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NIBIO RAPPORT | VOL. 4 | NR. 21 | 2018

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DATO/DATE:	RAPPORT NR./ REPORT NO.:	TILGJENGELIGHET/AVAILABILITY:	PROSJEKTNR./PROJECT NO.:	SAKSNR./ARCHIVE NO.:
04.04.2018	4/21/2018	Åpen	630001	18/00307

ISBN:	ISSN:	ANTALL SIDER/ NO. OF PAGES:	ANTALL VEDLEGG/ NO. OF APPENDICES:
978-82-17-02046-2	2464-1162	66	2

OPPDRAGSGIVER/EMPLOYER:	KONTAKTPERSON/CONTACT PERSON:
Breiðafjarðarnefnd	Theódóra Matthíasdóttir

STIKKORD/KEYWORDS:	FAGOMRÅDE/FIELD OF WORK:
Island, Breiðafjörður, vegetasjon, kartlegging, plantearter, gjengroing, fugleliv	Kulturlandskap og biomangfold
Iceland, Breiðafjörður, vegetation, mapping, plant species, overgrowing, birdlife	Cultural Landscape and Biodiversity

SAMMENDRAG/SUMMARY:

I 2014 ble 22 øyer i Breiðaförður, Vest-Island, vegetasjonskartlagt. Hensikten med kartlegginga var å registrere vegetasjonstyper, artssammensetning og gjengroingsstatus på øyer som har ulik størrelse, topografi, geologisk sammensetning, brukshistorie, samt ulikt fugleliv. De fleste øyer i denne undersøkelsen har ikke blitt kartlagt før, slik at prosjektet har bidratt til ny kunnskap om deler av dette unike øyriket i Breiðafjörður.

In 2014, 22 islands in Breiðafjörður, West-Iceland were mapped for vegetation. The purpose to this study was to map vegetation types, distribution of plant species and overgrowing status in islands which differs in size, topography, bedrock composition, land use and birdlife activity. Most of the islands in this study have not been mapped before. This project provides new knowledge to part of the unique archipelago of Breiðafjörður.

LAND/COUNTRY:	Iceland
STED/LOKALITET:	22 islands in Breiðafjörður

GODKJENT /APPROVED	PROSJEKTLEDER /PROJECT LEADER
Knut Anders Hovstad	Thomas Holm Carlsen
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Preface

Norwegian Institute for Bioeconomy research, NIBIO in cooperation with the University of Iceland's Research Centre at Snæfellsnes have accomplished vegetation mapping of 22 islands in Breiðafjörður in the west part of Iceland. The project was funded by Breiðafjarðarnefnd (www.breidafjordur.is). The contact person in Breiðafjarðarnefnd was Trausti Baldursson, a former member of the board and Theódóra Matthíasdóttir, the secretary of the board.

We want to thank Rannveig Thoroddsen and Guðmundur Guðjónsson at The Icelandic Institute of Natural History for helping out with the vegetation classification. We had good discussions of which legends to use on the different islands regarding to the different plant species found and the distribution of them. We also like to thank Árni's father Ásgeir Árnasson for boat rental, and Kristján Lár Gunnarsson for driving us to Vaktarhólmi, Stóri Sindingahólmi, Litli Sindingahólmi, Ólafsey and Galtarey in the eastern part of the mapping area.

Tjøtta, 04.04.18

Thomas Holm Carlsen

Project leader

Innhold

1 Introduction

Breiðafjörður is the second largest bay in Iceland, characterized by thousands of islands and shallow waters in between. The islands and tides interact to create tidal currents in several places, particularly near the outlet of the fjord Hvammsfjörður. The tidal amplitude is high and reaches a maximum of five metres, which makes the tidal currents particularly powerful. The geology in Breiðafjörður is relatively uniform: most of the islands consist of basic and intermediate lavas from tertiary, older than 3.1 million years. Some few exceptions are Hrappsey, Purkey, Seley and Klakkeyjar located some few kilometres northeast of Stykkishólmur; these islands have intrusions of basic and intermediate dolerite (Jóhannesson 1994).

The islands are vegetated, largely due to fertilizing from abundant birdlife (Ferðafélag Íslands 1989) but also due to historical land use. Historically, island farmers, supported by the abundant natural resources found within the area, inhabited the. Breiðafjörður was commonly called "Iceland's treasure chest" due to its rich natural resources. During the mid-20th century, the number of farms in the islands dramatically decreased and subsequent urbanization on the mainland in relation to increased fisheries (Kjartansdóttir 2009). In 1942, 1960 and 1975 there were 26, 8 and 3 islands farms inhabited, respectively (Ferðafélag Íslands 1989) although Brokey remained inhabited year-round until 1982.

Island farming was a combination of conventional farming, fisheries and natural resources. Livestock was kept on the "home" islands (is: heimaeyjar) where the people lived or adjacent, smaller islands and islets belonging to each farm. Island farming was labour intensive; for example, haymaking for island farms required visiting every island, cutting, raking, drying and transporting hay from each island with boats. Boats were the main means for transport and travel within Breiðafjörður, connecting the islands and the coastal settlements. Island farming was supported by natural resources, especially abundance of colonially nesting birds, which helped sustaining human settlements through the centuries. The most important species were kittiwake (is: rita), greater black-backed gull (is: svartbakur), common eider (is: æðarfugl) and Atlantic puffin (is: lundi). Egg, feathers and birdmeat were important resources. The most valuable of all natural resource was the nest down of common eider, which remains a valuable product to this day (Kristjánsson 1986).

Some islands are still used for sheep grazing, or sheep are kept there to counteract undesirable plant growth, such as *Angelica archangelica* (is: ætihvönn), *Lupinus nootkatensis* (is: lúpína) or in some few cases *Betula pubescens* (is: birki), which can be superabundant after island farming has been abandoned. The Breiðafjörður islands are rich and highly variable in vegetation. The islands can differ in plant species composition, even those that are relatively close to one another. Location, area, soil type and shape of the coastline are influential factors, as well as the amount of nutrients from excrement produced by the seabirds. The nutrients fertilize the soil surrounding the seabird colonies. Island farming historically was an influential factor, especially via effects of grazing and haymaking (Petersen 1989).

There have been few studies of the vegetation in the islands of Breiðafjörður. Between 1940 and 1970 botanist Ingólfur Davíðsson wrote six short reports on the vegetation in different islands in Breiðafjörður (Davíðsson 1943, Petersen 1989). He documented that the variation in species richness varied significantly between different islands. The German student Stefan W. Mörsdorf repeated some of Davíðsson's surveys but also visited sites not reported by Davíðsson (Mörsdorf 1989).

The purpose of this project was to revisit and map some of the islands mapped by Davíðsson and Mörsdorf, but also map some new islands never been mapped for vegetation before. The main goal of the mapping was to assign vegetation types or legends for each island, not to search for every plant species living there. We chose islands that differed in land use (grazing vs. not grazing), birdlife activity, historical use and size to get a wide range of variation that probably affect the composition of plants living there.

2 Method

The mapping of vegetation was a combination of fieldwork and interpretation of aerial photos from Loftmyndir ehf. (n.d.) or Já hf. (n.d.). We used the scale 1:5000 for mapping. To get a representative variation we chose 22 islands nearby Stykkishólmur for vegetation mapping (figure 1-3). In the southwest of the study area we chose a cluster of islands consisting of Kiðey, Sellón, Lyngey, Ljótunshólmi, Loðinshólmi, Vatnsey, Lónið, Gimburey, Þorvaldsey, Melrakkaey and Sellátur (figure 3, chapter 3.1-3.4, 3.8-3.13). Closest to Stykkishólmur are Hjallsey, Stakksey and Landey, (figure 3, chapter 3.5-3.7). Some kilometres north of Stykkishólmur we chose to map Vaðstakksey and Elliðaey (figure 2, chapter 3.14 and 3.15). Arnarey is located in the northeast corner, while Vaktarhólmi, Stóri Sindingahólmi, Litli Sindingahólmi, Ólafsey and Galtarey are located in the southeast part of the of the study area (figure 2, chapter 3.17-3.22). All islands were mapped by Thomas Holm Carlsen (THC) and Árni Ásgeirsson (ÁÁ) during summer (June-August) of 2014.

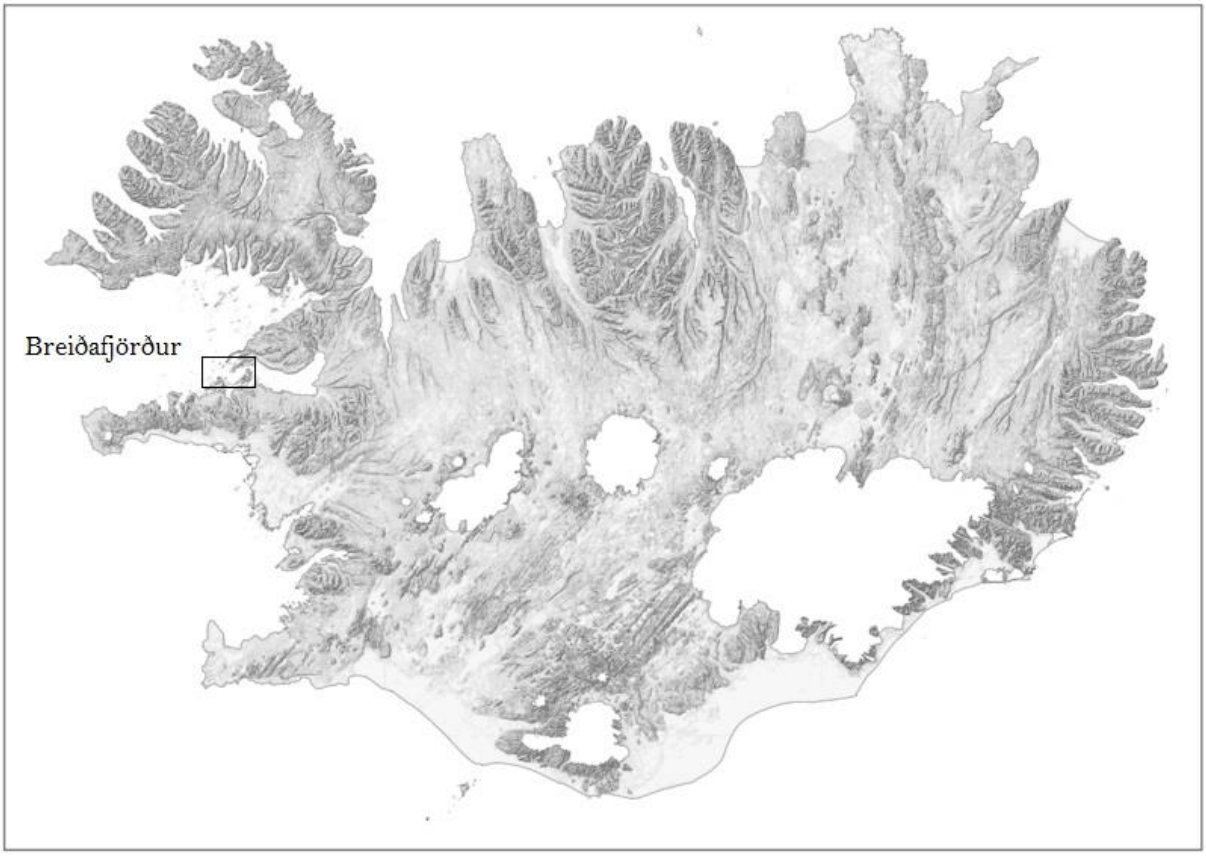

Figure 1. Breiðafjörður is located in the west part of Iceland between Snæfellsnes and the west-fjords. The study area includes 22 islands nearby Stykkishólmur (black box).

