the Master Plan differ in many ways; there is, for example, a huge difference between the underdeveloped, uninhabited land in the Highlands and the settled land in the Lowlands. As the largest and most controversial effects of the power plants are expected to be in the Highlands and in areas where wilderness and intact nature are most sensitive to construction, the main emphasis was on including those elements when developing the methodology.

The areas under evaluation in the second phase of the Master Plan also differ in that attributes that are relevant in one type of area are often absent in others. As the relevant regions have very different properties, it is therefore difficult to select attributes that are relevant in all regions. By using a large common set of attributes and evaluating them in all regions, but only taking into the total score in each region the score for the attributes that get the highest scores, the attributes important in each region are emphasised, but attributes that are not important do not lower the score for the region. In this way, one score is obtained for the present value of each tourism region.

The evaluation of tourism regions

The working process was divided into seven steps (Figure 2) and each step is described in the following sections.

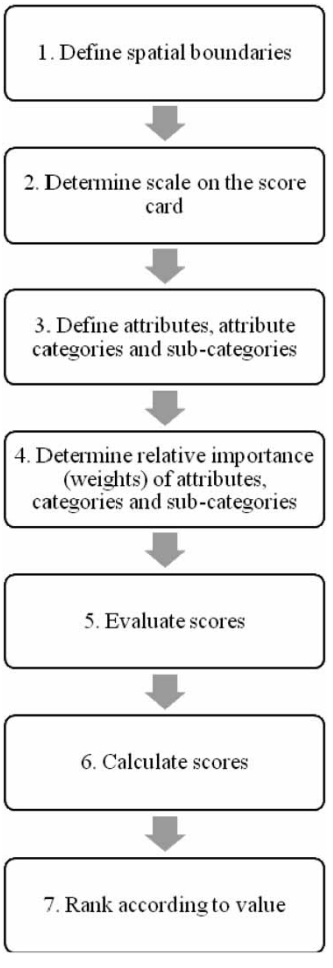

Figure 2. The working procedure when evaluating tourism regions.

Step 1. Define spatial boundaries

An important element in resource systems analysis is defining the boundaries of a system but at the same time, boundaries are often difficult to define. The selection of the boundary of a destination, or any boundary when analysing impacts, will affect the relative size and degree of system change within that boundary. Therefore, boundaries have to be imposed by application of judgement as to where a system begins and ends, and in relation to the problem that is to be solved (Hall & Lew, 2009).

Three kinds of regions are relevant when considering the impact of power plants; *construction regions, impact regions* and *tourism regions*. A construction region is defined as the area where the power plant is situated, including all the related constructions, e.g. buildings, lagoons, dams, canals, drill pads and pipes, as well as the areas where high voltage power lines and roads built for the developments go through. But hydro-power plants can additionally alter the water flow in rives far away from the actual construction site causing waterfalls to be reduced and even disappear. Due to these changes as well as the characteristics of tourism, such as travel patterns, tourism will be affected in a larger area than just the construction region. The area in which tourism is affected is called the

