

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

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

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

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Designation date

Site Reference Number

2. Date this sheet was completed/updated:

4 February 2013

3. Country:

Iceland

4. Name of the Ramsar site:

Snæfell and Eyjabakkar Area, (Snæfells- og Eyjabakkasvæðið).

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

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;

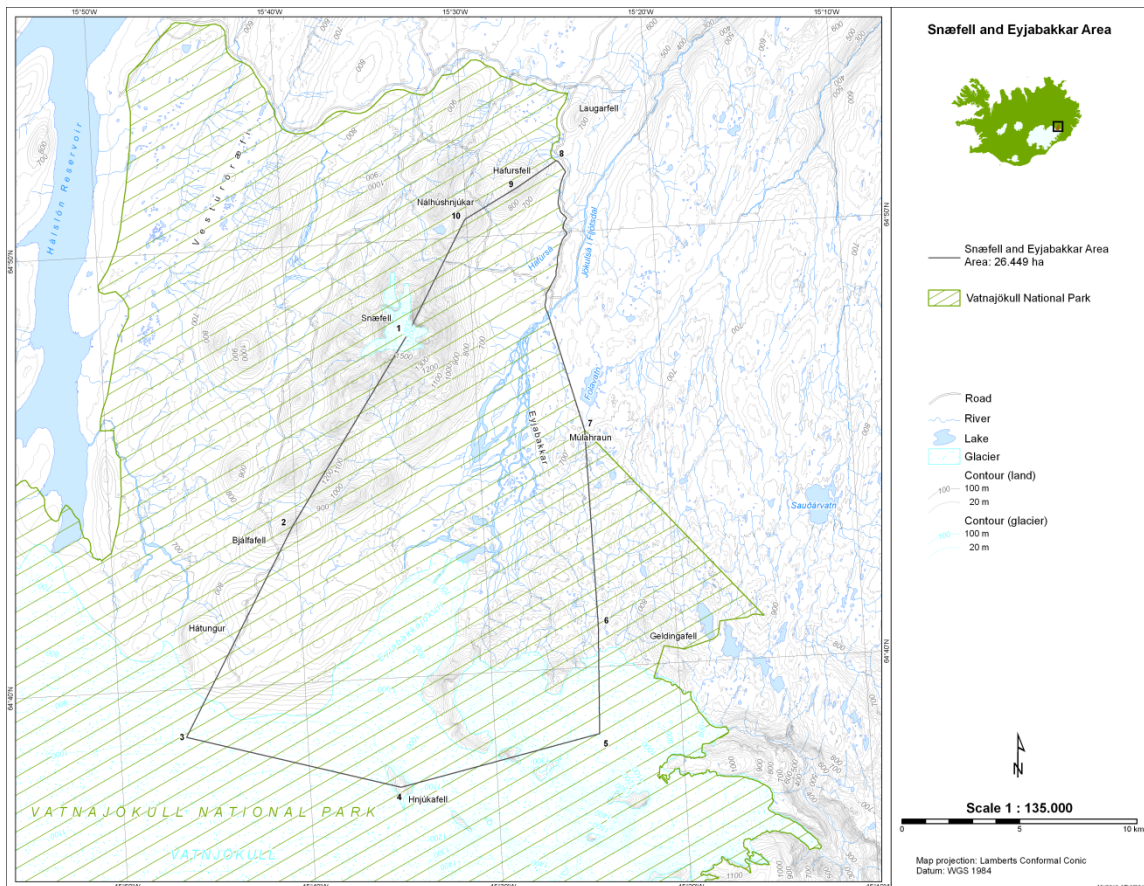


Fig 1. Map showing the boundaries (black line drawn through points 1–10) of Snæfells and Eyjabakkar Site within the Vatnajökull National Park in Eastern Iceland. The green line and the hatched area indicate the borders and the area of Vatnajökull National Park.

