

# Information Sheet on Ramsar Wetlands (RIS) – 2009-2012 version

Available for download from [http://www.ramsar.org/ris/key\\_ris\\_index.htm](http://www.ramsar.org/ris/key_ris_index.htm).

*Categories approved by Recommendation 4.7 (1990), as amended by Resolution VIII.13 of the 8<sup>th</sup> Conference of the Contracting Parties (2002) and Resolutions IX.1 Annex B, IX.6, IX.21 and IX.22 of the 9<sup>th</sup> Conference of the Contracting Parties (2005).*

## Notes for compilers:

1. The RIS should be completed in accordance with the attached *Explanatory Notes and Guidelines for completing the Information Sheet on Ramsar Wetlands*. Compilers are strongly advised to read this guidance before filling in the RIS.
2. Further information and guidance in support of Ramsar site designations are provided in the *Strategic Framework and guidelines for the future development of the List of Wetlands of International Importance* (Ramsar Wise Use Handbook 14, 3rd edition). A 4th edition of the Handbook is in preparation and will be available in 2009.
3. Once completed, the RIS (and accompanying map(s)) should be submitted to the Ramsar Secretariat. Compilers should provide an electronic (MS Word) copy of the RIS and, where possible, digital copies of all maps.

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### 1. Name and address of the compiler of this form:

Sigurður Thraínsson, Ministry for the Environment and Natural Resources,  
Prof. Björn Þorsteinsson, Dr. Hlynur Oskarsson, and Dr. Ragnhildur Sigurdardóttir for the Wetland Centre, Agricultural University of Iceland, Hvanneyri, 311 Borgarnes, Iceland

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Designation date

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Site Reference Number

### 2. Date this sheet was completed/updated:

6 February 2013

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### 3. Country:

Iceland

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### 4. Name of the Ramsar site:

The precise name of the designated site in one of the three official languages (English, French or Spanish) of the Convention. Alternative names, including in local language(s), should be given in parentheses after the precise name.

Andakill Protected Habitat Area (Andakill, Hvanneyri)

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### 5. Designation of new Ramsar site or update of existing site:

This RIS is for (tick one box only):

- a) Designation of a new Ramsar site ; or  
b) Updated information on an existing Ramsar site

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### 6. For RIS updates only, changes to the site since its designation or earlier update:

#### a) Site boundary and area

The Ramsar site boundary and site area are unchanged:

or

**If the site boundary has changed:**

- i) the boundary has been delineated more accurately ; or
- ii) the boundary has been extended ; or
- iii) the boundary has been restricted\*\*

and/or

**If the site area has changed:**

- i) the area has been measured more accurately ; or
- ii) the area has been extended ; or
- iii) the area has been reduced\*\*

**\*\* Important note:** If the boundary and/or area of the designated site is being restricted/reduced, the Contracting Party should have followed the procedures established by the Conference of the Parties in the Annex to COP9 Resolution IX.6 and provided a report in line with paragraph 28 of that Annex, prior to the submission of an updated RIS.