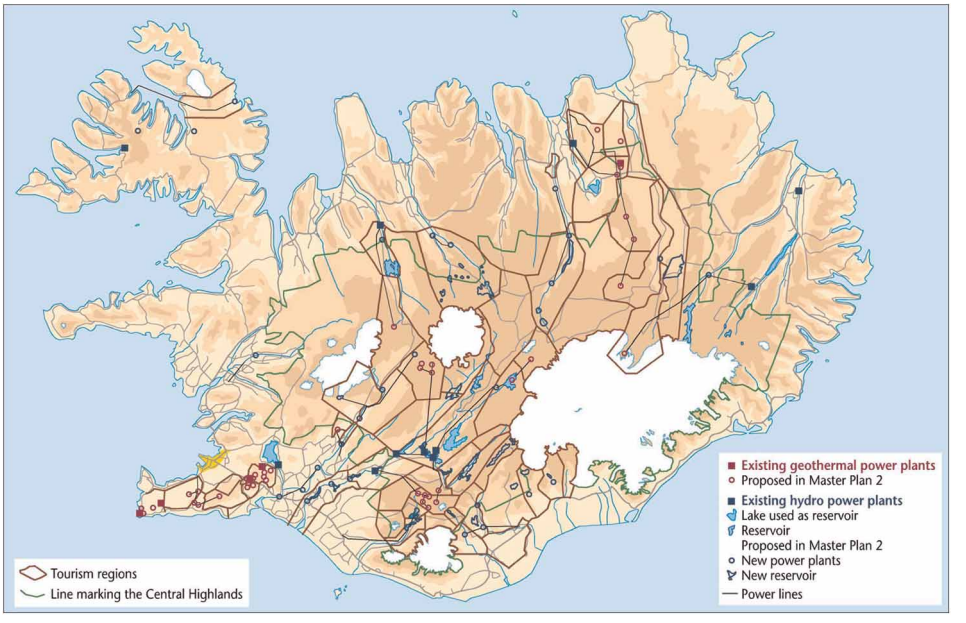

Figure 3. The division into 57 tourism regions.

impact region. The boundaries of the impact region can be difficult to define, and in some cases, the impact region could extend throughout the country as some proposed power plants are visible to almost every visitor to Iceland and might therefore impact their overall image of Iceland. Because of the timeframe of the Master Plan, it was not possible to evaluate the whole country, even though this would have given the most accurate results. The workgroup did evaluate about half of Iceland (Sæþórsdóttir & Ólafsson, 2010c) and that area was divided into 57 *tourism regions* (Figure 3).

When defining the boundaries of the tourism regions, it is of primary importance that the region is homogeneous with regard to the type of tourism there, but it is also important to take into consideration current infrastructure such as roads and main travel routes as they have major influence on travel patterns and type of tourism. Physical elements such as mountain ridges and rivers also create natural boundaries and were used to set the boundaries. An example of division into tourism regions is the two adjoining regions Askja and Ódáðahraun in the northern Highlands. The characteristics of tourism in the tourism region Askja is – to some extent – determined by mass tourism, as tourists travel by bus to see the caldera Askja. At the main tourist attractions there are mountain huts and toilets. The tourist area is defined along the mountain road that leads from the Lowlands and around the caldera. Tourism in the adjoining tourism region Ódáðahraun on the other hand consists mainly of hikers and tourist in specially equipped 4 × 4 vehicles, and infrastructure is almost nonexistent.

Step 2. Determine scale on the score card

In the first phase of the Master Plan, Workgroups 1 and 2 used a 5-point scale with scores given on the scale: 10, very high value; 6, high value; 3, some value; 1, little value; and 0, no value – seldom used though. In order to keep the methods and results as comparable as possible, it was decided to use the same scale in the second phase of the Master Plan. The coarseness of the scale was also considered appropriate for the accuracy of the data.

The workgroup developed definitions of all the attributes (see next step) with description of how to grade them and examples of tourism regions given that specific grade. To ensure coherence, this was then used as a helping tool when evaluating the attributes.

Steps 3 and 4. Define attributes, attribute categories and sub-categories and determine their relative importance

In the next step, all the most important attributes that characterise the tourism regions and differentiate between were listed, 43 in total. Attributes that lead to the same grade for all areas are not useful and are avoided. The attributes were then divided into categories and subcategories, and the appropriate weight was decided by the group through a Delphi procedure.

Five main categories of attributes were used: experience, use, recreation opportunities, infrastructure and future value. Experience was considered the most important category and accounts for half the valuation score (Table 1). The regions vary enormously regarding their use for tourism and recreation as some are already popular tourist destinations, while others are unknown. This is reflected in the amount of infrastructure that has been built for tourism at those destinations, as popular tourist destinations have some infrastructure but 'undiscovered' destination none. The workgroup had to decide whether an area already popular by tourists, and therefore with some infrastructure, even though most of the time the investment is very low, is more valuable than an 'undiscovered' destination important for a certain market group. It was decided to give credit for the destinations already popular; so the use category was given the weight 0.2; and the infrastructure category the weight 0.1. As the tourism industry and recreation is underdeveloped in Iceland, it was decided that when evaluating recreation to consider both what is already practised in the area as well as the opportunities in the area. Future value was given the weight 0.1. The weight of categories that represent future value is in fact much higher, or a total of 0.7 (experience, recreation opportunities and future value) but the categories that describe the current situation weigh less, a total of 0.3 (infrastructure and use). This proportionate division was chosen as to reflect that tourism is a fairly new industry in Iceland, and many opportunities are yet to be exploited. Future possibilities are therefore more important than the current situation.