- ii) an **electronic format** (e.g. a JPEG or ArcView image) X; JPEG file is provided.
- iii) a **GIS file** providing geo-referenced site boundary vectors and attribute tables .

b) Describe briefly the type of boundary delineation applied:

The boundaries of the nominated Ramsar site follow the mountains and ridges bordering the uppermost part of the Eyjabakkar area. To the west the boundary is the dormant volcano Mt. Snæfell and its associated mountain ridge from the glacier to the foothills of Hafursfell. The eastern boundary is on lower land, from the glacier across Dökkafell through the rocky hills of Múláhraun down to the Kelduárlón-reservoir, where it continues to the west of the reservoir, along the wetland delta and across the river Jökulsá í Fljótsdal to the west of the Ufsarlón reservoir. From there it follows a highland-road until it meets the western boundary to the northeast of Hafursfell. The southern boundary is on the main glacier to the south of the Eyjabakkajökull outlet glacier. The eastern boundary follow partly the boundaries of Vatnajökull National Park and exclude the newly formed reservoirs, Ufsarlón and Kelduárlón, along with some wetlands that are affected and disturbed by the activities and water diversions for the hydro power production in the area.

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 coordinates of the centre of the site is N64 43, W15 32.

The boundaries are drawn through points 1–10, the coordinates of the points are following, see figure 1:

Point 1 N64 47 W15 33

Point 2 N64 43 W15 40

Point 3 N64 38 W15 46

Point 4 N64 37 W15 35

Point 5 N64 38 W15 24

Point 6 N64 40 W15 24

Point 7 N64 45 W15 24

Point 8 N64 51 W15 25

Point 9 N64 51 W15 27

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 Eyjabakkar area is located in the Eastern part the Central Highlands of Iceland within the municipality Fljótsdalshreppur. The nearest town is Egilsstaðir, in the municipality Fljótsdalshérað, about 100 km away.

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

The minimum elevation is 600 meters and the maximum height of the reserve is 1833 meters (Snæfell) above sea level.

11. Area: (in hectares)

The area is 26,450 hectares, and it is protected within Vatnajökull National Park.

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 Eyjabakkar wetland is situated at the north-eastern boundaries of the Vatnajökull icecap in the outwash plain formed by the river Jökulsá í Fljótsda where it flows through the depression to the north of Eyjabakkajökull outlet glacier. Extensive wetlands are also found on gently sloping land to the west and east of the river in the northern part of the reserve. Small ponds and lakes are abundant in the wetland. Most of the wetland is classified as poor wetland with short sedge fen, palsa mire, sandy fen, moist sedge heath and moist moss heath as the main habitat types. The wetland of the delta is fed by the water from the glacier to the south, whereas the wetland in the northern part of the reserve is more fed by water draining from the hills above. The Eyjabakkar wetland is among the most extensive and diverse wetlands

found in the central highlands of Iceland. There are no major man-made structures with the reserve area, but the area to the east of it has recently been encroached by water diversions to the Fljótsdalsvirkjun power plant.

Over 30 species of birds have been recorded within the reserve area and its surroundings of which 21 have bred (Skarphéðinsson & Þórisson 1993). The Eyjabakkar wetland is a key-area for moulting non-breeding pink-footed goose (*Anser brachyrhynchus*) in summer. Their numbers have monitored since 1979 when around 1200 geese were found. The number peaked at 13.000 birds in 1991 after which it has declined and has been of the order 2000 – 5000 birds from 2004 (Skarphéðinsson 1999, Stefánsson & Þórisson 2010). The most common and/or conspicuous breeding birds of the Eyjabakkar wetlands and surrounding heathlands are, whooper swan (*Cygnus cygnus*), golden plover (*Pluvialis apricaria*), dunlin (*Calidris alpina*) and snow bunting (*Plectrophenax nivalis*) (Skarphéðinsson & Þórisson 1993).

Overall densities of upland birds in the reserve was estimated 48.8 pairs/km² in July 2004 (Gudmundsson & Stefánsson, in press), being lowest on barren gravelly flats but highest in the palsa mires. The most common birds were golden plover, snow bunting, dunlin, and meadow pipit, 16.8, 10.0, 9.7, 4.0, 3.2 and 8.0 pairs/km², respectively.

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		X		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).

In the Arctic and Subarctic region there are some of the most extensive wetlands in the world, .e.g. within Alaska, Canada, Sweden, Finland, Russia and Siberia. These include bogs, fens and palsa mires. Permafrost is widespread. The wetlands in the highlands of Iceland are only a minor proportion of the circumpolar wetlands.

Criterion 1: A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.