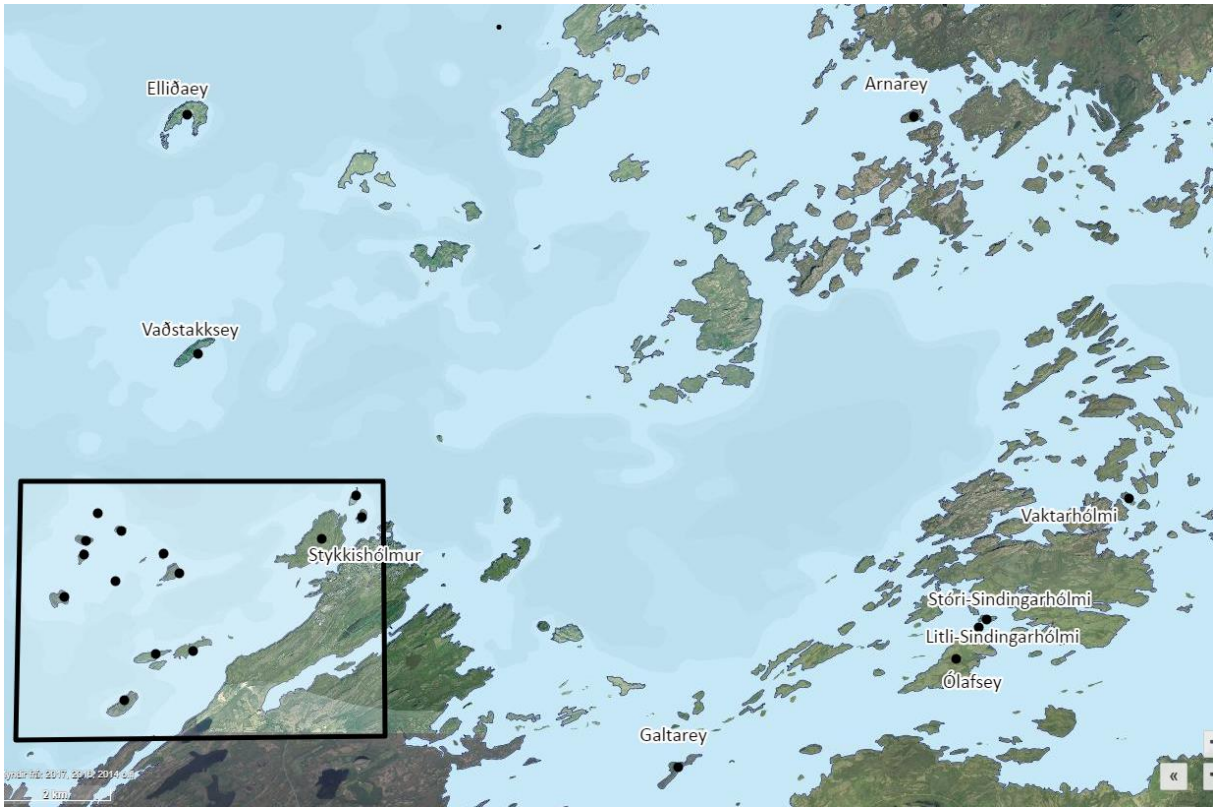

Figure 2. Overview of the 22 islands mapped in Breiðafjörður indicated by black dots.

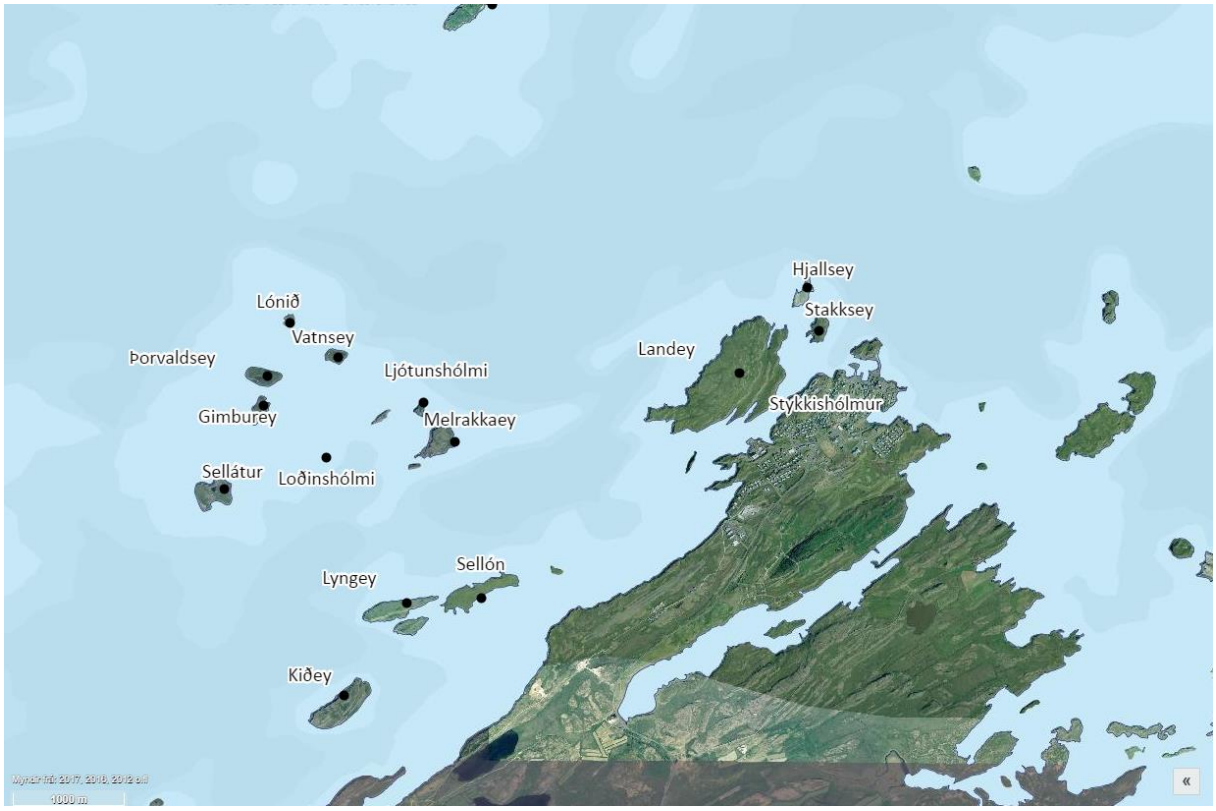

Figure 3. Overview of the cluster of 11 islands (black box in figure 2) in the southwest part of the study area and the three islands closest to Stykkishólmur.

For every island, we searched for plant species that would indicate both richness and legends of vegetation. We used Lid & Lid (2005), Mossberg & Stenberg (2007), Kristinsson (2010) and Flóra Íslands (n.d.) to determine and verify the plant species found. For the Latin and Icelandic names of the species, we used Flóra Íslands (n.d.). To classify different plant communities many parameters like topography, hydrology, soil depth, grazing intensity and former land use, bedrock/geological patterns, bird influence (fertilizing) were include to make good demarcations of different polygons. The classification system for vegetation mapping in Iceland, The vegetation legend of the Icelandic Institute of Natural History which is based on Steindorsson (1981) was used to assign correct vegetation legends to the different plant communities found on the different Islands. Table 1 gives an overview to the most relevant legends for the islands of Breiðafjörður.

In some cases, we found vegetation types that did not fit into any of the described legends in the table above. In consultation with the Icelandic Institute of Natural History, we made up new legends in those cases and described the characteristic of the composition of vegetation. New legends are marked with the symbol * in table 1

If the vegetation did not cover the land fully (90-100% cover) we gave the current legend letter "x" – average 75% vegetation cover, letter "z" – average 50% vegetation cover or letter "þ" – average 25% vegetation cover.

Each of the 22 islands have a list of species assembled in appedix 1. We used a code 1, 2 or 3 to indicate the quantity of each species. "1" means that the species was found, but is rare or less common, "2" means that the species is common but not dominant and "3" means that the species is dominant, covering considerable parts of the island. In each chapters, the number of plant species is listed for each island under "Number of species".

In islands without grazing or harvesting, we were curious to find out if any plant species were relatively abundant, compared to that in grazed islands. In cases where some species in ungrazed islands tend to dominate and oust other smaller, light demanding species, we define such species as an overgrowing species. Examples of such species is *Betula pubescens* (is: birki), *Salix ssp*. (is: víðir), *Angelica archangelica* (is: ætihvönn) and *Leymus arenarius* (is. melgresi). Every mapped island got a valuation of the degree of overgrowing, or an overgrowing index: **low – middle – high**. If an island has no parts dominated by any overgrowing species, the overgrowing index is *low*. Islands somewhat covered by overgrowing species, up to 50% of its area, were assigned the overgrowing index *medium*. Islands dominated by overgrowing species, which covered more than 50% of its area, were assigned the overgrowing index *high*. Each mapped island also got an index of grazing. This is a subjective score based on which kind of livestock grazing, number of animals in relation to size of the island, degree of fertility and grazing capacity of the islands. The grazing index ranged: **No grazing - low – middle – high**.

In addition to the vegetation, we also mapped the birdlife in the islands of this study. We noted the different species we found, the number of individuals and if the birds were breeding or not in the island. Every island got an index for birdlife, which ranged: **low – middle – high** as a subjective score related to the impact of the birds activity and their effects on vegetation (see appedix 2).

Table 1. List of vegetation legends used to describe the mapped islands of Breiðafjörður

Legend	Character/species of dominant
	Heathland dominated by *ericaceous* dwarf shrubs
B3	*Empetrum nigrum – Salix* spp.
B6	*Dryas octopetala - Empetrum nigrum – Salix* spp.
B7	*Vaccinium uliginosum - Empetrum nigrum – Salix* spp.
B20*	*Empetrum nigrum - Vaccinium uliginosum*
	Heathland dominated by *Kobresia myosuroides*
E1	*Kobresia myosuroides*
	Grassland vegetation
H1	Grasses
H4	*Leymus arenarius*
H8*	Bird dropping areas dominated by grasses
H10*	Grassland with *Carex lyngbyei*
	Forb meadows
L1	Tall forbs
L2	Low forbs. (a): low in richness, (b): high in richness
L4*	Bird dropping areas dominated by herbs. (X2b in Fremstad 1997)
L5*	*Angelica archangelica*
	Reforestation
R6	Reforestation. 1: conifers. 2: decidous trees
	Fringes (moist land)
T5	Grasses – sedges
	Sloping fens
U2	*Carex nigra/C. bigelowii – Salix* spp.
U4	*Carex nigra/C. bigelowii – Eriophorum angustifolium*
U8	*Carex nigra/C. bigelowii – C. lyngbyei*
U12	*Trichophorum caespitosum - Carex nigra/C. bigelowii*
	Level fens
V1	*Carex lyngbyei*
V3	*Eriophorum angustifolium*
V4	*Carex rariflora*
	Aquatic vegetation
Y4	*Hippuris vulgaris*
Y20*	*Ranunculus hyperboreus*
Y21*	*Callitriche palustris*

* New legends made for this project

3 Results

3.1 Kiðey

GPS coordinate:	65°02'56.4"N 22°49'12.6"W
Size of island:	11.8 ha
Date:	12.06.14
Mappers:	THC (Thomas Holm Carlsen), ÁÁ (Árni Ásgeirsson)
Grazing intensity:	Low. Some few sheep
Overgrowing index:	Low
Special findings:	*Montia fontana, Saxifraga rivularis*
Number of species:	55
Birdlife index:	Medium. Breeding colony of lesser black-backed gulls (*Larus fuscus*)
Historical use:	Deserted 1845 (6-8 persons). Later used for grazing and/or haymaking

Kiðey is the most western island mapped in this project. It is 11,8 ha big and is a fertile, grassy island (figure 5). The highest point is 24 m above sea level. The main vegetation type is grassland (H1) with *Anthoxanthum odoratum* (is: ilmreyr), *Avenella flexuosa* (is: bugðupuntur), *Festuva vivipara* (is: blávingull), *Hierochloë odorata* (is: reyrgresi) and *Poa pratensis* (is: vallarsveifgras) as dominant grass species. The grassland is in combination with low forb meadows (L2(a)) where *Rumex acetosa* (is: túnsúra) and *Cardamine nymanii* (is: hrafnaklukka) dominate (figure 4).