Experience was further divided into physical properties A (weighting factor 0.2), physical properties B (weighting factor 0.1) and impressions (weighting factor 0.2) (Table 2). The physical properties A sub-category was divided into the following attributes:

- *Naturalness of the environment* where the highest score is given for wilderness and the lowest for urban areas.
- *Large continuous areas*, where the traveller can travel through vast uniform entities, get the highest score.

Table 1. The categories and their weights.

Category	Weight
Experience	0.5
Recreation opportunities	0.1
Infrastructure	0.1
Use	0.2
Future value	0.1

Table 2. Categories, sub-categories and attributes, their weights and computation.

Categories	Weights	Attributes	Number of attributes in average
Experience	0.5		
Physical properties A	0.2	Naturalness of the environment Extent of tourism region Unique and exceptional areas Landscape	All four
Physical properties B	0.1	Geothermal areas, hot springs Signs of volcanic activity, craters, lava Colours – flora – fauna – Diversity, homogeneity Mountains, glaciers – Water, rivers, waterfalls Ravines, canyons – protected areas	Three highest
Impressions	0.2	Beauty Magnificence Tourism carrying capacity Awe, sanctuary, image	Three highest
Recreation opportunities	0.1	Gaze – hiking – boating – cycling Horse back riding – Fishing and hunting Berries, mushrooms, Iceland moss picking Wild geothermal bath Snow scooter, glacier trips 4x4 safari – Driving in a ordinary car History, Visitor centres	Six highest
Infrastructure	0.1		
Access	0.05	Infrastructure for tourists Highway Mountain track	highest
Accommodation	0.05	Local accommodation Accommodation in the neighbourhood	highest
Use	0.2		
Users	0.1	Number of tourists Tourist industry	Both
Pattern of utilisation	0.09	Distance from market Travel pattern	Both
Travel behaviour	0.01	Length of stay Revisit rate	Highest
Future value	0.1	Future value	

- *Unique and exceptional areas* score highest, while areas characterised by common natural phenomena score lowest.
- Impressive *landscape* scores highest, but common and modest landscape gets the lowest score.

In the sub-category physical properties B, the main natural phenomena in the tourism regions such as mountains, waterfalls, hot springs and vegetation were evaluated. If the tourism regions had national parks within their boundaries, the attribute-protected area scored highest, but regional parks or other nature reserves scored 6. Other score values on the scorecard were not used for this attribute. In retrospect, this attribute should rather

have been in the category impression than in physical properties as it is a marker (like national park) that has influence on visitor perceptions, but is not a real physical property.

The sub-category of impression was divided into the following attributes:

- *Beauty.* Areas that most visitors would consider to be very beautiful score highest.
- *Magnificence*. Areas that most visitors would grade as magnificent score highest.
- *Tourism carrying capacity.* Areas where visitors experience that the capacity level has not been reached, e.g. where few visitors come, score the highest, but areas where very many come and indications are that quite many tourists experience that the capacity level has been reached, score lowest.
- *Awe, sanctuary, image*. It was decided to give scores only to the sites that truly evoke this sensation, and the only scores given were 10 and 6. As an example, the volcano Hekla scored 10 for being a significant marker of Iceland.

The recreation opportunities category contained 13 of the most important recreation activities practised in Iceland, such as nature watching, hiking, horseback riding and fishing.

The infrastructure category was divided into the sub-categories of access (weighting factor 0.05) and accommodation (weighting factor 0.05). Access contains three attributes:

- *Highway* measures whether the access road is suitable for passenger cars. Highest scores get areas with good access for all vehicles, but areas not easily accessible on a non-SUV vehicle score only 1.
- *Mountain track s*imilarly measures whether the track is easily passable by unmodified SUV's and if so, the area scores 10. Conversely where the track is very rough and unclear and difficult even for SUV's, the area receives the score 1. This attribute does not assess the challenge and entertainment value of the route for 4×4 travel as that is assessed in the category recreation opportunities in the attribute 4×4 safari.
- *Infrastructure for tourists* scores highest where there are good toilets, signs, and good paths or horse trails, but areas that only contain an outhouse and/or simple markings get a 1.