Justification for criterion 1. The forefield of Eyjabakkajökull is characterized by sandur, end moraines, ice-cored and ice-free hummocky moraines. The Eyjabakkar wetland area is partly made up of hummocky vegetated end moraine that consist of wave shaped bundles of compact and „crumple” vegetated soil with small lakes and ponds in between. These ponds have been interpreted as collapsed palsas, an indicator of deteriorating permafrost. This is a relative rare land formation / geological formation and wetland area in Iceland.

Criterion 2: A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.

Justification for criterion 2: The wetland area has international importance for a number of species that are listed as threatened internationally and included in Appendix II of the Convention on Migratory Species. The area hosts higher numbers of breeding pairs per km² of Eurasian golden plover (*Pluvialis apricaria*), dunlin (*Calidris alpina*) and whooper swan (*Cygnus cygnus*) than other highland areas in Eastern Iceland. Although the area does not support these species in sufficient numbers to qualify by its self as internationally important area, it has an international importance as a part of a network of similar habitats

breeding sites for these species in the central highlands of Iceland, namely Guðlaugstungur proposed for inclusion on the Ramsar List and the Þjórsárver Ramsar Site.

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.

Justification for criterion 3: The Eyjabakkar wetland is among the most extensive and diverse wetlands found in the central highlands of Iceland. Along with other protected wetland sites in the central highlands and sites proposed for protection in the future (Oddaflóð) it forms a network of wetlands for conservation of diverse habitat types and mountain biological diversity in the biogeographic region.

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.

Justification for criterion 4:

The Eyjabakkar wetland is a key-area for the pink-footed goose (*Anser brachyrhynchus*) in Iceland as one of the main area where the geese concentrate during moult in mid-summer. The number of moulting geese in the area has been monitored almost annually from 1979 when around 1200 geese were found. The number peaked at 13,000 birds in 1991 after which it has declined and has been of the order 2000 – 5000 birds from 2004 (Stefánsson & Thórisson 2010). In the year 2000 these numbers were 4% of the total Iceland-Greenland population of the pink-footed goose, and estimated 10-15% of the non-breeding segment of the population (Skarphédinsson & Thórisson 2001; see also Skarphédinsson 1999). The importance of the area for moulting pink-footed gees is paramount due to the limited number of such sites. Furthermore, the Eyjabakkar wetland has been an important moulting site for pink-footed geese, at least intermittently since medieval times with historical records dating back to 1397.

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 water bird.

Justification for criterion 6:

As of 2012 the geese numbers (5,000) represent approx. 1.5% of the total pink-footed goose population.

In addition, whooper swan (*Cygnus cygnus*), Eurasian golden plover (*Pluvialis apricaria*), dunlin (*Calidris alpina*), snow bunting (*Plectrophenax nivalis*), and also the pink-footed geese breed in the area.

The area is an important site for the pink-footed goose population and forms a network of sites along with two other important sites in Iceland, Thjórsárver Ramsar Site and Guðlaugstungur.

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):

<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.

Geology & Geomorphology: The area is in the north-eastern highlands of Iceland, in a depression at the northern edge of Vatnajökull-glacier. The bedrock of the mountain ridge in the western part of the reserve is mostly basic and intermediate hyaloclastite, pillow lava and associated sediments from the upper Pleistocene. In the lowest part of the reserve along the river course there are basic and intermediate extrusive rocks with intercalated sediments, also from the upper Pleistocene. Bedrock in the easternmost part of the reserve is acidic extrusive, from the Tertiary and Pleistocene, older than 10.000 years (Jóhannesson & Sæmundsson 1989).

Soil type: Soil within the reserve area has not been studied so studies from similar habitats in the central highlands must be used for reference. In the barren habitats gravelly and sandy vitrisol is the dominant soil type, with organic C (carbon) generally lower than 1.5%, with a pH of ~7. In the wetlands gleyic andosol is the dominant soil type, with organic C generally lower than 12% and pH in the range of 6 – 7. In the drier heathland part brown andosol is the dominant soil type, with organic C ~ 5% and a pH of ~6.5 (Arnalds & Óskarsson 2009, Magnússon et al. 2009).

Sediment characteristics: Not relevant.