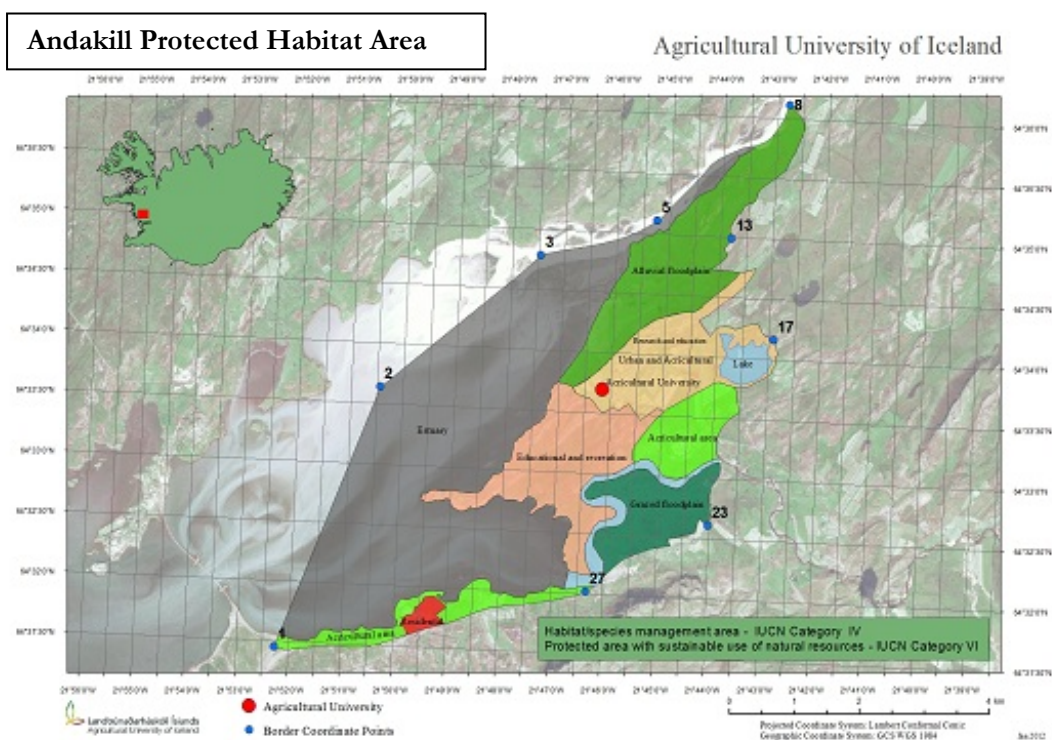
**b) Describe briefly any major changes to the ecological character of the Ramsar site, including in the application of the Criteria, since the previous RIS for the site:**

**7. Map of site:**

Refer to Annex III of the *Explanatory Note and Guidelines*, for detailed guidance on provision of suitable maps, including digital maps.

**a) A map of the site, with clearly delineated boundaries, is included as:**

- i) a hard copy (required for inclusion of site in the Ramsar List): **X**;



- ii) an electronic format (e.g. a JPEG or ArcView image) **X**;

iii) a GIS file providing geo-referenced site boundary vectors and attribute tables X.

**b) Describe briefly the type of boundary delineation applied:**

e.g. the boundary is the same as an existing protected area (nature reserve, national park, etc.), or follows a catchment boundary, or follows a geopolitical boundary such as a local government jurisdiction, follows physical boundaries such as roads, follows the shoreline of a waterbody, etc.

The boundaries are the same as the boundaries for the Andakill Nature Reserve (<http://www.stjornartidindi.is/Advert.aspx?ID=0341f3f4-fc8d-47ac-8537-54931156b1f8>). To the North West they follow the boundaries of the farms and properties that contribute land to the site and follow the centre of the river Hvítá southward and then towards the shore at Seleyri, south of the bridge across the river Hvítá. The western part of the site constitutes the river and riverbanks of Hvítá along with extensive flood plains along the river. The southern and eastern borders follow more or less the main road (no. 50), Borgarfjardarbraut, through the farms Grjóteyri, Árdalur, Ytri- og Innri- Skeljabrekka, Neðri-Hreppur and Ausa to the farm Vatnshamrar. From there the boundaries follow more or less those of the farms Vatnahamrar and Ausa and around the lake Vatnshamravatn following an old water course through the farms Vatnshamrar and Bárksstaðir and straight to the road Hvítárvallarvegur. Then the boundary follows the borders of the farm Hvanneyri, the farms Báreksstaðir and Grímsstaðir and straight through to the floodplains, following the edge of the floodplains to the north east through the farms Grímarsstaðir and Hvítárvellir to the middle of the river Hvítá.

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**8. Geographical coordinates** (latitude/longitude, in degrees and minutes):

Provide the coordinates of the approximate centre of the site and/or the limits of the site. If the site is composed of more than one separate area, provide coordinates for each of these areas.

The coordinate for the approximate center of the area:

N64° 33'41      W021° 46'09

The area is defined within the following limits, (see map above):

	X	Y
1	1 N64° 31'27	W021° 52'15
2	2 N64° 33'38	W021° 50'26
3	3 N64° 34'47	W021° 47'27
4	5 N64° 35'06	W021° 45'14
5	8 N64° 36'06	W021° 42'46
6	13 N64° 34'59	W021° 43'47
7	17 N64° 34'09	W021° 42'54
8	23 N64° 32'36	W021° 44'01
9	27 N64° 32'01	W021° 46'19

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**9. General location:**

Include in which part of the country and which large administrative region(s) the site lies and the location of the nearest large town.