Figure 4. Grassland dominates Kiðey in a combination with *Rumex acetosa* (is: túnsúra) and *Cardamine nymanii* (is: hrafnaklukka).

In some areas of Kiðey *Angelica archangelica* (is: ætihvönn) dominates together with *Hippuris vulgaris* (is: lófótur) (Y4/L5) in open waters (figure 6) or *Taraxacum spp.* (is: túnfíflar), *Hieracium spp.* (is: undafíflar) and *Rumex acetosa* (is: túnsúra) (L5/L1) in semi-wet areas.

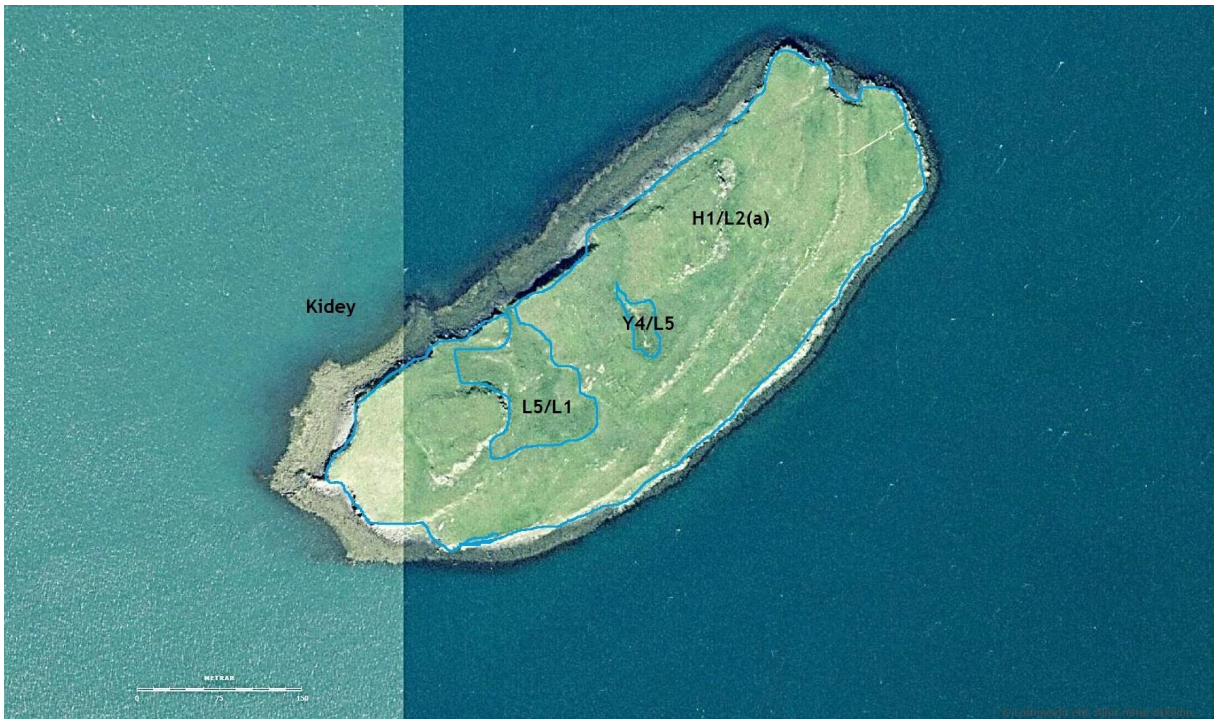

Figure 5. Vegetation types in Kiðey.

We found two species, *Montia fontana* (is: lækjagrýta) and *Saxifraga rivularis* (is: lækjasteinbrjótur) not found in other islands during this project. Except of the wettest areas dominated by *Angelica archangelica* (is: ætihvönn) the overgrowing index is low for Kiðey. Some few sheep graze the island in summertime. We only found one ewe with two lambs during fieldwork. Kiðey also holds a colony of lesser black backed (*Larus fuscus*), few pairs of great black backed (*Larus marinus*) and Black-headed gull (*Larus ridibundus*). We also found some eiders (*Somateria mollissima*) nesting in Kiðey.

Figure 6. In a wet area with open water on Kiðey *Angelica archangelica* (is: ætihvönn) dominates (L5). We also found areas dominated by *Hippuris vulgaris* (is: lófótur) (Y4).

3.2 Sellón

GPS coordinate:	65°03'32.6"N 22°47'44.1"W
Size of island:	8.1 ha
Date:	12.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	Low. Some few sheep
Overgrowing index:	Low
Special findings:	*Caltha palustris*
Number of species:	47
Birdlife index:	Medium. Mostly eiders
Historical use:	Deserted 1816 (9-10 persons). Later used for grazing and/or haymaking

Sellón is a flat island stretching 10 m above sea level on the highest point, almost attached to Lyngey to the west. The size of Sellón is 8,1 ha. The vegetation structure is dominated by species of grasses like *Anthoxanthum odoratum* (is: ilmreyr), *Avenella flexuosa* (is: bugðupuntur), *Festuca richardsonii* (is: túnvingull), *Luzula multiflora* (is: vallhæra), *Poa pratensis* (is: vallarsveifgras) and *Trichophorum cespitosum* (is: mýrafinnungur) in combination with herbs like *Cardamine nymanii* (is: hrafnaklukka), *Potentilla anserina* (is: tágamura) (figure 9), *Rumex acetosa* (is: túnsúra), *Galium verum* (is: gulmaðra) and other species indicating the presence of basic bedrock. This makes up the combination of the two legends H1, grasses and L2(b), low forb meadow (figure 7 and 8). One species, *Caltha palustris* (is: hófsóley), was found unique for this project on Sellón. We saw only a couple of sheep grazing on Sellón during fieldwork in the mid-June. Despite a low grazing intensity, the overgrowing effect was low at the time of study.

A colony of common eiders breeds on Sellón.

Figure 7. Vegetation types in Sellón.

Figure 8. The flat island of Sellón consist of a combination of grassland (H1) and rich, low forb meadow (L2(b)).

Figure 9. Towards the sea on the south of Sellón *Potentilla anserina* (is: tágamura) dominates.

3.3 Lyngey

GPS coordinate:	65˚03'26.2"N 22˚48'39.9"W
Size of island:	10.0 ha
Date:	12.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	Low. Some few sheep
Overgrowing index:	Low
Special findings:	*Carex maritima, Puccinellia maritima, Carex pilulifera, Galium uliginosum*
Number of species:	67
Birdlife index:	Medium. Mostly eiders
Historical use:	No farming but grazing and/or haymaking

Lyngey is the neighbour island of Sellón and consists of two parts as shown in figure 10. Total size of the two parts is 10,0 ha (7,2 and 2,8 ha). The highest point is 17 metres above sea level. The name, Lyngey, indicates that we should find *Ericales* (is: lyng), but that was not the case. The main impression of vegetation structure on Lyngey is that it is wetter than Sellón and therefore the main vegetation legend is the sloping fens, U12, indicated by the dominating *Trichophorum cespitosum* (is: mýrafinnungur) and presens of *Carex nigra* (is: mýrastör) and *Carex bigelowii* (is: stinnastör). U12 appears in a combination with grassland, H1 and forb meadow, L2(a) represented by *Anthoxanthum odoratum* (is: ilmreyr), *Avenella flexuosa* (is: bugðupuntur), *Festuca richardsonii* (is: túnvingull), *Hierochloë odorata* (is: reyrgresi), *Cardamine nymanii* (is: hrafnaklukka), *Rumex acetosa* (is: túnsúra), *Galium verum* (is: gulmaðra) and *Galium normanii* (is: hvítmaðra).

In the south part of the northern Lyngey there is a nice sloping, sun exposed hill containing a lot of different low forbs indicating basic bedrock (L2(b)) (figure 11 and 12). Here we found species like *Botrychium lunaria* (is: tungljurt), *Bistorta vivipara* (is: kornsúra), *Cerastium fontanum* (is: vegarfi), *Erigeron borealis* (is: jakobsfífill), *Gentianella campestris* (is: maríuvöndur), *Myosotis stricta* (is: sandmunablóm) and *Sagina subulata* (is: broddkrækill). Some notable findings on Lyngey were *Carex maritima* (is: bjúgstör), *Carex pilulifera* (is: dúnhulstrastör), *Puccinellia maritima* (is: sjávarfitjungur) and *Galium uliginosum* (is: laugamaðra).

East of L2(b) the height of the vegetation is greater and the soil is deeper and wetter. Fewer species grow here, mostly grasses and some tall herbs like *Rumex longifolius* (is: njóli) and *Angelica archangelica* (is: ætihvönn).

Figure 10. Vegetation types in Lyngey.

Figure 11. The sloping hill of L2(b) dominated by grasses and *Cardamine nymanii* (is: hrafnaklukka).

Figure 12. F2(b) with species like *Erigeron borealis* (is: jakobsfífill), *Thymus praecox* ssp. *arcticus* (is: blóðberg) and *Galium verum* (is: gulmaðra).

3.4 Sellátur

GPS coordinate:	65°03'56.0"N 22°50'52.0"W
Size of island:	6.2 ha
Date:	12.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	Low. Some few sheep
Overgrowing index:	Low
Special findings:	-
Number of species:	30
Birdlife index:	High
Historical use:	Deserted 1945 (8-10 persons). Later used for grazing.

Sellátur is a 6,2 ha, quite flat (highest point: 9 m above sea level) and complex island in terms of vegetation structure and degree of moisture. The combination of species made it difficult to choose a single legend for the main part of Sellátur. It's a mix of grassland (H1) identified by *Festuca richardsonii* (is: túnvingull) and *Poa pratensis* (is: vallarsveifgras), sedges like *Carex bigelowii* (is: stinnastör), *Carex nigra* (is: mýrastör) and some *Carex lyngbyei* (is: gulstör) (U8) and grass dominated vegetation highly affected by bird droppings (H8) (figure 14). In the central part of Sellátur wetlands dominate the vegetation. T5/V1 is not so different from H1/U8/H8 but it is wetter (fringes/level fens) and dominated by *Carex lyngbyei* (is: gulstör) (V1), *Festuca richardsonii* (is: túnvingull), *Carex bigelowii* (is: stinnastör) (T5) and salt tolerant species like *Potentilla anserina* (is: tágamura) (figure 13) and *Armeria maritima* (is: geldingahnappur). Closer to the pond with dense areas of *Hippuris vulgaris* (is: lófótur) (Y4) (figure 15) we found an area almost completely dominated by *Carex lyngbyei* (is: gulstör) (V1). On the north side of the pond (Y4) the stony area dividing the pond from the sea is dominated by *Rumex longifolius* (is: njóli) (L1). A pond in the southwest part of Sellátur is mostly free of vegetation except for some spots covered with *Hippuris vulgaris* (is: lófótur) (Y4).