In the subcategory accommodation, scores were given for both local accommodation and accommodation in the neighbourhood.

- If the *accommodation in the region* suits the target group that visits the area and accommodates easily all visitors, a score of 10 is given.
- If *accommodation in the neighbourhood* is appropriate and within a certain travelling time from the region it scores. Within a 30 min drive from the tourism region scores 10, 30–59 min drive 6, 60–119 min 3, and areas where suitable accommodation is more than 2 h drive away score 1.

The category use was divided into three sub-categories; number of visitors (weighting factor 0.1), pattern of utilisation (weighting factor 0.09) and travel behaviour (weighting factor 0.01).

- The attribute *number of visitors* reflects the present popularity of a region. Areas visited by more than 10,000 tourists per year score 10, where there come 5000–10,000 scores 6, 5000–2000 score 3 and areas where less than 2000 visitors come annually score 1.

- *The tourist industry*. The attribute indicates the importance of the area for the tourist industry as a business or economic turnover. Very important areas such as Gullfoss and Landmannalaugar score 10. Regions that are now of very little importance score 1, even if they might be valuable in the future.

Pattern of utilisation contains two attributes;

- *Distance from market*. A market was defined as a place with many inhabitants, or where many tourists pass through. Areas near to a large market receive a 10, but areas very far from a market area receive the score 1.
- *Travel pattern*. A region that is an important part of a travel pattern scores 10, but areas that are single destinations or part of a travel pattern score 1.

In the sub-category travel behaviour, there are two attributes;

- *Length of stay*. Areas where most visitors stay for at least one night score 10, but areas where daytrips are the most common form of tourism get 6, areas where tourists stay half a day get 3, and where the stay is less than half a day the score is 1.
- *Revisit rate*. Regions that are frequently revisited by tourists/recreationists score 10; conversely regions that are seldom revisited score 1.

The category (and attribute) future value assesses the possibilities for future exploitation of tourism and recreation. Areas that are considered to have great possibilities score highest, but areas that are less likely to become in the near future important for recreation or the tourism industry score 1.

Steps 5 and 6. Evaluation and calculations of scores

The workgroup evaluated all the above-mentioned 43 elements for each of the 57 tourism regions, which means that 2451 grades were given.

In the Master Plan, hydroelectric and geothermal energy developments are being compared. Accordingly the regions under evaluation are very dissimilar and different features generate their value for tourism. In order to compare the two types of regions and still use the same methods of calculation, all attributes are evaluated for all regions, but in some categories only the ones important in the relevant tourism region are calculated into the weighted average (Table 3). This is done automatically as only the attributes that receive the highest scores in the region are incorporated in the calculation, but the rest is left out. In this way, the attributes important in each area are automatically selected. As an example in the geothermal regions, the categories, hot spring area, geothermal heat, hot spring and colour are the most relevant for the value of the area and usually receive the highest scores and consequently enter the score for geothermal areas. Areas where hydroelectric power stations are situated usually obtain the highest scores for the categories, water, rivers, waterfalls and gully, canyon, and ravine and those categories are therefore automatically included in the score, but hot spring area, geothermal heat and hot spring are seldom important. By including the highest grades, the value of geothermal areas is not reduced because of their lack of waterfalls, nor is the value of hydroelectric power station areas diminished because of the absence of hot springs and other geothermal activity. In this way, the qualities that are significant are highlighted without the irrelevant ones devaluating the region.

Table 3. Value of tourism regions.