The Andakill Nature Reserve is in Borgarbyggð municipality, which is within the county of Borgarfjardarsýsla, Western Iceland. The centre of the area is Hvanneyri, the campus of the Agricultural University of Iceland (AUI). The town Borgarnes, which is the administrative center of the area, is 8 km direct distance from Hvanneyri, and 12 km driving distance.

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**10. Elevation:** (in metres: average and/or maximum & minimum)

The elevation of the area is from about 2 m below sea level to approximately 20 m above sea level.

**11. Area:** (in hectares): 3086 ha

The Andakíll Nature Reserve covers 3086 ha, belonging to Hvanneyri the Agricultural University of Iceland and to thirteen neighboring farms, Hvítárvellir, Grímsstaðir, Heggstaðir, Báreksstaðir, Vatnshamrar, Ausa, Neðri-Hreppur, Innri-Skeljabrekka, Ytri-Skeljabrekka, Árdalur, Grjóteyri, Grjóteyrartunga og Skógarkot.

**12. General overview of the site:**

Provide a short paragraph giving a summary description of the principal ecological characteristics and importance of the wetland.

The Andakill Nature Reserve is located at the estuary of the fjord Borgarfjörður, with two rivers, the glacial river Hvítá and the river Andakilsá, wetland bogs and the lake Vatnshamravatn. The Andakilsá catchment is free of glacial influence and has its origin in the lake Skorradsavatn, which is fed by numerous spring water sources and small tributaries. Hvanneyri forms a peninsula into the fjord with the two rivers on either side. The peninsula consists of rows of rocky outcrops intervened with extensive freshwater bogs (within area: educational and recreational – see 19). Along the Hvítá river side of the peninsula are floodplains (alluvial plains) created by regular floods containing high sediment loads from spring melting and heavy winter rains in combination with high tide effects. The alluvial plain is an important resting, feeding and breeding area for wetland birds. Animal fodder has been harvested from these wetlands for centuries as a major fodder source for the local farming community. Parts of these floodplains are still harvested to some degree. On the other side of the peninsula, the floodplains of Andakilsá river, are extensive wetlands and marshes primarily used for livestock grazing. The cultivated areas, especially the managed hayfields, of the Agricultural University experimental farm at Hvanneyri and neighbouring farms are important grazing areas for staging Greenland white-fronted geese. The lake Vatnshamravatn (41 ha) within the site is a shallow and rich freshwater lake frequently hosting numerous species of wetland birds. Below sea level, when the tide is out in the estuary, extensive mud, sand and gravel bars provide important feeding grounds for birds.

**13. Ramsar Criteria:**

Tick the box under each Criterion applied to the designation of the Ramsar site. See Annex II of the *Explanatory Notes and Guidelines* for the Criteria and guidelines for their application (adopted by Resolution VII.11). All Criteria which apply should be ticked.

1	•	2	•	3	•	4	•	5	•	6	•	7	•	8	•	9
X		<input type="checkbox"/>		X		X		<input type="checkbox"/>		X		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>

**14. Justification for the application of each Criterion listed in 13 above:**

Provide justification for each Criterion in turn, clearly identifying to which Criterion the justification applies (see Annex II for guidance on acceptable forms of justification).

**Ramsar criterion****Justification for Criterion****Criterion 1:**

A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or most -natural wetland

A range of wetland habitats are associated with Borgarfjörður, including an estuary, natural saltmarsh and inter-tidal habitats, freshwater lakes, wet heath and other peatland areas, both natural and managed marshes, some dominated by “gulstör”

<sup>1</sup> The *Carex* marshes have significant cultural significance being an example of a wetland type that was formerly managed in a high sustainable manner so as to produce hay. They are an example of a cultural landscape. In recent years, the Ramsar Convention has strongly highlighted the importance of wetlands for their relevant cultural and sustainable socio-economic importance, and this is a major theme at the forthcoming Conference of Parties in November 2005.

type found within the appropriate biogeographic region.

*Carex lyngbyei*<sup>1</sup>, as well as farmland under a variety of agricultural practices. The richness and extent combination of bio-habitats is unique both nationally and in international context.

**Criterion 3:**

A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.