The grazing intensity on Sellátur is low, but there were no signs of overgrowing. Sellátur has a rather big eider colony (few hundreds breeding individuals), and many other bird species breeding there, resulting a high birdlife index. We found breeding red-throated loon (*Gavia stellata*), dunlin (*Calidris alpina*), red-necked phalarope (*Phalaropus lobatus*), puffins (*Fratercula arctica*), arctic terns (*Sterna paradisaea*), oystercatchers (*Haematopus ostralegus*) and other (see appendix 2).

Figure 13. Grass-dominated area with *Potentilla anserina* (is: tágamura).

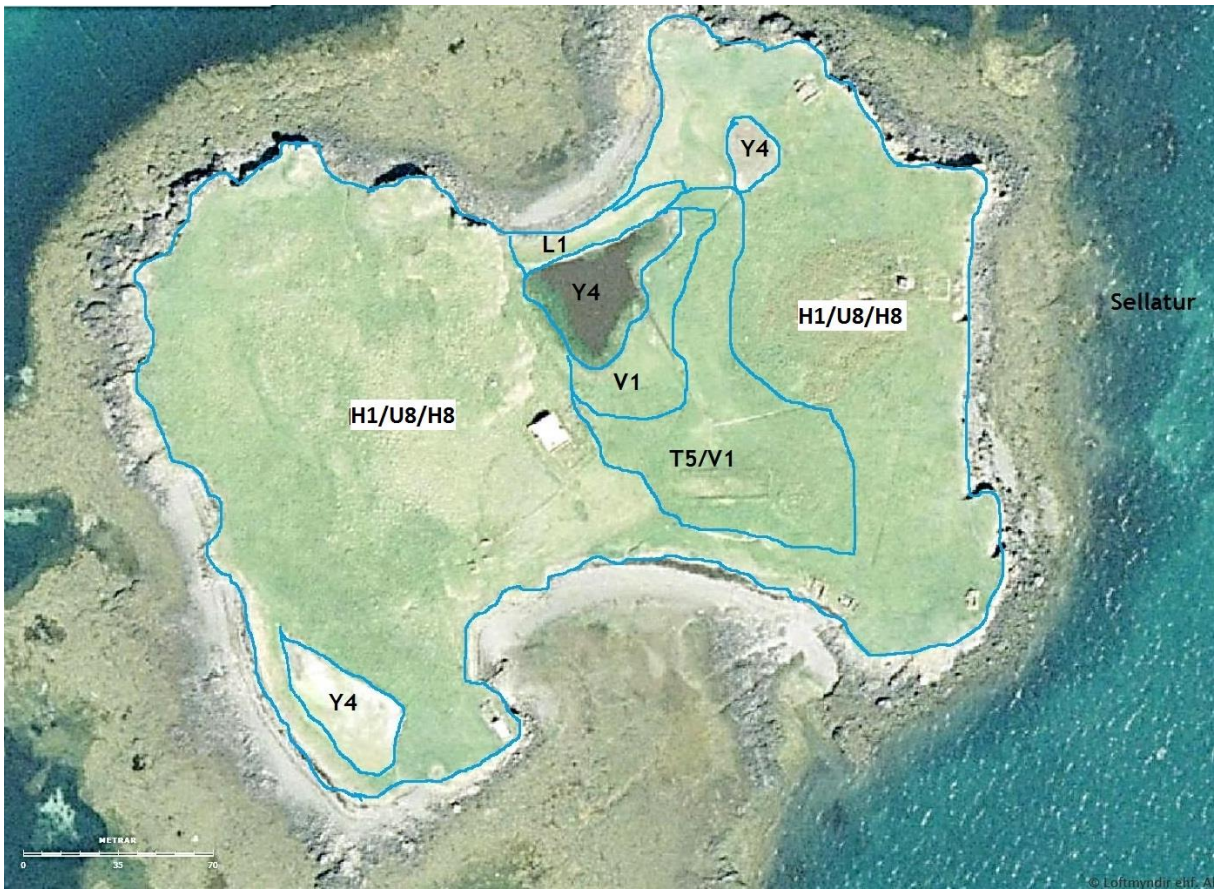

Figure 14. Vegetation types in Sellátur.

Figure 15. Central part of Sellátur and the small pond dominated by *Hippuris vulgaris* (is: lófótur) (Y4).

3.5 Hjallsey

GPS coordinate:	65°05'03.2"N 22°44'15.2"W
Size of island:	1.7 ha
Date:	05.06.14, 29.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	Low. Four sheep in 2-3 months summer of 2013. Some horses during winter/spring
Overgrowing index:	Low
Special findings:	-
Number of species:	44
Birdlife index:	Medium. Mostly breeding eiders and a colony of arctic terns
Historical use:	Little or no grazing

Hjallsey is a 1,7 ha island almost attached to Landey in the north east. Hjallsey is relatively flat with the highest point in the south reaching around 10 m above sea level. The main vegetation type is grassland (H1) mixed with some forb meadows (L2), but in the middle of Hjallsey pointing north we find wetland vegetation represented by a combination of a grass dominated fringes (T5) and a *Carex lyngbyei* (is: gulstör) and *C. nigra* (is: mýrastör) dominated sloping fens (U8). Further north a belt of *Angelica archangelica* (is: ætihvönn) (L5) borders a gravel beach (figure 17). In the south the vegetation is dominated by a rich low forb meadow (L2b) with species like *Draba incana* (is: grávorblóm), *Thymus praecox ssp. arcticus* (is: blóðberg), *Galium normanii* (is: hvítmaðra), *Galium verum* (is: gulmaðra), *Myosotis stricta* (is: sandmunablóm) and *Cerastium alpinum* (is: músareyra) (figure 16).

Overall, Hjallsey is a grass-dominated island not grazed, but not overgrown. Some common eiders and a small colony of arctic terns breed here (see appendix 2).

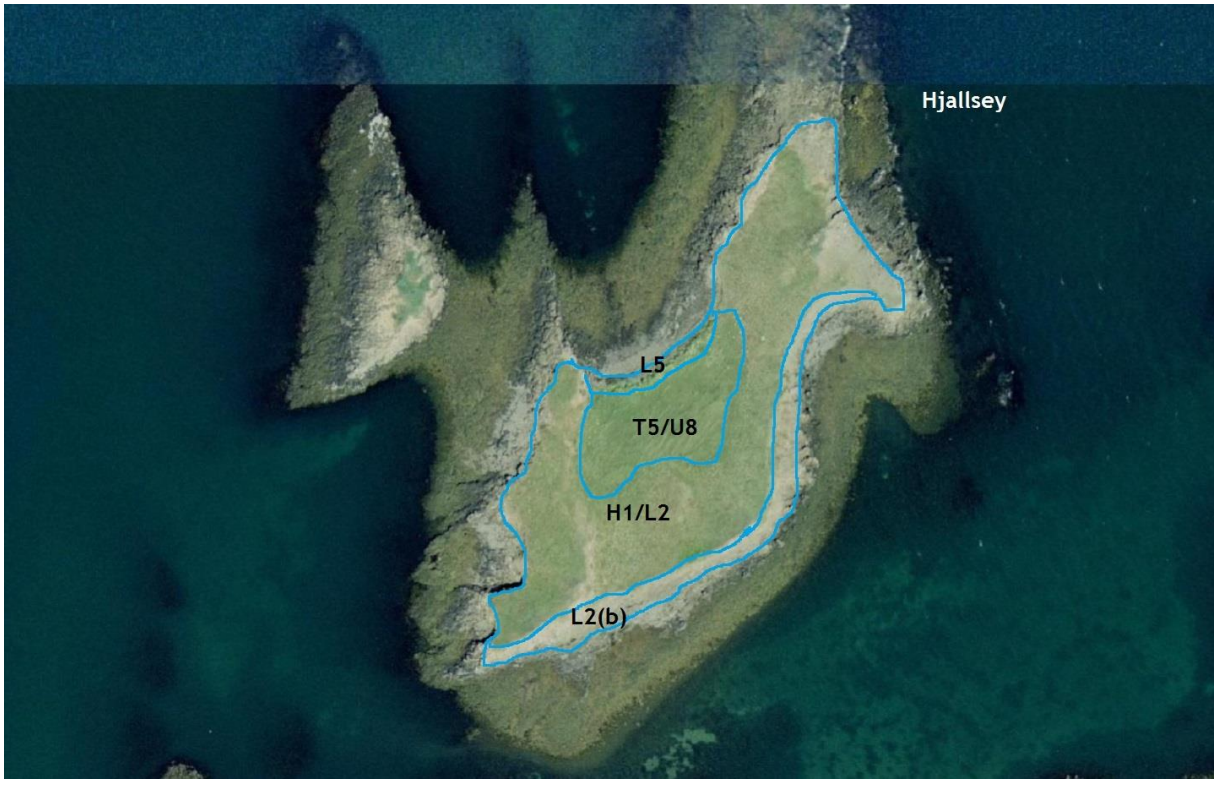

Figure 16. Vegetation types in Hjallsey.

Figure 17. The belt of *Angelica archangelica* (is: ætihvönn) (L5) close to the sea in the north part of Hjallsey. A popular area for the common eider.

3.6 Stakksey

GPS coordinate:	65°04'54.2"N 22°44'02.0"W
Size of island:	2,5 ha
Date:	13.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	Low – medium. Horses are kept there during winter
Overgrowing index:	Low
Special findings:	-
Number of species:	50
Birdlife index:	Medium. Mostly eiders
Historical use:	Vegetable gardens

Stakksey is the neighbour island of Hjallsey in north and to Landey in west. The size of Stakksey is 2,5 ha, a slightly larger than Hjallsey. Stakksey is hill-shaped with the highest point reaching 16 m above sea level. The vegetation structure is homogeneous consisting of a mix of grassland and low forb meadow (H1/L2) (figure 18). H1 is represented by a dominance of *Anthoxanthum odoratum* (is: ilmreyr), *Avenella flexuosa* (is: bugðupuntur), *Festuca richardsonii* (is: túnvingull) and some *Hierochloë odorata* (is: reyrgresi) (figure 19). *Cardamine nymanii* (is: hrafnaklukka) is the dominated herb in L2 with other herbs like *Galium normanii* (is: hvitmaðra), *Galium verum* (is: gulmaðra) and *Taraxacum* spp. the *Spectabilia*-group (is: túnfíflar) also well representated.

Horses from Landey occasionally make it over to Stakksey and graze during the winter months keeping the overgrowing index low. Figure 20 gives an indication what can be a much more common species (*Salix phylicifolia* (is: gulvíðir)) if no grazing occurred at all. In summer, eiders breed in the whole island, mostly aggregated in the southwest part. Other birds breeding in Stakksey are some few pairs of oystercatchers, one pair of great black-backed gull and fulmars in the cliffs towards Stykkishólmur.

Figure 18. Vegetation types in Stakksey.

Figure 19. Vegetation combination of H1 and L2 in Stakksey dominated by different species of grasses and *Cardamine nymanii* (is: hrafnaklukka).