Tourism region	Value	Tourism region	Value
Jökulsárgljúfur	9.60	Djúpá	8.09
Hveravellir	9.58	Fremrinámar	8.04
Askja	9.42	Núpsstaðaskógur	7.89
Torfajökull	9.31	Skagafjarðardalir	7.80
Landmannalaugar	9.29	Ódáðahraun	7.76
Sprengisandur	9.28	Gjástykki	7.74
Gullfoss	9.18	Þjórsárdalur	7.72
Eldgjá	9.11	Ófeigsfjarðarheiði	7.62
Mývatn	9.10	Gljúfurleit	7.57
Langisjór	8.97	Arnardalur	7.53
Þórsmörk	8.94	Hagavatn	7.38
Hólmsárbotnar	8.91	Hágöngur	7.32
Kerlingarfjöll	8.90	Vonarskarð	7.25
Mælifellssandur	8.88	Tindfjöll	7.17
Laki	8.87	Keilir	7.11
Kiðagil	8.86	Þjórsárver	7.01
Geysir	8.83	Brennisteinsfjöll	7.01
Hengill	8.72	Bláfjöll	6.91
Markarfljót	8.71	Þeistareykir	6.28
Hverfisfljót	8.69	Þórisvatn	6.23
Eldhraun	8.68	Þjórsá í byggð	6.03
Krýsuvík	8.59	Hrunamannaafréttur	5.85
Reykjanestá	8.52	Jökulheimar	5.71
Hekla	8.47	Tungnaá	5.33
Álftavatn	8.38	Skálafell	5.21
Kverkfjöll	8.37	Eyvindarstaðaheiði	4.90
Veiðivötn	8.37	Skarðsmýrarfjall	4.54
Öldufell	8.37	Auðkúluheiði	4.52
Goðafoss	8.33		

As recreation opportunities are very dependent on the terrain, it is unusual and unrealistic for all of these to be available in each area; so by the same argument as above, only the six that receive the highest scores, out of a total of 13 attributes, contribute to the score for the region.

After the value of all attributes for each tourism region had been determined, they were summed up according to the calculation rules and the weights (Table 2), to obtain the final score for the region.

Step 7. Ranking according to value

The last step in the process was ranking the tourism regions according to the computed score they received. The most valuable tourism regions are Jökulsárgljúfur, Hveravellir, Askja, Torfajökull, Landmannalaugar, Sprengisandur, Gullfoss, Eldgjá and Mývatn (Table 3).

Discussion

Due to the foreseeable growth in demand for natural resources in Iceland, their utilisation has to be carefully planned. The evaluation presented in this paper will be valuable for the tourism sector and can be used as a foundation for further work and for helping the sector when setting goals and planning the future.

As the data available were limited, it was decided to use a systems approach and develop a model based on the evaluation of the tourism regions by the eight specialists in the workgroup. Such an approach has its weaknesses – for example the small size of the workgroup. Asking visitors about their experiences in a scientifically conducted research project would have given more reliable results, but that method of gathering data was not feasible due to the timeframe of the project and economic limitations.

As in most analyses of tourism systems, it was not easy to define the spatial boundaries and the relative size of the regions used. The group defined the boundaries of the identified tourism regions based on the type of tourism, infrastructure and the physical properties of the region. Where the boundaries are set affects the value of the tourism region, the score for infrastructure can, for example, be affected by on which side of the border a tourist cabin is located. The size of a tourism region also affects its value. If the defined area is quite small, it is less likely to contain many attributes that receive high grades than if a larger region is defined. Consequently, the value of small regions is likely to be lower than the value of their larger counterparts. To determine the effect of this would have required experimenting with regions of different size, but this was not possible due to the short timeframe of the project. To minimise this effect, the workgroup made an effort to define regions of similar size with comparable features. Only the areas affected by the proposed power plant projects were divided into tourism regions and evaluated and these include most of the Highlands, but only small areas in the Lowlands. It would have been preferable to divide the entire country into tourism regions. Due to this limitation, a few regions were undervalued. For example, the tourism region Gullfoss should have been defined much larger, and all destinations that are on the 'Golden Circle' travel route, which includes Þingvellir and Reykjavík, Geysir and Gullfoss, should have been assessed.

In the model, the most important attributes that characterise tourism regions were listed, in total 43 attributes. The model emphasises particularly the importance of nuclei in the attractions in tourist destinations by focusing on the tourist experience which weighs half the final score.

One of the main difficulties encountered when developing the model was that there does not exist any preferred land-use plan for the tourist industry. The official tourism strategy for the 2006–2015 period does however indicate the importance of nature and wilderness for the sector.