The Andakill Nature Reserve hosts about 10% of the population of Greenland White-fronted Geese during flyway season. The nature reserve hosts about 50-60% of the Icelandic breeding population of shelducks (*Tadorna tadorna*) and more than 1% of the breeding population of white-tailed sea eagle (*Haliaeetus albicilla*). The reserve has redshank, snipe and godwits on the sedge meadows together with divers and ducks on the lakes and estuary, which contributes to conserving wetland bird diversity of Iceland.

**Criterion 4:**

A wetland should be considered internationally important if it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

The spring and autumn migration periods are a critical period in the life-cycle of the Greenland White-fronted Goose when the ability to 'refuel' adequately can mean the difference between successful or unsuccessful breeding in Greenland, and in extreme situations, the ability to be able to reach breeding or wintering areas from this staging area.

**Criterion 6:**

A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Andakill Nature Reserve qualifies by sustaining at least 10% of the world population of Greenland White-fronted Geese during spring and autumn migration. Ramsar guidance indicates that turnover should be taken into account in assessing the relative important of such sites, and on this basis, Andakill Nature Reserve probably supports considerably more than 10% of the total population.

**15. Biogeography** (required when Criteria 1 and/or 3 and /or certain applications of Criterion 2 are applied to the designation):

Name the relevant biogeographic region that includes the Ramsar site, and identify the biogeographic regionalisation system that has been applied.

**a) biogeographic region:**

Arctic biogeographical region (EEA)

**b) biogeographic regionalisation scheme** (include reference citation): In Annex B of the Resolution IX.1 it is indicated that it is generally most appropriate to use a continental, regional or supranatural scheme rather than national one.

<http://www.eea.europa.eu/data-and-maps/figures/biogeographical-regions-in-europe-1>

**16. Physical features of the site:**

Describe, as appropriate, the geology, geomorphology; origins - natural or artificial; hydrology; soil type; water quality; water depth, water permanence; fluctuations in water level; tidal variations; downstream area; general climate, etc.

The main landscape features were formed during the ice age. At the end of the ice age the area was below sea level leaving rock outcrops and marine sediments in the depressions and flatter areas. The bedrock is tertiary basalt with some andesitic intrusions. The nature reserve includes parts of two rivers, the rivers Hvítá to the north and Andakílsá to the south. Both are under the influence of tidal waters and periodic flooding influences the estuarine plains, especially extensive along Hvítá. The Andakílsá river originates in Lake Skorradalvatn about 10 km upstream from the estuary.

The bedrock and the marine sediments have low permeability and on the flatter areas and in the depressions over 2 m, up to 5-6 m, thick organic soils (Histosols) have developed. The organic carbon content is often in the range 25 to 40% and the pH 4 to 5, in some places below 4. In flooded areas the pH is higher, often 5 to 6 and in some places above 6. This is a good indication of the higher natural fertility of the flooded soils.

On the flood plain the mineral soils were classified as Fluvisols, pH 5-6, organic C 7-8% in the top soil and soluble nutrients fairly high. The soils of the rocky outcrops are on the whole shallow; primarily Leptosols, Regosols and Andosols (Þórðardóttir, A. and Guðmundsson, Þ. 1994).

The organic soils were originally very wet and difficult to access or use. During the last century the organic soils were drained by open ditches, those intended for cultivation intensively and some of the others extensively to improve pasture quality and accessibility. The water table in the drained area has been lowered by 1 metre or more in the ditches. However due to the low permeability and low evapotranspiration the water table is higher or even close to the surface after heavy rain and in winter especially in the extensively drained areas. The organic soils have very high water holding capacity thus still fulfil the function of mediating the water flow in the area. The ground water is basically confined to the organic soils and is thus of poor quality as drinking water but it is unpolluted and of high ecological value.

A weather station has been operated within the Andakíll Nature reserve since 1997. Average annual temperature (1998-2011) is 4.4°C. Average annual precipitation at Hvanneyri (1999-2011) was 1028, with minimum annual precipitation of 640 mm and maximum of 1613 mm (calculated from data provided by the Icelandic Met Office).

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### 17. Physical features of the catchment area:

Describe the surface area, general geology and geomorphological features, general soil types, and climate (including climate type).