Origins: A natural wetland, that has not been disturbed and is not managed within the reserve. Adjacent wetland to the east of the reserve has been disturbed by the recent Kelduár-lón (reservoir) diversion

Hydrology: The wetland is mainly fed by surface and subsurface water seepage from the glacier down through the delta area below, also by water from the hills to the west and east of the valley.

Water quality: High, glacial outwash and freshwater streams and ponds, undisturbed by human activity or contamination.

Depth, fluctuations and permanence of water: This has not been studied in the Eyjabakkar wetland. However, judging from other similar areas, the water table is high throughout the year with annual fluctuations of < 1 m. Water level is highest after snowmelt in spring and lowest at the end of the growing season in late summer.

Tidal range and variation: Not relevant.

Downstream area: Not relevant.

Climate: The climate in the area is cool and dry. The mean annual temperature is in the range of $\pm 2 - 0$ °C and the annual precipitation for the area is 600 – 800 mm (Björnsson 2003, Crocket et al. 2007). The mean monthly temperature in the wetland area is above freezing from June – September, with the growing season extending between June and August. The area is windy, dominated by southerly and northerly winds. Extreme climatic events are not known to affect the area. Continued global warming is likely to affect permafrost and palsa formation in the area and lead to a reduction in the extent. The mean annual air temperature on the Eyjabakkar outwash plain, approximately 10 km from the glacier, was 0.1°C between November 1997 and October 2008, indicating that the present climate is too warm for any substantial permafrost to be sustained (Benediktsson et al. 2010).

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 Eyjabakkar area is 5 – 15 km wide depression at the northern edge of Vatnsjökull, with a high mountain ridge (Snæfell) to the west and lower hills to the west. The valley is widest at the base of the glacier. A glacial river from Eyjabakka valley glacier has deposited a delta in the bottom of the valley where extensive wetlands, small lakes, ponds and streams are found. Large moraines are about 3 km from the edge of the valley glacier and fresh gravel deposits which have only recently become free of ice, and show the signs of the retreating glacier. Organic gleyic andosol is dominant in the wetland with a relatively

high pH and low organic matter content for a wetland soil. Subarctic climate, with Mean Annual Temperature below 0 °C.

Eyjabakkajökull is a surge-type outlet glacier draining the north-east part of the Vatnajökull ice cap in Iceland with advances recorded in 1890, 1931, 1938 and 1972-73 (Benediktsson et al. 2010). The largest advance (3-4 km) occurred in 1890 when the glacier terminated at the Eyjafell bedrock knob and formed the end distinctive moraines. The forefield of Eyjabakkajökull is characterized by sandur, end moraines, ice-cored and ice-free hummocky moraines. Prior to the 1890 surge, the distal part of the proglacial sandur had developed a thick vegetated soil cover of loess, peat and tephra (Benediktsson et al. 2010).

Indicators of permafrost are rare in the forefield of Eyjabakkajökull. Indistinct frost-crack polygons were observed on the Eyjafell bedrock knob and circular ponds occur in places in front of the 1890 moraine and in clusters on the Eyjabakkar outwash plain to the north. These ponds have been interpreted as collapsed palsas, an indicator of deteriorating permafrost (Benediktsson et al. 2010).

The mean annual air temperature on the Eyjabakkar outwash plain, approximately 10 km from the glacier, was 0.1°C between November 1997 and October 2008, indicating that the present climate is too warm for any substantial permafrost to be sustained (Benediktsson et al. 2010).

18. Hydrological values:

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

The wetland is in a remote highland area. The river Jökulsá í Fljótssdal has recently been harnessed by diversions and small reservoirs located downstream and outside the reserve. This is part of the water diversion for the Kárahnjúkar Hydroelectric Project (hydro-electric power plant) and Fljótssdalur Hydropower Station that was formally opened in 2007 and concluded in 2009.

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.

M – permanent rivers/streams/creeks

O – permanent freshwater lakes

U – Non-forested peatlands. Poor sedge fens are the dominant type.

Vt – tundra wetlands with frozen palsas and open pools within the sedge fens.

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.

Barren land types (69 km²) are extensive within the reserve area and are mainly found in the hills of the mountain ridge in the western part of the reserve where steep screes and rocks are extensive. At the base of the glacier are large areas of gravelly flats with very sparse vegetation (see: Habitat map, Table 1). Moss heaths and heathlands are also extensive (56 km²) with *Anthelia*-heath as the dominant habitat type, found in areas of heavy and late snow-lie. Sedge heath is also extensive in lower areas above the wetlands.