As the aim of the Master Plan is to rate and rank all the 84 power plant projects, the workgroup had to come up with a method that evaluated all kinds of regions on the same scale. This immediately made the work very challenging as the regions are very diverse and difficult to compare. This is particularly so when comparing the settled parts of the Lowlands with the Highlands which are experienced as wilderness by current visitors (Sæþórsdóttir, 2010b). The quality of wilderness increases because of higher remoteness and primitiveness (naturalness) values (Hall & Page, 2006; Helburn, 1977; Lesslie & Taylor, 1983). The quality of tourism in the Lowlands depends, on the other hand, on quite the opposite factors, that is, on good infrastructure and a variety of good service. Over half (44) of the power plants are planned in the Highlands and the wilderness and nature areas in those regions are the most sensitive to construction, and research among travellers in the Iceland Highlands has shown that power plants have negative effect on their wilderness experience (Sæþórsdóttir, 2010b). It is therefore to be expected that the largest and most controversial effects of the proposed power plants will be in the Highlands. Consequently the attributes that reflect on the naturalness and remoteness were given high weight in the model. In addition, as over 70% of foreign tourists who visit Iceland come to experience nature, nature is made the most important attraction in the model (Capacent Gallup, 2008).

Infrastructure is very important for tourism destinations but lowers at the same time the quality of the wilderness by making them less natural. The categories of infrastructure (weight = 0.1) and use (weight = 0.2) reflect the value of a destination. The number of visitors and the number of tourism businesses that use an area are indicators of the importance or value of a destination, and are used as attributes in the model.

Icelandic wilderness is accessible by four-wheel drive vehicles and large regions with only pedestrian access are relatively few. The Highlands have always been utilised for grazing and farmers went there on horseback to collect their sheep. In the last decades, the area has become popular with tourist travelling in four wheel drive vehicles that find the rough tracks and wild rivers challenging. Winter tourism in specially equipped large wheeled vehicles that can go over snow and glaciers is also popular, and now tours are offered in the so-called super jeeps to areas that are normally difficult to come to and in weather not suitable for hikers. This has resulted in conflicts between groups of recreationists as these vehicles tend to be noisy and disturb the peace and quietness that many people so strongly connect with the highland wilderness. When plans are presented to curb motorised traffic, as is happening in the new Vatnajökull National Park, conflicts arise.

An important attribute of wilderness is its relative accessibility – for example, its distance from a large market, population centre or a busy tourist destination. This quality of wilderness was evaluated in the attribute distance from market. The value of areas near to large population centres is only going to increase with increasing population and the reduction of wilderness areas there.

Due to the importance tourists give to unspoiled nature and how sensitive they are to constructions like power plants, the model emphasises these attributes – that is, the natural capital (e.g. wilderness, natural soundings, national parks, natural phenomena), but puts less emphasis on attributes that are valuable in the inhabited lowland regions, like built capital (e.g. infrastructure, housing, built attractions) and human capital (e.g. professional skill, individual knowledge, education). Quality of service was, for example, not included in the model though it undoubtedly is an important part of the tourist experience.

The areas under evaluation in the second phase of the Master Plan do not only differ with respect to wilderness and habitation, but are also very different with respect to the type of landscape. The landscape around a hydroelectric plant usually consists of running water, waterfalls, canyons and vegetated valleys. Geothermal power plants would, on the other hand, be situated near to geysers and boiling mud pots. The regions do therefore have very different properties, and it is difficult to select attributes that are relevant in all regions. By using a large common set of attributes and evaluating each of them in all regions, but only taking into the score for each region a fixed number of the highest scores, the attributes that are important in each region are selected and compose the score of the region. In this way, one score is obtained for the present value of each tourism region which can be used to rank them on along one scale. The workgroup considered that by using this method, the majority of the tourism regions benefitted from their valuable attributes and were not put into disadvantage due to attributes they ‘lacked’.

The model also utilises the notion of tourism carrying capacity (Hendee et al., 1990). This attribute depends on the condition of the physical environment, the infrastructure, the opinion of the inhabitants and of the visitors, and if the carrying capacity at any given location is not to be exceeded, the number of tourist has to be suitable in all those four aspects. Tourism carrying capacity was put in the sub-category impressions, but it would have fitted better in a separate sub-category. Research on tourism carrying capacity has only been conducted in five locations in Iceland (Sæþórsdóttir, 2010a); so the group used their best knowledge to estimate its value according to the physical situation and

the tourist experience with reference to the current market segment in each region. Few destinations in Iceland have reached their tourism carrying capacity; so most regions got high scores for this attribute.