Figure 20. *Salix phylicifolia* (is: gulvíðir) that has been partly grazed by horse.

3.7 Landey

GPS coordinate:	65˚04'38.5"N 22˚44'57.1"W
Size of island:	61.5 ha
Date:	13.06.14, 29.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	High. Some horses (up to 20) from September - Mars
Overgrowing index:	Low
Special findings:	*Menyanthes trifoliate, Koenegia islandica, Ranunculus reptans, Parnassia palustris, Filipendula ulmaria, Minuartia rubella, Kobresia myosuroides, Achillea millefolium, Atriplex glabriuscula , Caltha palustris, Salix arctica, Salix lanata, Rorippa islandica, Equisetum fluviatile, Arctostaphylos uva-ursi*
Number of species:	100
Birdlife index:	High
Historical use:	Pasture for many decades, but never mentioned as a farm and no houses ever known.

Landey is the second largest island mapped in this project with its 61,5 ha (Ólafsey is 78.2 ha) and is attached to Stykkishólmur at low tides. Landey is complex and quite hilly but in general flat with highest point reaching 20 m above sea level. It would require considerable effort to accurately estimate the complexity and microstructure in vegetation composition on Landey. Thus, we had to mix different vegetation legends into bigger polygons (areas). That means that within each big polygons we'll find a fine scaled mosaic of two or three different vegetation legends (figure 21). The biggest polygon consists of grassland, heathland and low forb meadow (H1/B3/L2(b)). This part of Landey is hilly and very hummocky (bumpy) due to grass tussocks. The species that are dominant here are a combination of *Agrostis capillaris* (is. hálíngresi), *Poa pratensis* (is: vallarsveifgras), *Anthoxanthum odoratum* (is: ilmreyr), *Festuca* spp. (is: vinglar), *Luzula multiflora* (is: vallhæra) (H1), *Empetrum nigrum* (is: krækilyng), *Salix herbacea* (is: grasvíðir) and other *Salix* spp. (is: víðir), *Alchemilla alpina* (is: ljónslappi) (B3) and *Cardamine nymanii* (is: hrafnaklukka), *Cerastium fontanum* (is: vegarfi), *Draba incana* (is: grávorblóm), *Hieracium* spp. (is: undafíflar), *Leontodon autumnalis* (is: skarifífill) and *Thymus praecox ssp. arcticus* (is: blóðberg) (L2(b)). The tussocks make perfect hiding places to breeding lesser black-backed *(Larus fuscus)* and common eiders (*Somateria mollissima*); both have large breeding population in Landey (figure 22).

The eastern part of Landey has more *Empetrum nigrum* (is: krækilyng) and fewer grass species than the central part described above. Apart from that we found much of the same species and structure making up the combination of legends B3/L2(b). A couple of fens are located in between these two hilly and tussocky parts of Landey. The dominant species in the fens (is: mýri) are *Carex nigra* (is: mýrastör), different species of *Salix* spp. (is: víðir) and *Eriophorum angustifolium* (is: klófífa) (U2/U4) (figure 23). Most of the *Salix* spp. are kept down by the grazing horses so that the overgrowing index is low for Landey. *Empetrum nigrum* (is: kræklyng) is less common in the western part of Landey. The hilly part in the west (H1/L2(b)) is more or less similar to what we find in the central part and in the east except that the *Empetrum nigrum* (B3) is lacking. The wetland in the central part of Landey is a mix of different legends like sloping fens (U4) and level fens (V3) dominated by *Eriophorum angustifolium* (is: klófífa), *Carex nigra* (is: mýrastör) and *Carex bigelowii* (is: stinnastör) and moist land (T5) with different grass species *Agrostis capillaris* (is: hálíngresi), *Poa pratensis* (is: vallarsveifgras), *Anthoxanthum odoratum* (is: ilmreyr), *Festuca spp.* (is: vinglar) and *Luzula multiflora* (is: vallhæra). The southwest of Landey is a heathland dominated by *Kobresia myosuroides* (is: þursaskegg) (E1), but has generally much of the same species found in B3-areas.

Landey is the island with the highest number of plant species (100) and with the highest number of special findings like *Menyanthes trifoliata* (is: horblaðka), *Koenegia islandica* (is: naflagras), *Ranunculus reptans* (is: flagsóley), *Filipendula ulmaria* (is: mjaðjurt), *Kobresia myosuroides* (is: þursaskegg), *Atriplex glabriuscula* (is: hrímblaðka), *Rorippa islandica* (is: kattarjurt), and *Arctostaphylos uva-ursi* (is: sortulyng)

Figur 21. Vegetation types in Landey.

Figure 22. Lesser black-backed gulls (*Larus fuscus*) breed in the tussocky grassland of Landey.

Figure 23. Overview to the U2/U4-fens on the east side of Landey. On top of the picture, we see houses in Stykkishólmur.

Figure 24. ***Rorippa islandica*** **(is: kattarjurt) found in Landey.**

3.8 Ljótunshólmi

GPS coordinate:	65˚04'23.6"N 22˚48'32.5"W
Size of island:	0.5 ha
Date:	16.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	No grazing
Overgrowing index:	Medium - high. Areas dominated by *Leymus arenarius*
Special findings:	-
Number of species:	13
Birdlife index:	Low – medium. Some puffins
Historical use:	Haymaking and/or grazing.

Ljótunshólmi is around 1,5 ha, but cover of vegetation is only 0,5 ha. The island used to hold a colony of puffin, but today only a few pairs still breed here. The soil is rich in nutrients because of all the bird dropping fertilizing the soil over a long period. More than half of Ljótunshólmi is covered by *Leymus arenarius* (is: melgresi), H4 in figure 25 (see also figure 27), except of some few individuals of *Angelica archangelica* (is: ætihvönn) and *Rumex longifolius* (is: njóli). *Leymus arenarius* (is: melgresi) is very tall and dense, making no space for other species to grow (figure 27). The field height reaches up to one meter. It looks like the puffins avoid this area as well. The northern part of Ljótunshólmi is gras-dominated by *Festuca richardsonii* (is: túnvingull) and *Poa pratensis* (is: vallarsveifgras) assigned H8 in figure 25 (se also figure 26). Some few herbs like *Ranunculus acris* (is: brennisóley), *Stellaria media* (is: haugarfi), *Silene uniflora* (is: holurt), *Cochlearia officinalis* (is: skarfakál), *Taraxacum spp.* (is: túnfíflar) and *Rumex acetosa* (is: túnsúra) were sparsely found. Most of the population of breeding puffins at Ljótunshólmi was found in this area.

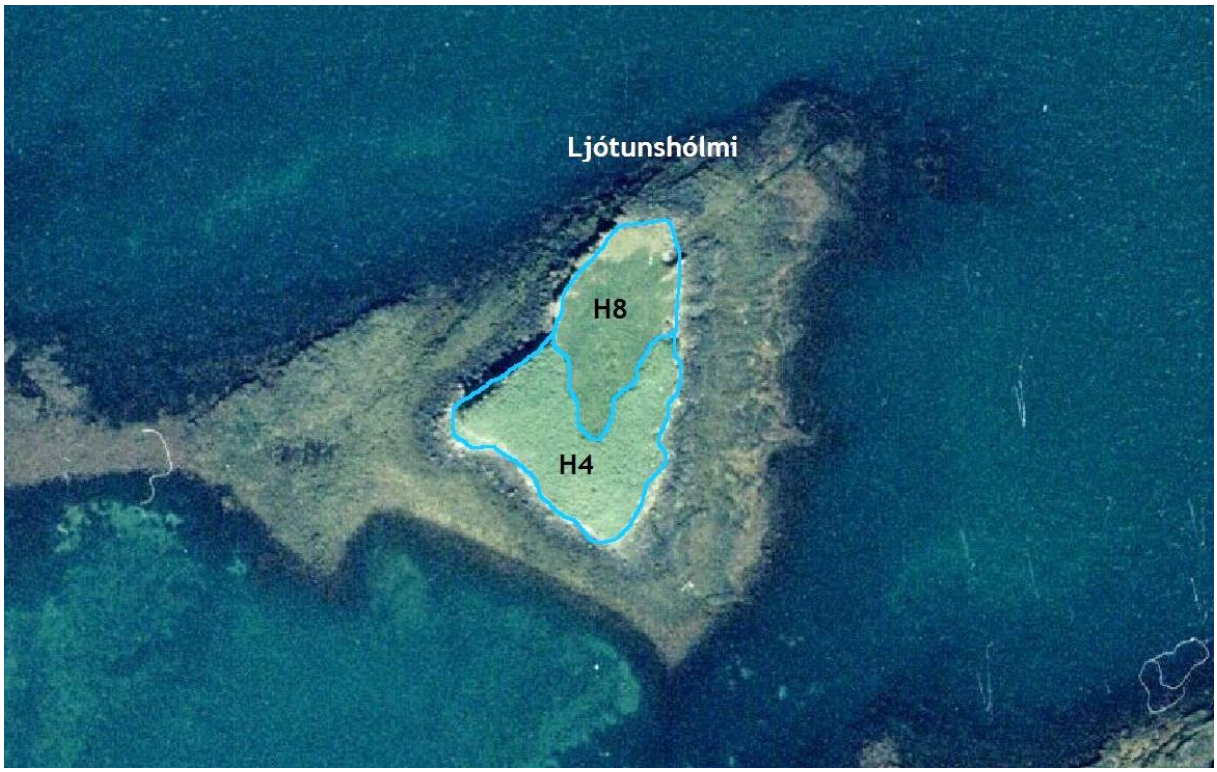

Figure 25. Vegetation types in Ljótunshólmi.

Figure 26. Different species of grasses cover the H8-part of Ljótunshólmi.

Figure 27. *Leymus arenarius* (is: melgresi) covers the H4-part of Ljótunshólmi.

3.9 Loðinshólmi

GPS coordinate:	65°04'08.8"N 22°49'40.0"W
Size of island	0.26 ha
Date:	16.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	No grazing
Overgrowing index:	Low - medium
Special findings:	-
Number of species:	8
Birdlife index:	Medium. Active breeding area for puffins
Historical use:	Not known

Loðinshólmi is the smallest island mapped in this project with its 2.600 m² (0.26 ha) and it has the lowest number of plant species documented. Only eight species were found during the fieldwork, all of them adapted to the extreme environment of colonies of seabirds. Most of the puffins breed in the south part of the island. As for the neighbour island of Ljótunshólmi the soil on Loðinshólmi is significantly packed with nutrients from puffins (*Fratercula arctica*) and cormorants (*Phalacrocorax carbo*) droppings. Only species tolerating high levels of nutrients and salts as well as disturbance from the puffins digging their breeding holes will manage to live here. *Festuca richardsonii* (is: túnvingull) and *Poa pratensis* (is: vallarsveifgras) dominate the field layer. In the southeast, we also found a lot of *Atriplex glabriuscula* (is: hrímblaðka). Close to the cliffs at the edges of the vegetation layer *Cochlearia officinalis* (is: skarfakál) and *Matricaria maritima* (is: baldursbrá) are dominant species (figure 29). Other species sparsely found are *Stellaria media* (is: haugarfi), *Leymus arenarius* (is: melgresi) and *Agrostis stolonifera* (is: skriðlíngresi). Based on the combination of plant species, we decided to choose the legend H8 in combination to L4 to describe the vegetation type in Loðinshólmi. These types are eighter grass-dominated (H8) or forb-dominated (L4) areas (figure 28) highly affected to seabirds activity (i.e. bird droppings) (figure 30). Typically, we did not find any species of heather (*Ericales*) in such kind of island, because they would not tolerate the high level of nitrogen in the soil.