The wetland area of the reserve covers 36 km² including rivers and lakes. The dominant habitat types of the wetland are: short sedge fen (20 km²), moist moss heath (3 km²), moist sedge heath (2 km²) and palsa mire (2 km²). Extensive wetlands (14 km²) are also found in the area adjacent to the reserve, mainly short sedge fens. They are part of the same complex of wetlands found within the reserve area (see Habitat map). This excludes the newly formed hydro power reservoirs, Ufsárlón and Kelduárlón, along with some wetlands that are affected and disturbed by the activities and water diversions for the hydro power production in the area.

The short sedge fens are flat expanses of sedge dominated wetlands rich in brown mosses. In the fens there is a mosaic of sedge flats, ponds and drier ridges with heath vegetation. In depressions and around the ponds the fen vegetation is dominant with *Eriophorum angustifolium*, *Carex rariflora*, *C. nigra*, *C. rostrata* and *Calamagrostis stricta* as the main species. On the drier ridges the dominant species are *Salix callicarpaea*, *S. herbacea* and *Bistorta vivipara* (Magnusson et al. 2009).

The moist moss heath and moist sedge heath are poor wetland types with high cover of brown mosses and *Salix herbacea*, *Salix callicarpaea*, *Bistorta vivipara*, *Calamagrostis stricta* and *Carex bigelowii* as the dominant vascular species (Magnusson et al. 2009).

The palsa mires are diverse wetlands with dry palsa ridges and wetter pond or sedge areas in depressions. The flora is therefore species rich with a mixture of heathland and wetland communities. Lichens are abundant on the palsa ridges. The most common vascular plant species are *Salix callicarpaea*, *Calamagrostis stricta*, *Carex bigelowii*, *Salix herbacea*, *Equisetum arvense*, *Bistorta vivipara*, *Eriophorum angustifolium* and *Carex rariflora* (Magnusson et al. 2009).

The main ecosystem services:

The area has in recent decades become the main moulting area of the pink-footed geese in Iceland, with several thousand birds moulting in the area each summer. Pink-footed geese also breed in the area. The wetlands are also a habitat of a fairly large populations of waders (e.g. golden plover, dunlin and knot) and whooper swans.

The most important ecosystem service value to people is probably that the wetland and heathland within the reserve is an important source of grazing for livestock (sheep) during summer. Wild reindeer also graze in the area and hunting reindeer is an important source of income for local guides and the population in the area.

Table 1. Habitat- and land types within the Eyjabakkar reserve and in adjacent area. (Ref.: Habitat types – Eyjabakkar, Map, Náttúrufræðistofnun Íslands 2010.)

Habitat- and land types	Reserve area	Outside reserve	Mapped area total
Barren lands	69,16	35,95	105,11
Exposed river beds	13,30	0,56	13,86
Screes/Rocks	24,84	23,97	48,80
Gravelly flats	30,93	11,43	42,36
Sand and tephra fields	0,08	0,00	0,08
Exposed andic soils	0,01	0,00	0,01
Moss heaths	56,12	32,74	88,85
<i>Racomitrium eriocoides</i> heath	9,65	3,66	13,31
<i>Anthelia</i> heath	46,47	29,08	75,54
Heathlands	28,02	11,54	39,55
Dwarf willow scrub heath	0,09	0,00	0,09
Dwarf willow scrub heath with gullies	2,05	1,61	3,66
Sedge heath	21,04	9,58	30,62
Grassy <i>Racomitrium</i> heath	4,83	0,35	5,18
Poor wetlands	28,48	9,15	37,63
Springs and springfens	0,03	0,18	0,21
Moist moss heath	3,29	0,10	3,39
Moist sedge heath	2,43	1,34	3,77
Palsa mire	1,91	0,00	1,91
Short sedge fen	20,12	7,50	27,62
Sandy fen	0,70	0,03	0,73
Rich wetlands	0,31	0,31	0,62
Scrub fen	0,05	0,00	0,05
Tall sedge fen	0,26	0,03	0,30
<i>Carex nigra</i> fen		0,28	0,28
Other	0,01	0,21	0,22
Inhabitated areas	0,01	0,00	0,01
Disturbed land/Gravel mines		0,21	0,21
Base map	82,40	61,55	143,95
Glaciers	75,45	56,62	132,07
Rivers and lakes	6,95	4,93	11,88
	264,49	151,46	415,94