The valley system of the Borgarfjörður area is of glacial origin. Hvítá river is the 6th largest river in Iceland as measured by water volume, with a flow of 170 m<sup>3</sup>/s. Hvítá river is of mixed origin, has glacier fed, direct runoff and groundwater fed components. Because of the glacier origin of the river, Hvítá has a sediment discharge of about 0.25 million tons per year (Rist, S. 1990). The sediment load partially precipitates in the estuary adding constantly to the alluvial plain. The catchment area of Hvítá is 3550 km<sup>2</sup> and thereof 360 km<sup>2</sup> under glacier.

Andakílsá catchment gathers water from direct runoff supplemented by groundwater flow and has thus no glacier influences. The catchment area is 146 km<sup>2</sup>, the mean flow rate is about 8 m<sup>3</sup>/s, with an annual sediment load of only about 1,800 tonnes.

The sediment load of Hvítá has filled up the inner part of the fjord forming an alluvial plain. The particle sizes of the recent sediments are dominated by fine sand and silt and due to the sea water influence and high Na concentration, the sediments have a layered coherent structure. The soils show redoximorphic morphology up to the surface and were classified as Fluvisols (Þórðardóttir, A. and Guðmundsson, Þ. 1994). Further away from the river, but still under the influence of periodic flooding, mineral rich organic soils (Histosols) have formed on the alluvial plain.

The climate of the coastal region in Iceland is subpolar oceanic.

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### 18. Hydrological values:

Describe the functions and values of the wetland in groundwater recharge, flood control, sediment trapping, shoreline stabilization, etc.

The main hydrological value of the peat land area and the lake Vatnshamarsvatn (41 ha) is in supporting the ecology of the area but also in mediating water flow and flood control. On the floodplain the hydrological value is in flood control, retention of sediments and nutrients and shoreline stabilization. The high water table in the peat land, furthermore, decreases release of greenhouse gases into the atmosphere.

The estuarine plane along the Hvítá which is periodically flooded by brackish water is unique for the area and only a very few plains of this type exist in Iceland. Due to the input of nutrients the plain is fertile and has a high primary production that in turn favours the bird population. The secure fodder production of this plain is one of the major reasons why the Agricultural School was established at Hvanneyri. The alluvial plain was used for centuries for fodder production and kept that role well into the 20<sup>th</sup> century. Nowadays a part of it is regularly moved and grazed, but has never been fertilised. This part of the wetland thus plays an important role ecologically as well as historically and culturally.

### 19. Wetland Types

#### a) presence:

Circle or underline the applicable codes for the wetland types of the Ramsar "Classification System for Wetland Type" present in the Ramsar site. Descriptions of each wetland type code are provided in Annex I of the *Explanatory Notes & Guidelines*.

Marine/coastal: A • B • C • D • E • F • G • H • I • J • K • Zk(a)

Inland: L • M • N • O • P • Q • R • Sp • Ss • Tp • Ts • U • Va •  
Vt • W • Xf • Xp • Y • Zg • Zk(b)

Human-made: 1 • 2 • 3 • 4 • 5 • 6 • 7 • 8 • 9 • Zk(c)

#### b) dominance:

List the wetland types identified in a) above in order of their dominance (by area) in the Ramsar site, starting with the wetland type with the largest area.

Area	Type	Size (ha)
Estuary waters	F	1218
Intertidal mud, sand or salt flats	G	1218
Intertidal marshes	H	347
Coastal brackish / saline lagoons	J	1218
Permanent rivers/streams / creeks	M	100
Permanent fresh water lakes	O	41
Permanent fresh water marshes	U	336
Non-forested peatlands	U	336
Seasonally flooded agricultural land	4	189
Canals and drainage channels, ditches	9	82 km

Note, some wetland areas fit more than 1 category

### 20. General ecological features:

Provide further description, as appropriate, of the main habitats, vegetation types, plant and animal communities present in the Ramsar site, and the ecosystem services of the site and the benefits derived from them.

The habitat protection of Hvanneyri (Government gazette 364/2002) refers to the importance of the site for the white-fronted geese as a stop over migratory bird. The site provides all the full range of different functional habitats needed by the birds i.e. for feeding, safe resting, drinking and bathing and therefore

Hvanneyri has become the most important stop over site for this population throughout its range. This habitat mosaic of freshwater lake, ponds and waterways, the brackish estuary, the alluvial flood plains, intertidal marshes, the bogs, fens, with intermitted rocky ridges offers habitat for many plant and bird species. The wetlands also serve as the prime habitat of the shelduck (*Tadorna tadorna*) in Iceland.