Figure 28. Vegetation types in Loðinhólmi.

Figure 29. Lots of *Cochlearia officinalis* (is: skarfakál) flourish on the edge of the islands as a response to the high amount of nutrients from bird droppings.

Figure 30. The vegetation type in Loðinshólmi is a combination of grass-dominated (H8) and forb-dominated (L4) areas highly affected by nutriens in bird droppings.

3.10 Vatnsey and Vatnseyjarkálfur

GPS coordinate:	65˚04'38.3"N 22˚49'32.5"W
Size of islands:	1.75 ha (Vatnsey), 0.28 ha (Vatnseyjarkálfur)
Date:	16.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	No grazing
Overgrowing index:	Medium (Vatnsey), high (Vatnseyjarkálfur).
Special findings:	-
Number of species:	12
Birdlife index:	Medium
Historical use:	Not known.

Vatnsey and Vatnseyjarkálfur are close to each other and it is possible to walk between them on low tides. They are located in the cluster of islands in the western part of the mapping area (figure 3). The size of Vatnsey is around 1,75 ha and it's almost completely flat. The northern part of this island includes a colony of puffins. We found similar vegetation structure in this area as for other puffin islands like Ljótunshólmi and Loðinshólmi with the dominance of grass species like *Festuca richardsonii* (is: túnvingull) and *Poa pratensis* (is: vallarsveifgras). This grass-dominated vegetation type in areas high in bird droppings and digging holes from breeding puffins was assigned as H8 (figure 31, 32).

The central part of Vatnsey is a mix of different vegetation types in a mosaic structure (figure 32). In the wettest part we found areas of level fens, V1 formed by the presence of *Carex lyngbyei* (is: gulstör). This species can grow up to one meter tall and covers the areas completely displacing all other plant species. *Carex lyngbyei* is in some cases like on Vatnsey considered as an overgrowing species. Other vegetation types found in the central part is forb meadows with tall forbs, L1 and the bird droppings affected forb meadow type L4. Common species in these areas are *Ranunculus acris* (is: brennisóley)*, Stellaria media* (is: haugarfi)*, Rumex longifolius* (is: njóli)*, Cochlearia officinalis* (is: skarfakál) and *Angelica archangelica* (is: ætihvönn). At the southwestern part of the island, we found a narrow belt of *Leymus arenarius* (is: melgresi) related to the sandy beach in the south west of Vatnsey.

Vatnseyjarkálfur is almost entirely covered with *Leymus arenarius* (is: melgresi) and some *Angelica archangelica* (is: ætihvönn) (figure 33). Thus, the overgrowing index was estimated as high. Vegetation type is a mix of H4 and L5 (figure 31). A breeding colony of arctic terns (*Sterna paradisaea*) was found in the dense vegetation on Vatnseyjarkálfur.

Figure 31. Vegetation types in Vatnsey and Vatnseyjarkálfur.

Figure 32. The north side of Vatnsey consists of grassland related to puffins breeding ground (H8) and mosaique-areas of V1/L1/L4 where *Angelica archangelica* (is: ætihvönn) and *Carex lyngbyei* (is: gulstör) dominate.

Figure 33. Vatnseyjarkálfur is almost entirely covered with *Leymus arenarius* (is: melgresi).

3.11 Lónið

GPS coordinate:	65°04'47.0"N 22°50'05.8"W
Size of island:	1.5 ha
Date:	16.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	No grazing
Overgrowing index:	Medium
Special findings:	-
Number of species:	8
Birdlife index:	High
Historical use:	Not known

Lónið is the most northern island in the cluster consisting of Gimburey, Þorvaldsey, Vatnsey and Vatnseyjarkálfur (figure 3). The size of the island is 1,5 ha, but vegetation only covers around 0.7 ha. The composition of the vegetation is highly affected by the rich birdlife on Lónið. Puffins and arctic terns breed in hundreds and we found many other species of bird breeding as well. In the areas were the puffins have their nest we found the typical grass dominated and bird dropping vegetation type. *Festuca richardsonii* (is: túnvingull) and *Poa pratensis* (is: vallarsveifgras) are the two species dominating these puffin-breeding grasslands. The ground is rough and uneven because of all the digging holes from the puffins. The field height is usually low (figure 36) for this vegetation type and we have assigned this grassland type as H8. At the north side of the island is a belt of *Leymus arenarius* (is: melgresi), H4.

The central part of the island is a mix of different vegetation types, quite similar to what we found on the central parts of Vatnsey. However, on Lónið we found more *Angelica archangelica* (is: ætihvönn), making up the vegetation type L5 as the main type (figure 35). Some wet areas of level fens are dominated by *Carex lyngbyei* (is: gulstör), indicated by the vegetation type V1 and in between we still can find some open grass dominated areas of H8 (figure 34). Nevertheless, it seems like *Angelica archangelica* (is: ætihvönn) and *Carex lyngbyei* (is: gulstör) are expanding and could displace other smaller species in parts of Lónið.

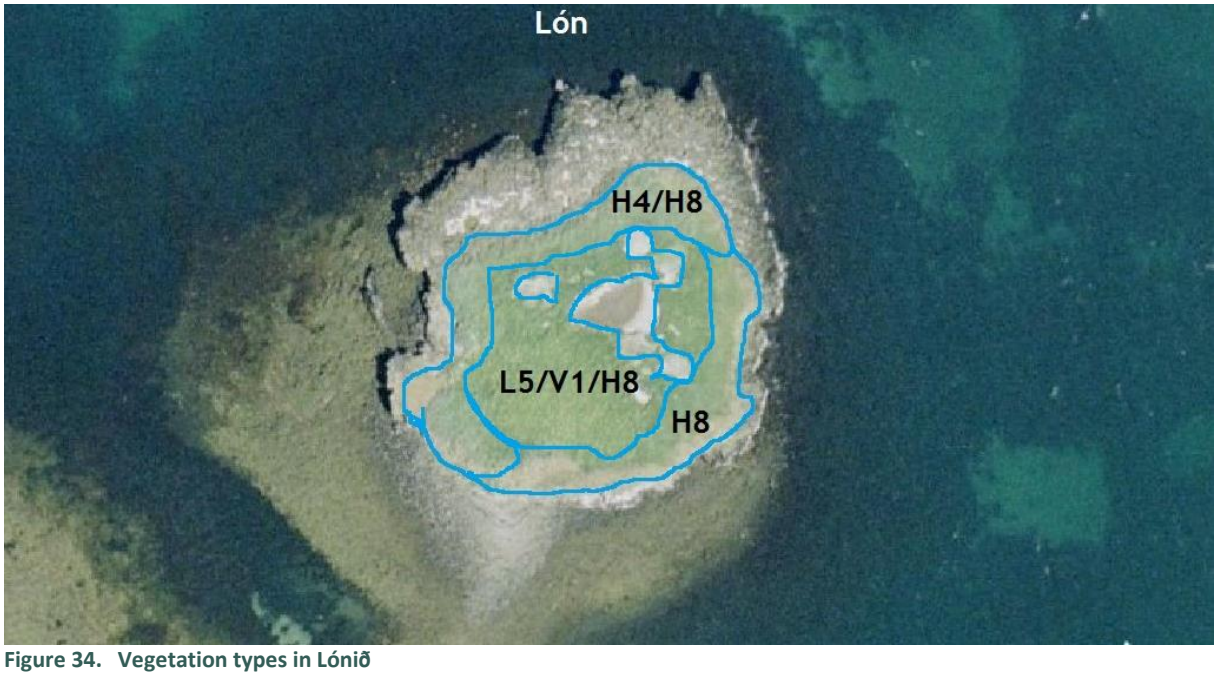

Figure 34. Vegetation types in Lónið

Figure 35. ***Angelica archangelica*** **(is: ætihvönn) dominates the central part of Lónið (L5).**

Figure 36. The H8-part of Lónið, where the puffins breed, different species of grass are dominating.

3.12 Gimburey

GPS coordinate:	65°04'20.9"N 22°50'21.9"W
Size of island:	1.8 ha
Date:	16.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	Medium. Sheeps
Overgrowing index:	Low
Special findings:	*Carex nigra x lyngbyei*
Number of species:	26
Birdlife index:	Medium.
Historical use:	Haymaking and/or grazing

Gimburey is located in the southwestern part of the study area, approx. 100 metres south of Þorvaldsey. The island is approximately 1.8 ha. Gimburey is dominated by grassland (H1) with the two most common species in the H1-areas being *Festuca richardsonii* (is: túnvingull) and *Poa pratensis* (is: vallarsveifgras) (figure 38). We also found many herb species that are related to bird dropping affected areas like *Matricaria maritima* (is: baldursbrá), *Stellaria media* (is: haugarfi), *Rumex longifolius* (is: njóli), *Cochlearia officinalis* (is: skarfakál), *Rumex acetosa* (is: túnsúra) and some few *Angelica archangelica* (is: ætihvönn). We used L4 to indicate a forb meadow consisting of herbs tolerating high levels of nitrogen from the bird droppings. The wet parts of Gimburey are combination of grassland and fens vegetation. *Carex lyngbyei* (is: gulstör) and the hybrid of *Carex nigra x lyngbyei* dominates in these areas together with other species like *Carex panicea* (is: belgjastör), *Carex nigra* (is: mýrastör) and *Ranunculus acris* (is: brennisóley) (U8). Figure 37 shows the combination of the different vegetation types found in Gimburey. The field layer is rather low due to the grazing sheep, and we found no sign of any overgrowing processes.

Figur 37. Vegetation types in Gimburey.

Figure 38. Gimburey is grass-dominated. Grazing intensity is medium resulting in a low field height and a low overgrowing index.

3.13 Þorvaldsey

GPS coordinate:	65°04'31.1"N 22°50'21.3"W
Size of island:	4.2 ha
Date:	16.06.14
Mappers:	THC, ÁÁ
Grazing intensity:	Low
Overgrowing index:	Medium. Large areas are dominated by *Carex lyngbyei*
Special findings:	*Carex nigra x lyngbyei*
Number of species:	22
Birdlife index:	Medium - high
Historical use:	Haymaking and/or grazing

The neighbour island of Gimburey and Lónið, Þorvaldsey is 4.2 ha in total including a pond in the southwest part of the island. Vegetation covers 3.2 ha. A summerhouse with some few hundred m^2 of lawn is in the centre of Þorvaldsey. Many birds, especially eiders (*Somateria mollissima*) are breeding on the island and make use of the pond for the first few days after the ducklings have been hatched. There is also a colony of arctic terns breeding counting up to hundred pairs, mainly at the western side. The main vegetation type on Þorvaldsey is grassland, H1 consisting of *Festuca richardsonii* (is: túnvingull) and *Poa pratensis* (is: vallarsveifgras) (figure 39, 40) as the same for some of the other islands in this cluster. *Carex lyngbyei* (is: gulstör) and the hybrid of *Carex nigra x lyngbyei*, making up the vegetation type U8, are also common all over the island, but most of all in the wettest areas close to the pond (figure 39). In contrast to Gimburey the *Carex* is much bigger and taller (up to one meter tall) on Þorvaldsey (figure 41). Other species found is i.e. *Matricaria maritima* (is: baldursbrá), *Carex panicea* (is: belgjastör), *Mertensia maritima* (is: blálilja), *Ranunculus acris* (is: brennisóley), *Honckenya peploides* (is: fjöruarfi), *Calamagrostis stricta* (is: hálmgresi), *Carex nigra* (is: mýrastör), *Potentilla anserina* (is: tágamura) and *Rumex acetosa* (is: túnsúra).