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.*

In the Eyjabakkar area 319 species of plants (133 vascular species, 113 bryophytes, 56 lichens and 17 fungi) have been recorded (Guttormsson & Gíslason 1977, Ottósson et al. 1999). Most of the species are common in Iceland and none is confined to the reserve area. Four vascular species in the area are rare in Iceland, these are *Callitriche hermaphroditica*, *Draba nivalis*, *Papaver radicum* and *Erigeron humilis*.

The most important plant communities within the reserve are probably those of the short sedge fens which form the main grazing areas of the moulting pink-footed geese. The most common species are *Carex rariflora*, *Eriophorum angustifolium*, *Calamagrostis neglecta* as well as the moss species *Calliergon stramineum*, *Pseudobryum cinclidioides* and *Sphagnum teres* (Guttormsson & Gíslason 1977).

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.

Some 20 species of birds are known to have bred in the Eyjabakkar-area and immediate surroundings. None of them is rare in Iceland but the area is of particular importance for moulting pink-footed geese (*Anas brachyrhynchos*) in Iceland. Density of breeding whooper swans (*Cygnus cygnus*) is high with over 30 pairs breeding in the area. Whimbrel (*Numenius phaeopus*) and meadow pipit (*Anthus pratensis*) breed in the area which is not common in areas over 400 m a.s.l. surroundings (Ottósson et al. 1999).

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 most important ecosystem service value to people is probably that the wetland and heath land within the nature reserve is an important source of grazing for livestock (sheep) during summer. Wild reindeer also graze in the area and hunting reindeer is an important source of income for local guides. There is also some ptarmigan hunting in a limited part of the area. In addition the area is valued culturally for the large number of birds the area sustains, both in terms of the number of moulting geese and the number of different waders found in the area.

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 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:
- ii) sites which have exceptional cultural traditions or records of former civilizations that have influenced the ecological character of the wetland:
- 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:

24. Land tenure/ownership:

a) within the Ramsar site:

A Nation wide legal process in accordance with law to determine ownership of land in the central highlands has concluded that the land within the nominated site is a state owned land. The area is within the Vatnajökull National Park and the park authorities are responsible for management, conservation and protection of the site.

b) in the surrounding area:
Surrounding areas are public and state owned land.

25. Current land (including water) use:

a) within the Ramsar site:

The current land use within the proposed Ramsar site is mainly grazing and some tourism, mostly hiking. There has been some hunting in the past for gees, reindeer and ptarmigan in the area, but the proposed Management Plan for Vatnajökull National Park suggests a ban on hunting of birds and reindeers in most of the area, but not on hunting of minks and foxes.

b) in the surroundings/catchment:

Land use in the surrounding area is similar with hunting, hiking and grazing. There is more reindeer hunting in areas surrounding the site and there is a reservoir for a power plant adjacent to the National Park and further downstream.

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:

Severe soil erosion has occurred in the Icelandic highlands during past centuries. Erosion has affected the eastern highlands surrounding the site to some extent, especially the heathlands, as in other highland areas (Arnalds et al. 2001). Overgrazing by sheep probably occurred within the area during the last century, with the stock peaking in 1977. Since then reduction in grazing has occurred with positive effects on range and vegetation condition in the highlands.

Continued global warming is likely to affect glaciers, permafrost and palsa formation in the area and lead to a reduction in the extent. The mean annual air temperature on the Eyjabakkar outwash plain, approximately 10 km from the glacier, was 0.1°C between November 1997 and October 2008, indicating that the present climate is too warm for any substantial permafrost to be sustained (Benediktsson et al. 2010).

b) in the surrounding area:

The large Kárahnjúkar Hydropower Project and Fljótisdalur Hydro Power Station, completed in 2009, has adversely affected the adjacent areas (Habitat map). Construction of river diversions and small reservoirs (Kelduárlón-reservoir and Ufsarslón-reservoir) has led to changes in the northern part of the valley and areas to the east of the reserve. A road used during the construction period crosses the northern part of the reserve area. As the main source of water is from the glacier this is not expected to have influence on the Ramsar site catchment area.