The most economically important ecosystem service provided by wetlands and rivers in the Borgarbyggð municipality is fishing of wild Atlantic salmon (*Salmo salar*). About 20% of the total catch of wild salmon in Iceland is derived from the Hvítá river hydrological system. The Andakílsá is also a popular salmon fishing river. All salmon in the Andakílsá and the Hvítá river systems needs to migrate through the Ramsar site, rendering migration of salmon to be some of the most important ecosystem services of the wetland.

The peatlands are important sinks for carbon dioxide. The flood plains serve an important role in flood alleviation, while sediments and nutrients carried by floods to the floodplain have served an important role to sustain agriculture and biological productivity in the area.

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### 21. Noteworthy flora:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 14, Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

The list of higher plants in the area counts more than 130 species, while the list for mosses and lichens is more incomplete. To date, 50 moss species and 25 lichen species have been identified in the nature reserve. The flooded marshes are dominated by the American species (not found in mainland of Europe) *Carex lyngbyei* which grows in extensive natural monoculture. For full list of plant species see appendix A.

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### 22. Noteworthy fauna:

Provide additional information on particular species and why they are noteworthy (expanding as necessary on information provided in 12. Justification for the application of the Criteria) indicating, e.g., which species/communities are unique, rare, endangered or biogeographically important, etc., including count data. *Do not include here taxonomic lists of species present – these may be supplied as supplementary information to the RIS.*

Breeding birds of Hvanneyri comprise both wetland and upland species. Wetland birds include at least seven species of waterfowl and nine species of shorebirds. A few pairs of rock ptarmigan, arctic tern, parasitic jaeger, and three gull species nest every year. All three species of Iceland's raptors nest near or within Hvanneyri and short-eared owl has been recorded breeding within the property. Eight of the nine historical Icelandic passerine species are breeding birds within Hvanneyri. Nearby Borgarfjörður is a wintering area for gulls, common eider, and cormorants. The estuary is also important as a stopover site for a number of other species, such as the Eurasian teal, but in fall of 2012 the Icelandic Institute of Natural History counted 1500 individuals of the species in the estuary, one of the largest flocks of Eurasian teal ever counted in Iceland, and about 5-10% of the biogeographical population in Iceland (Jón Einar Jonsson, pers. comm.). With more information and further monitoring of bird populations, more species are likely to fulfil the Ramsar requirements for listing on the site. For full list of bird species see appendix B.

Atlantic salmon (*Salmo salar*) uses the estuary on its migration up the rivers Hvítá and Andakílsá. The rivers and tributaries of the Hvítá river are among the most economically important salmon fishing rivers in Iceland, with about 20% of the total catch of wild salmon in Iceland. Other migratory salmonid species, such as arctic char (*Salvelinus alpinus*) and brown trout (*Salmo trutta*) use the estuary as well for an important part of their lifecycle, such as for feeding and migration.

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### 23. Social and cultural values:



**a)** Describe if the site has any general social and/or cultural values e.g., fisheries production, forestry, religious importance, archaeological sites, social relations with the wetland, etc. Distinguish between historical/archaeological/religious significance and current socio-economic values:

The site is the home of the Agricultural University of Iceland which specialises in teaching and research in agricultural and natural sciences, nature conservation and land use. The University established recently a Centre for Wetland Research and Monitoring which will be responsible for management and monitoring of the protected area.

The site fulfils the wise use features presented in Ramsar, as it is a site of sustainable forms of tourism, outdoor recreation, education, scientific research, agricultural production, grazing and fisheries. Hvanneyri has a long history, reaching back more than 1100 years ago at the time when Iceland was first settled by man. An agricultural school was founded at Hvanneyri in 1890. Since then, Hvanneyri has been the main centre of agricultural education and science in Iceland, having profound effect on the agricultural and land-use history of Iceland.

**b)** Is the site considered of international importance for holding, in addition to relevant ecological values, examples of significant cultural values, whether material or non-material, linked to its origin, conservation and/or ecological functioning?