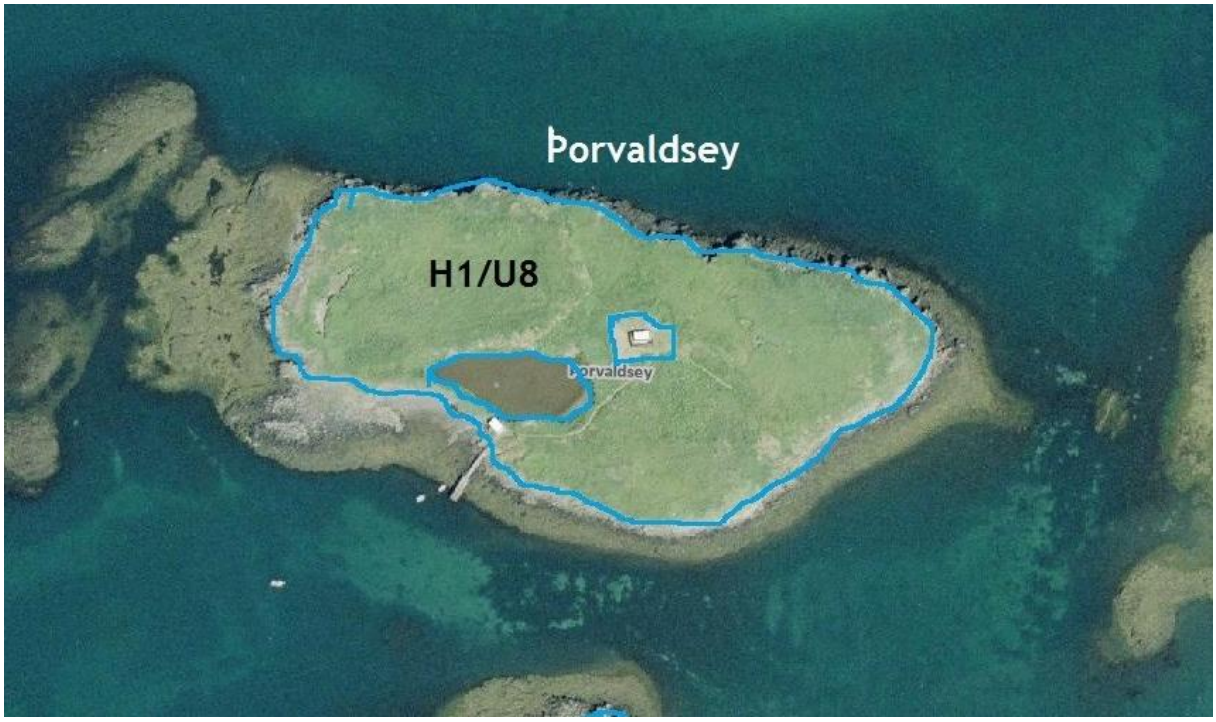

Figure 39. Vegetation types in Þorvaldsey.

Figure 40. Grassland, H1, consisting of *Festuca richardsonii* (is: túnvingull) and *Poa pratensis* (is: vallarsveifgras). *Carex lyngbyei* (is: gulstör) in front.

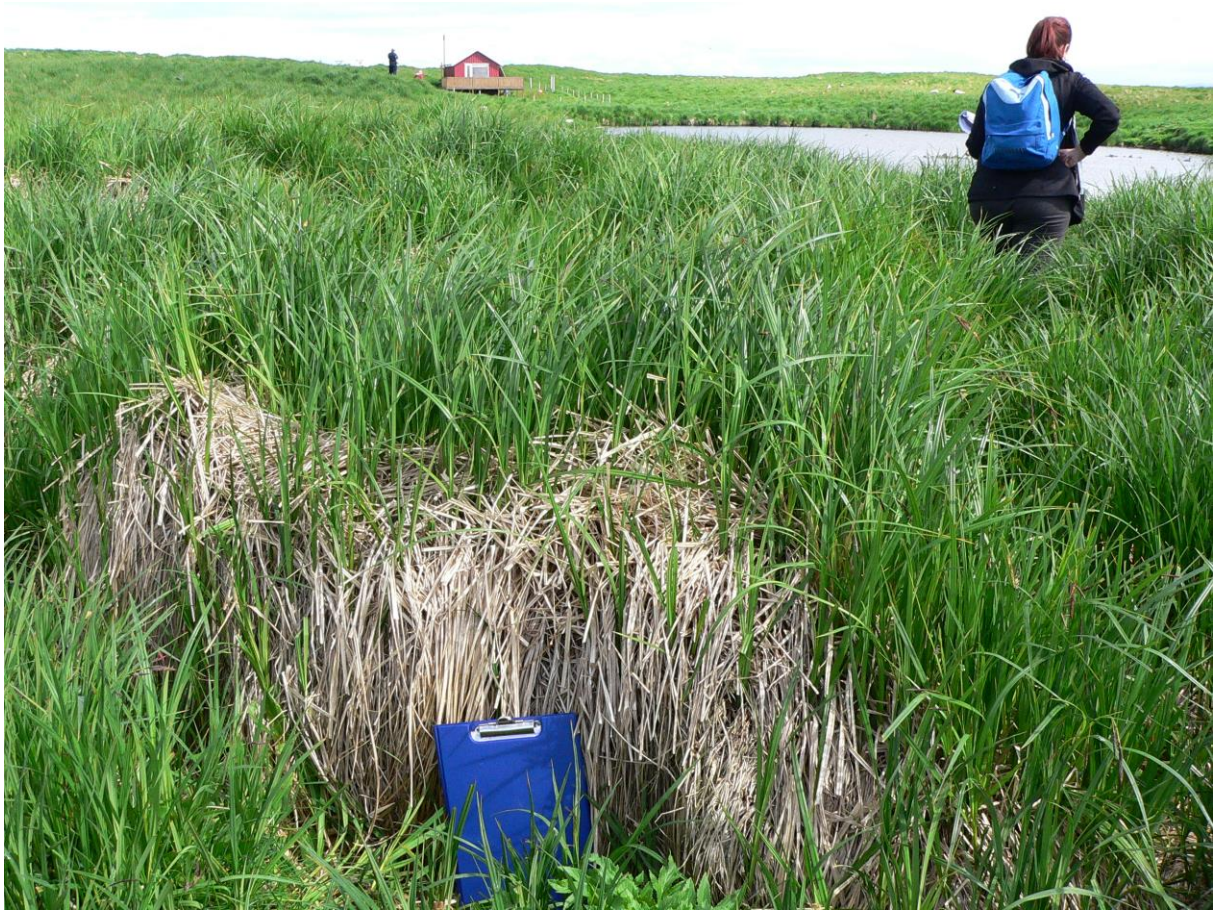

Figure 41. *Carex lyngbyei* (is: gulstör) (U8) is up to one meter tall close to the pond at Þorvaldsey.

3.14 Melrakkaey

GPS coordinate:	65˚04'15.9"N 22˚48'16.5"W
Size of island:	5.2 ha
Date:	22.08.14
Mappers:	THC, ÁÁ
Grazing intensity:	Low. Only some few sheep grazing summertime
Overgrowing index:	Low – medium. *Angelica archangelica* dominates but is not very tall
Special findings:	-
Number of species:	22
Birdlife index:	Low - medium
Historical use:	Deserted 1845 (4-6 persons). Haymaking and/or grazing from other island farmers.

Melrakkaey is located in the west part of the study area around 1 km north of Sellón and close to Ljótunshólmi. The size of the island is 5.2 ha and it is relativly flat. Highest point is 13 m above sea level. There are foundation walls from houses that used to be on Melrakkaey.

The vegetation structure on Melrakkaey is even and homogeneous dominated by grassland. *Agrostis capillaris* (is: hálíngresi), *Festuca richardsonii* (is: túnvingull) and *Poa pratensis* (is: vallarsveifgras) are the most common species on Melrakkaey making up the grassland legend H1 (figure 42, 43). We also found lots of *Angelica archangelica* (is: ætihvönn) spread over the island (L5) (figure 42). However, the leaves of *Angelica archangelica* were particularly small on Melrakkaey, probably due to a high level of sheep grazing in periods. We did not see any sheep during the fieldwork, but they were probably moved to another island earlier that summer. Other species found on Melrakkaey are i.e. *Calamagrostis stricta* (is: hálmgresi), *Cardamine nymanii* (is: hrafnaklukka), *Carex lyngbyei* (is: gulstör), *Carex nigra* (is: mýrastör), *Cerastium fontanum* (is: vegarfi), *Cochlearia officinalis* (is: skarfakál), *Deschampsia caespitosa* (is: snarrótarpuntur), *Galium verum* (is: gulmaðra), *Ranunculus acris* (is: brennisóley), *Rumex acetosa* (is: túnsúra) and *Rumex longifolius* (is: njóli). Some few spots of *Leymus arenarius* (is: melgresi) (H4) are located in some small areas around the island close to the shoreline (figure 42).

Figure 42. Vegetation types in Melrakkaey.

Figure 43. The grassland in Melrakkaey consists of *Agrostis capillaris* (is: hálíngresi), *Festuca richardsonii* (is: túnvingull) and *Poa pratensis* (is: vallarsveifgras), but also species like *Rumex acetosa* (is: túnsúra) and *Rumex longifolius* (is: njóli).

3.15 Elliðaey

GPS coordinate:	65˚08'43.8"N 22˚48'30.3"W
Size of island:	24.4 ha
Date:	22.08.14
Mappers:	THC, ÁÁ
Grazing intensity:	Medium. 16 sheep
Overgrowing index:	Low
Special findings:	*Poa alpine, Callitriche palustris, Ranunculus hyperboreus, Sagina procumbens*
Number of species:	49
Birdlife index:	Medium - high
Historical use:	Deserted 1960 (4-17 persons). Grazing and/or haymaking. Lighthouse

The unique crescent-shaped island of Elliðaey is located eight kilometres north of Stykkishólmur and is the most remote island in this project (figure 2). The size of Elliðaey is approximately 24.4 ha and the highest point is 41 m above sea level. The outer-part of the island is the highest one, with a steep cliff wall towards the ocean. The bayside is lower and starts almost at sea level making the landscape on Elliðaey declivity from outside (north) to bayside (south). There is a old farmhouse still in use together with a barn in Elliðaey.

Elliðaey is covered with grassland vegetation dominated by *Agrostis capillaris* (is: hálíngresi) and *Festuca richardsonii* (is: túnvingull), assigned to the legend H1. In addition to species of grass we also found a great amount of herbs like *Cerastium fontanum* (is: vegarfi), *Leontodon autumnalis* (is: skarifífill), *Potentilla anserina* (is: tágamura) and *Rumex acetosa* (is: túnsúra). In the wettest parts of the grassland *Carex lyngbyei* (is: gulstör) is dominating together with the species of grasses mentioned above. These areas were not defined as fens, and *Carex lyngbyei* does not fit into the other legends of grassland described by Steindórsson (1981). We decided to give these parts a new legend, H10 – grassland with *Carex lyngbyei* (figure 45, 46). In the east below the lighthouse we found a nice spot rich in species like *Anthoxanthum odoratum* (is: ilmreyr), *Cardamine nymanii* (is: hrafnaklukka), *Draba incana* (is: grávorblóm), *Euphrasia frigida* (is: augnfró), *Festuca vivipara* (is: blávingull), *Galium verum* (is: gulmaðra), *Gentianella amarelle* (is: grænvöndur), *Poa alpina* (is: fjallsveifsgras), *Sagina procumbens* (is: skammkrækill) and *Thymus praecox ssp. arcticus* (is: blóðberg). This is a typical forb meadow, rich in low forbs, L2(b).