The workgroup considered various attributes that could describe the value of tourism regions, but decided not to include them in the evaluation. Examples of these are climate, challenge, safety and sounds in nature. There is no doubt that the silence in Iceland's nature is an extremely important part of the experience of many visitors and the reason many of them choose one destination rather than another. Sounds can also affect the tourist experience, e.g. the roars of great waterfalls, the bubbling of geysers, and bird songs. However, due to the difficulty of assessing these attributes of the natural soundscape, they were eventually left out of the evaluation. Climate is also significant when choosing a destination, especially for those who are not on an organised tour. Without doubt, good climate contributes to the popularity of some tourism regions and is therefore a part of their value. Yet the attribute was too complicated to assess as this would have required data on the correlation between weather, weather forecasts and travel patterns.

The workgroup also considered evaluating the attribute of personal challenge or risk which has been recognised as a significant factor in the attractiveness of some destinations and outdoor adventure activities (Hall & Boyd, 2005; Holden, 2008). However, this attribute is very difficult to assess as what is a huge challenge for some, may be easy for others and the attribute was therefore disregarded. Safety is also an important attribute for the value of tourism regions, and many natural areas in Iceland are somewhat hazardous for travellers (e.g. steep and unstable edges of cliffs and canyons) and in other areas, natural disasters like floods and eruptions can occur without warning – although that is not necessarily common. Tourists' awareness or knowledge of the risk involved is nevertheless often very limited (Bird, 2009; Bird, Gisladottir, & Dominey-Howes, 2009) therefore the attribute was not included in the evaluation.

Since the model was developed (mid 2009 to early 2010), Icelandic nature has demonstrated that a single-shot exercise such as the one developed for the Master Plan is hardly sufficient in an otherwise dynamic environment. For example, the value of the tourism region Þórsmörk increased significantly in March 2010 when a small eruption started near Eyjafjallajökull. The eruption was a spectacular tourist experience, and according to a web survey carried out by the consulting companies Miðlun and Rannsóknir og ráðgjöf ferðaþjónustunnar (2010), about a fifth of the Icelandic population went to see it. A month later when the main volcano itself awoke and gushed ashes into the upper atmosphere, the area was closed for tourists for over a month, and was during that period worthless for tourism and recreation. Now when the eruption has stopped, the area is open again for tourism, but everything is covered with a thick layer of fine ash which blows in the wind and makes life intolerable. So its value for tourism and recreation is probably going to be low until the situation changes and that could take some years, but then the value might very well become very high with all the new attractions such as new lava formations as well as greater international awareness as a result of the publicity the ash cloud and eruption received.

Conclusions

This paper has examined the undertaking of a rapid assessment of nature tourism resources in Iceland. It has outlined the process for identifying the value of tourism resources as well as how the approach fits into the wider planning and policy process. As the paper notes, there is no standardised method for evaluating areas for tourism and recreation and the

assessment is therefore unique to the Icelandic policy context. The paper highlights the role of data collection and expert judgment in developing a systematic assessment method (Deng et al., 2002; Smith, 1995). The approach also stresses the realities of spatial planning and policy in that the demands of decision-makers often require planning research to be undertaken in what would be sub-optimal method if more time and resources were available (Hall, 2008). The reality for much tourism planning is that resources, including substantial data sources based on previous research, will often not be available. The undertaking of even imperfect research will still provide a far greater weight for the conservation of tourism values in the planning process than if it was not conducted at all.

The paper has also identified areas in which research would have been appropriate if resources permitted as well as highlighted the weaknesses in the approach used. One of the most significant issues in the present study that will affect future planning developments is the extent to which the various perceptions of different markets/resource users can be balanced with respect to how they perceive and want to use the same area. Although rational models of evaluation and decision-making can be developed for this problem (Hall & Page, 2006), the reality is that decisions as to the relative weighting of the preferences between different sets of users, whether they be tourists or power generation schemes, is ultimately a political one. However, in the context of the present study, the assessment of tourism resources has become a much more significant part of the broader spatial planning process than has hitherto been the case.

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