If Yes, tick the box **X** and describe this importance under one or more of the following categories:

- i) sites which provide a model of wetland wise use, demonstrating the application of traditional knowledge and methods of management and use that maintain the ecological character of the wetland: Applies to Hvanneyri and Andakill.
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland: Applies to Hvanneyri and Andakill.
- iii) sites where the ecological character of the wetland depends on the interaction with local communities or indigenous peoples:
- iv) sites where relevant non-material values such as sacred sites are present and their existence is strongly linked with the maintenance of the ecological character of the wetland:

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**24. Land tenure/ownership:**

a) within the Ramsar site:

The Agricultural University of Iceland, government owned higher education institute: Surrounding farms are in private ownership.

b) in the surrounding area:

The proposed Ramsar site is surrounded by traditional farms in private ownership.

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**25. Current land (including water) use:**

a) within the Ramsar site:

The current land use is mainly habitat protection, education and research, agriculture and recreation. Within the Ramsar site, altogether 275 people live in the urban area at Hvanneyri, and about 25 people on the surrounding farms. In addition about 125 students reside at Hvanneyri during the academic year. The water use within the reserve is very limited, as water is piped into the area from springs further upstream.

In the alluvial floodplain, the natural floods of the river Hvítá provides natural fertilization of a number of agricultural fields.

b) in the surroundings/catchment:

Mainly agricultural activities. The Andakíll reserve is within the Borgarbyggð municipality, which is 4925 square km in area and has about 3500 inhabitants. About 82% of wetlands in Borgarbyggð municipality have been drained or altered (Óskarsson, H. 1998).

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**26. Factors (past, present or potential) adversely affecting the site's ecological character, including changes in land (including water) use and development projects:**

a) within the Ramsar site:

University campus expansion and expansion of agricultural fields has affected the ecological character of the site. Pollution is not a problem within the Ramsar site and overgrazing is currently not a problem within the site. Some of the wetlands have been drained to varying degrees, but further drainage is prohibited within the Andakíll reserve. The lake Vatnshamravatn, a 40 ha lake within the reserve needs hydrological restoration. The Wetland Centre at the Agricultural University, which manages the reserve, is currently (fall 2012) working on a management plan, which will include future wetland restoration plans within the reserve. A bridge, built in 1981 over the fjord Borgarfjörður has affected the ecological character of the fjord, including the Andakíll reserve in areas at and below sea level. The bridge and subsequent landfill slows the release of the Hvítá river into the Atlantic ocean, decreasing salinity in the fjord and increasing sedimentation of coarse grained material.

European flounder (*Platichthys flesus*), is a recent immigrant in Icelandic waters (as of 1999). It is currently not known whether the invasion of the species is natural or as a result of a release of ballast water or other human induced factors. The flounder competes with arctic char and brown trout for food resources within the estuary (both within and outside the Ramsar site). The flounder extends furthermore into the freshwater sections of the rivers Hvítá and Andaflá, into the breeding areas of the rivers and is considered to prey on juveniles of all salmonid species. There is currently a master's project studying the effects and possible treatment for the invasion of the flounder into the river systems.

b) in the surrounding area:

Limited increase of buildings on farms, increased development of holiday cottages, increased agricultural fields and further draining of wetlands.

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**27. Conservation measures taken:**

a) List national and/or international category and legal status of protected areas, including boundary relationships with the Ramsar site:

In particular, if the site is partly or wholly a World Heritage Site and/or a UNESCO Biosphere Reserve, please give the names of the site under these designations.

Habitat protection area for the Greenland white fronted geese was established in 2002 for a part of the proposed site as declared in the Government gazette 364/2002 (Stjórnartíðindi C). In 2011 the area was enlarged considerably to include important bird areas of the farms surrounding the original habitat area (Government gazette 338/2011, Stjórnartíðindi C).

b) If appropriate, list the IUCN (1994) protected areas category/ies which apply to the site (tick the box or boxes as appropriate):

Ia ; Ib ; II ; III ; IV ; V ; VI

The protected area has not been assigned an IUCN category yet, but a likely classification would probably be category VI, as indicated above.

c) Does an officially approved management plan exist; and is it being implemented?:

Management plan is as of fall 2012 being prepared by the Wetland Centre at the Agricultural University in cooperation with Umhverfisstofnun (Icelandic Environmental Protection Agency).

d) Describe any other current management practices:

According to the regulation on the Andakill reserve, all future land-use will be practiced to ensure the sustainability of the wetland ecosystems. Introduction of exotic plants and animals is prohibited outside the urban area and agricultural fields.