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.

The Ramsar area is within Vatnajökull National Park which is protected by a special legislation. The Act no. 60/2007 created the legal foundation for the establishment of Vatnajökull National Park which was consequently done with regulation no. 608/2008 on Vatnajökull National Park in June 2008.

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

Information on IUCN listing is not available, but likely listing is probably category IV due to the hunting activities in the area.

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

Physical Planning for the Central Icelandic Highlands covers the area and has been implemented. The Vatnajökull National Park does have a Management Plan for the park, signed 28 February 2011, including the proposed Ramsar site.

d) Describe any other current management practices:

The Snæfell and Eyjabakkar Wetland area is in the Eastern Territory of Vatnajökull National Park and the area is managed for nature conservation in accordance with the Management Plan for the park. (<http://www.vatnajokulsthjodgardur.is/media/pdf/Stjornunar--og-verndaraaetlun-20110228-stadfest.pdf>)

28. Conservation measures proposed but not yet implemented:

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

Existing Management Plan for Vatnajökull National Park, “Stjórnunar- og verndaráætlun Vatnajökulsþjóðgarðs, náttúruvernd, útivist og byggðaþróun”, approved by the Minister for the Environment and Natural Resources 28 February 2011, indicates a number of conservation measures to be implemented within the first five years. The Management Plan shall be renewed every ten years according to the legislation.

29. Current scientific research and facilities:

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

The only ongoing scientific research and monitoring in the area is related to the reindeer population for population size estimates and distribution.

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.

Vatnajökull National Park has a Visitor centre in Fljótsdalur Valley for the eastern territory of the National Park. Exhibitions in the centre express the nature, geology, glaciology and history of the whole Eastern Territory of Vatnajökull National Park with Mt. Snæfell area, and Eyjabakkar as one of the highlights. An information booklet about Eyjabakkar and Mt. Snæfell area, both in Icelandic and English, is available.

31. Current recreation and tourism:

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

There is a limited recreation in the area, a few hiking tours every summer and occasionally one or two organised horse riding tours a year at the western border of the area. Each year a few reindeer have been hunted in the area.

32. Jurisdiction:

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

Eyjabakkar is located in East Iceland, Norður-Múla County (Norður- Múlasýsla) in the Municipality of Fljótsdalshreppur. Vatnajökull National Park has the authority over the proposed Ramsar site and the National Park is governed by a Governing Board appointed by the Ministry for the Environment and Natural Resources.

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.

Local office and Park Manager for Eastern Territory: Vatnajökulsthjodgardur, Agnes Brá Birgisdóttir, Skriduklaustri, 701 Egilsstaðir, phone number: +354 4700840, e-mail: agnes@vjp.is

The Director for the Vatnajökull National Park, responsible for management in the park, including for managing the wetland site is: Thordur Ólafsson, Manager, Klapparstíg 25-27, 101 Reykjavík, phone number: +354 5758400, e-mail: info@vjp.is.

34. Bibliographical references:

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

Arnalds, O., E.F. Thorarinsdóttir, S. Metusalemsson, A. Jonsson, E. Gretarsson, og A. Arnason 2001. *Soil erosion in Iceland*. Reykjavík: Soil Conservation Service & Agricultural Research Institute.

Benediktsson, Í.Ö., A. Schomacker, H. Lokrantz, Ó. Ingólfsson 2010. The 1890 surge end moraine at Eyjabakkajökull, Iceland: a re-assessment of a classic glaciotectonic locality. *Quaternary Science Reviews* 29(3-4): 484-506. doi:10.1016/j.quascirev.2009.10.004.

Björnsson, H. 2003. *The annual cycle of temperature in Iceland*. Icelandic Meteorological Office, report no. 03037. Reykjavík: Veðurstofa Íslands.

Crochet, P., T. Jóhannesson, T. Jónsson, O. Sigurðsson, H. Björnsson, F. Pálsson, og I. Barstad 2007. Estimating the spatial distribution of precipitation in Iceland using a linear model of orographic precipitation. *Journal of Hydrometeorology* 8: 1285– 1306.