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**28. Conservation measures proposed but not yet implemented:**

e.g. management plan in preparation; official proposal as a legally protected area, etc.

Management plan is (fall 2012) being prepared by the Wetland Centre at the Agricultural University in cooperation with Umhverfisstofnun (Icelandic EA). Restoration of the lake Vatnshamravatn has been proposed, but not yet implemented. Further wetland restoration projects will be proposed in the management plan. A comprehensive monitoring program has been proposed for the Ramsar site.

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**29. Current scientific research and facilities:**

e.g., details of current research projects, including biodiversity monitoring; existence of a field research station, etc.

Number of scientific research projects conducted in the area by the staff of the University and visiting scientists, national and international. A new research facility will be opened in fall 2012 by the lake Vatnshamravatn, which will house the Wetland Centre and offer monitoring and research facilities for both the university scientists as well as visiting scientists.

See appendix for publication list

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**30. Current communications, education and public awareness (CEPA) activities related to or benefiting the site:**

e.g. visitors' centre, observation hides and nature trails, information booklets, facilities for school visits, etc.

A special wetland research centre has been founded (may 2008) to facilitate wetland teaching and research. The wetland centre offers facilities for visitors with observation hides by the lake Vatnshamravatn and special facilities for school visits. A map of nature trails and an information booklet has been published for the Ramsar site (in Icelandic, see appendix C).

The university and the Wetland Centre have had a leading role in building awareness in Iceland on wetland conservation issues and wetland restoration – including affecting national policies and international policies through making wetland restoration a recognized mechanism in combating climate change.

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**31. Current recreation and tourism:**

State if the wetland is used for recreation/tourism; indicate type(s) and their frequency/intensity.

The site is a recreation area for students and staff as well as visitors. Limited tourism.

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**32. Jurisdiction:**

Include territorial, e.g. state/region, and functional/sectoral, e.g. Dept of Agriculture/Dept. of Environment, etc.

Government authority responsible for nature reserves: Umhverfisstofnun (The Environmental Agency of Iceland), Sudurlandsbraut 24, 108 Reykjavik.

The site is within the municipality of Borgarbyggð with administrative headquarters in Borgarnes.

The Agricultural University of Iceland is a government owned education institute. The University has via contract with the Environmental Agency of Iceland the responsibilities of managing the reserve and the wetland area.

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### 33. Management authority:

Provide the name and address of the local office(s) of the agency(ies) or organisation(s) directly responsible for managing the wetland. Wherever possible provide also the title and/or name of the person or persons in this office with responsibility for the wetland.

Directly responsible for managing the wetland: Wetland Centre and Agricultural University of Iceland, Dr. Ragnhildur H. Sigurdardottir, managing director, Hvanneyri, 311 Borgarnes, phone.: +354 4335000, e-mail: [raga@lbhi.is](mailto:raga@lbhi.is).

Government body responsible for protected areas: Umhverfisstofnun (The Environmental Agency of Iceland), Ólafur A. Jónsson, Sudurlandsbraut 24, 108 Reykjavik, phone: +354 5912000, e-mail: [olafurj@umhverfisstofnun.is](mailto:olafurj@umhverfisstofnun.is).

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### 34. Bibliographical references:

Scientific/technical references only. If biogeographic regionalisation scheme applied (see 15 above), list full reference citation for the scheme.

Website of the Andakill and Hvanneyri Ramsar site:

<http://www.lbhi.is/Pages/2115> and [www.votlendi.is](http://www.votlendi.is). This site is under reconstruction and is expected to be completed in March 2013.

Related website from the Icelandic Environmental Agency: <http://www.ust.is/einstaklingar/nattura/fridlyst-svaedi/vesturland/andakill-hvanneyri/>

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Nyegaard, T., Kristiansen, J.N. & Fox, A.D. 2001. Activity budgets of Greenland White-fronted Geese *Anser albifrons flavirostris* spring staging on Icelandic hayfields. *Wildfowl* 52: 41-53.

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