Guðmundur A. Guðmundsson, Borgþór Magnússon, Erling Ólafsson, Guðmundur Guðjónsson, Hörður Kristinnsson, Kristbjörn Egilsson, Kristinn Haukur Skarphéðinsson, Sigurður H. Magnússon og Starri Heiðmarsson 2009. *Vistgerðir á miðbálendi Íslands. Kjölur – Guðlangstungur*. Náttúrufræðistofnun Íslands, NÍ-09016. Reykjavík: Náttúrufræðistofnun Íslands.

Guðmundur A Guðmundsson og Halldór Walter Stefánsson væntanleg. *Fuglar við Hraunaveitir*. Reykjavík: Náttúrufræðistofnun Íslands.

Halldór W. Stefánsson og Skarphéðinn G. Þórisson 2010. *Fuglar og spendýr á Austursvæði Vatnajökulspjóðgarðs*. Náttúrustofa Austurlands, NA-100096. Egilsstaðir: Náttúrustofa Austurlands.

Hjörleifur Guttormsson og Gísli Már Gíslason 1977. *Eyjabakkar. Landkönnun og rannsóknir á gróðri og dýralífi*. Orkustofnun, Raforkudeild, OSROD 7719. Reykjavík: Orkustofnun.

Jóhannesson, H. og K. Saemundsson 1989. *Geological Map of Iceland. 1:500.000. Bedrock geology*. Reykjavík: Icelandic Museum of Natural History and Iceland Geodetic Survey.

Jón Gunnar Ottósson, Kristinn Haukur Skarphéðinsson og Sigmundur Einarsson. *Eyjabakkar - náttúruminjar, náttúruverndargildi og alþjóðlegar skuldbindingar. Samantekt að beiðni umhverfis- og iðnaðarnefndar alþingis*. Náttúrufræðistofnun Íslands, NÍ-99022. Reykjavík: Náttúrufræðistofnun Íslands.

Kristinn Haukur Skarphéðinsson 1999. *Ábrif Fljótsdalsvirkjunar á heiðagæsir*. Unnið fyrir Landsvirkjun. Náttúrufræðistofnun Íslands, september 1999. 26 bls.

Kristinn Haukur Skarphéðinsson og Skarphéðinn Þórisson 1993. Fuglalíf. Bls. 63–88 í: Kristján Þórarinnsson (verkefnisstjóri): *Samanburður á umhverfisábrifum nokkurra tilbagana á stórvirkjun á Austurlandi (Austurlandsvirkjun)*. Samstarfsnefnd iðnaðarráðuneytisins og Náttúruverndarráðs um orkumál (SINO). Reykjavík.

Kristinn Haukur Skarphéðinsson og Skarphéðinn Þórisson. *Ábrif Kárahnjúkavirkjunar á heiðagæsir*. Náttúrufræðistofnun Íslands, NÍ-01003. Unnið fyrir Landsvirkjun. Reykjavík: Náttúrufræðistofnun Íslands.

Ólafur Arnalds og Hlynur Óskarsson 2009. Íslenskt jarðvegskort [A soil map of Iceland].
Náttúrufræðingurinn 78: 101–121.

Sigurður H. Magnússon, Borgþór Magnússon, Erling Ólafsson, Guðmundur Guðjónsson, Guðmundur A. Guðmundsson, Hörður Kristinsson, Kristbjörn Egilsson, Kristinn H. Skarphéðinsson, Starri Heiðmarsson og Jón Gunnar Ottósson 2009. *Vistgerðir á miðhálandi Íslands. Flokkun, lýsing og verndargildi.* [Habitat types in the Central Highlands of Iceland. Classification, description and protection value]. Náttúrufræðistofnun Íslands, NÍ-09008. Reykjavík: Náttúrufræðistofnun Íslands.

Sigurður H. Magnússon, Erling Ólafsson, Guðmundur A. Guðmundsson, Guðmundur Guðjónsson, Kristbjörn Egilsson, Hörður Kristinn Haukur Skarphéðinsson 2001. *Karabnjúkavirkjun. Ábrif Háslóns á gróður, smádyr og fugla.* Náttúrufræðistofnun Íslands, NÍ-01004. Unnið fyrir Landsvirkjun. Reykjavík: Náttúrufræðistofnun Íslands.

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