Some of the ponds on Elliðaey have vegetation (figure 44). One pond in the west was almost dry and the dominated species here is *Ranunculus hyperboreus* (is: trefjasóley). Other species growing here are *Agrostis stolonifera* (is: skriðlíngresi) and *Potentilla anserina* (is: tágamura). We defined a new legend for this water vegetation dominated by *Ranunculus hyperboreus* (is: trefjasóley) – Y20. Another special finding was done further east in two pond-systems where the only plant living in the ponds was *Callitriche palustris* (is: vorbrúða). We assigned the legend the code Y21.

Figure 44. Vegetation types in Elliðaey.

Figure 45. Overview of Elliðaey from west toward east. Grassland (H1/H10) dominates.

Figure 46. The vegetation in Elliðaey mainly consists of a mosaique of H1 (grassland) and H10 (*Carex lyngbyei* in addition to grass). The yellow flower is *Leontodon autumnalis* (is: skarifífill).

3.16 Vaðstakksey

GPS coordinate:	65˚06'23.9"N 22˚48'08.4"W
Size of island:	11.4 ha
Date:	22.08.14
Mappers:	THC, ÁÁ
Grazing intensity:	Medium. Around 10 sheep grazing some part of the year
Overgrowing index:	Low
Special findings:	*Ranunculus hyperboreus, Rorippa islandica, Matricaria matricarioides,*
Number of species:	23
Birdlife index:	Low - medium
Historical use:	Deserted 1762 (10 persons). Haymaking and/or grazing occasionally.

Vaðstakksey is located between Elliðaey and Stykkisholmur (figure 2). The size of the island is 11.4 ha and the landscape is slightly hilly. The highest point is 27 metres above sea level. Except a little part of the legend L5, dominated by *Angelica archangelica* (is: ætihvönn) in the eastern part, the entired island is covered with grassland, H1 dominated by grass species like *Agrostis capillaris* (is: hálíngresi)*, Festuca richardsonii* (is: túnvingull) and *Poa pratensis* (is: vallarsveifgras) (figure 48). Furthermore, we also found a lot of *Stellaria media* (is: haugarfi)*, Rumex acetosa* (is: túnsúra) and *Rumex longifolius* (is: njóli).

It has not always been like that. In 1989, Mörsdorf mapped Vaðstakksey and judged by his vegetation map (figure 47) the island has changed significantly from 1989 to 2014. *Angelica archangelica* dominated half of the island in 1989 (blue-purple, figure 47) and the rest of the island was more herb rich with *Leontodon autumnalis* (is: skarifífill) and *Trifolium repens* (is: hvítsmári). The dominance *Angelica archangelica* indicate an early stage of overgrowing. Only few and small parts had grass vegetation, shown as the pink parts. In 2014, Vaðstakksey was almost entirely covered with grassland. *Angelica archangelica* has been reduced to a minimum, *Trifolium repens* was difficult to find and the most of the herbs have become rare. This is most probably a consequence of the grazing regime reintroduced after 1989.

We had three special findings on Vaðstakksey. *Rorippa islandica* (is: kattarjurt) was only found here and on the island of Landey and *Matricaria matricarioides* (is: hlaðkolla) was found only here on Vaðstakksey in a dry pond (figure 50). We also found *Ranunculus hyperboreus* (is: trefjasóley) which we also found in Elliðaey.

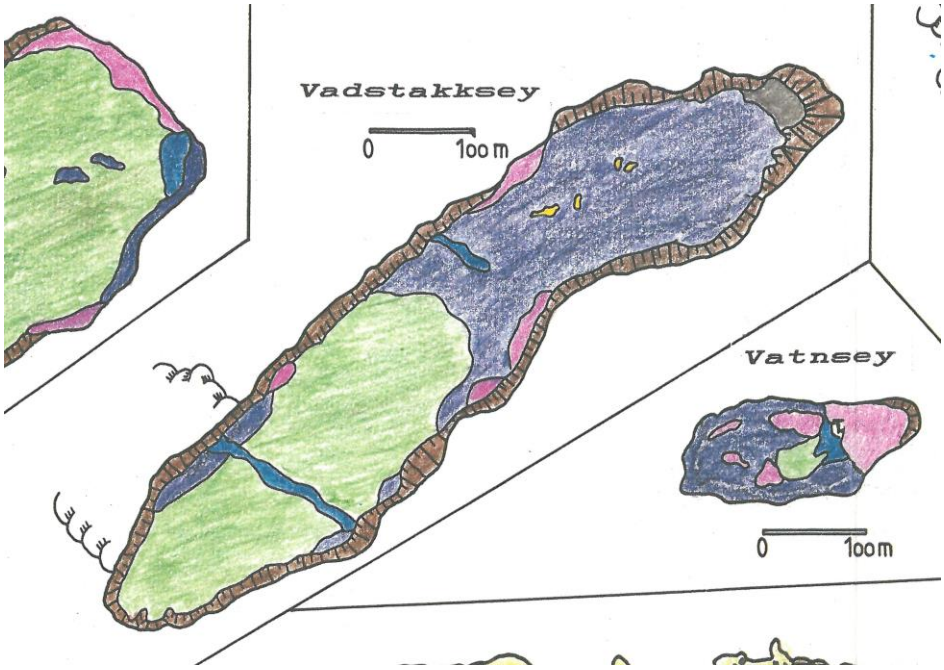

Figure 47. Vegetation map of Vaðstakksey in 1989 (Mörsdorf 1989). Blue-purple means *Angelica archangelica*-dominated areas, green is *Leontodon autumnalis-Trifolietum*-dominated areas and pink areas are grass-dominated areas.

Figure 48. Vegetation types in Vaðstakksey.

Figure 49. Vaðstakksey is characterised by grassland with few herb species (H1).

Figure 50. We found *Matricaria matricarioides* (is: hlaðkolla) only in Vaðstakksey within our study area.

3.17 Arnarey

GPS coordinate:	65°09'03.7"N 22°31'57.6"W
Size of island:	6.4 ha
Date:	09.06.14
Mappers:	THC
Grazing intensity:	No grazing
Overgrowing index:	Low
Special findings:	*Gentianella aurea, Vicaria alpina, Ericphorum scheuchzeri, Carex canescens, Lathyrus japonicas, Juniperus communis, Linum catharticum*
Number of species:	78
Birdlife index:	Low
Historical use:	No grazing or farming

Arnarey is the northeastern-most island in our study area. It is located north of Purkey, 12 km northeast for Stykkishólmur (figure 2). The size of Arnarey is approximately 6,4 ha and it's a flat, plateau-like island. The plateau consists of a mosaic between grassland (H1) with species like *Avenella flexuosa* (is: bugðupuntur), *Anthoxanthum odoratum* (is: ilmreyr), *Cardamine nymanii* (is: hrafnaklukka), *Luzula multiflora* (is: vallhæra), *Ranunculus acris* (is: brennisóley) and *Rumex acetosa* (is: túnsúra) and heathland dominated by *Empetrum nigrum* (is: krækilyng) and *Vaccinium uliginosum* (is: bláberjalyng). We had to make up the legend B20 for the heathland in Arnarey (figure 52) because the best alternative, B2 also includes *Loiseleuria procumbens* (is: sauðamergur) a plant not found on Arnarey and B2 is associated to inland areas as well. The south and southeastern part of Arnarey is a sheltered, sunny exposed forb meadow and extremely rich is species. The legend is a rich form of low forb meadows L2(b) and some of the species found here is *Botrychium lunaria* (is: tungljurt), *Cerastium alpinum* (is: músareyra), *Erigeron borealis* (is: jakobsfífill), *Draba verna* (is: vorperla), *Galium verum* (is: gulmaðra), *Gentianella campestris* (is: maríuvöndur) and *Rubus saxatilis* (is: hrútaber) (figure 51). On Arnarey we found species like *Gentianella aurea* (is: gullvöndur), *Vicaria alpine* (is: ljósberi), *Eriophorum scheuchzeri* (is: hrafnafífa), *Carex canescens* (is: blátoppastör), *Lathyrus japonicas* (is: baunagras), *Juniperus communis* (is: einir) and *Linum catharticum* (is: villilín) we did not find in other islands or at least very few specimens.

Arnarey presently is ungrazed and has been ungrazed in some decades. *Lathyrus japonicas* (is: baunagras) is a plant that is favoured by sheeps and is unlikely to be found in grazed islands. It was common on Arnarey and together with findings of *Betula pubescens* (is: birki) and some *Salix*-species this indicates a long time without grazing. Despite of this there is no sign of overgrowing.

Figur 51. Vegetation types in Arnarey.

Figure 52. The southeast tip of Arnarey is dominated by *Empetrum nigrum* (is: krækilyng) and *Vaccinium uliginosum* (is: bláberjalyng) (B20).

3.18 Vaktarhólmi

GPS coordinate:	65°05'30.9"N 22°26'36.0"W
Size of island:	1.9 ha
Date:	28.08.14
Mappers:	THC, ÁÁ
Grazing intensity:	No grazing
Overgrowing index:	Medium – high
Special findings:	*Juniperus communis, Coeloglossum viride, Rubus saxatilis, Salix lanata, Pinus mugo, Picea sitchensis, Populus x canadensis*
Number of species:	53
Birdlife index:	Low
Historical use:	Part of Brokey archipelago, not grazed since the end of 19 century

Vaktarhólmi is located in the east part of the mapping area close to Brokey, between Norðurey and Sviðna (figure 2). The size of Vaktarhólmi is 1.9 ha and it is quite low and flat, only a couple of m above sea level. The vegetation structure is quite different from the grass-dominated islands further west in Breiðafjörður with heather species (*Ericales*) dominating instead of grasses. Vaktarhólmi has been ungrazed for several decades. That factor affects the structure of the vegetation significantly in form of an overgrowing process (figure 55).

Most of the island is heathland dominated by species like *Empetrum nigrum* (is: krækilyng) and *Vaccinium uliginosum* (is: bláberjalyng) together with *Angelica sylvestris* (is: geithvönn), *Avenella flexuosa* (is: bugðupuntur), *Cardamine nymanii* (is: hrafnaklukka), *Galium verum* (is: gulmaðra) and a many other species. The mix of heathland (B7) and low forb meadow (L2) describes the main vegetation structure on Vaktarhólmi. The lack of grazing gives opportunity for some species to grow that we seldom find on grazed island. Those are *Salix phylicifolia* (is: gulvíðir), *Salix lanata* (is: loðvíðir), *Juniperus communis* (is: einir), *Betula pubescens* (is: birki), *Coeloglossum viride* (is: barnarót) and *Lathyrus japonicas* (is: baunagras).

On the north side of the island we found a part that was dominated by *Dryas octopetala* (is: holtasóley), *Empetrum nigrum* (is: krækilyng), *Salix herbacea* (is: grasvíðir) and other species of *Salix*. This part was defined as legend B6. The R6-legend shown in figure 53 has some planted *Picea sitchensis* (is: sitkagreni), *Pinus contorta* (is: stafafura) and *Populus trichocarpa* (is: alaskaösp) (figure 54).

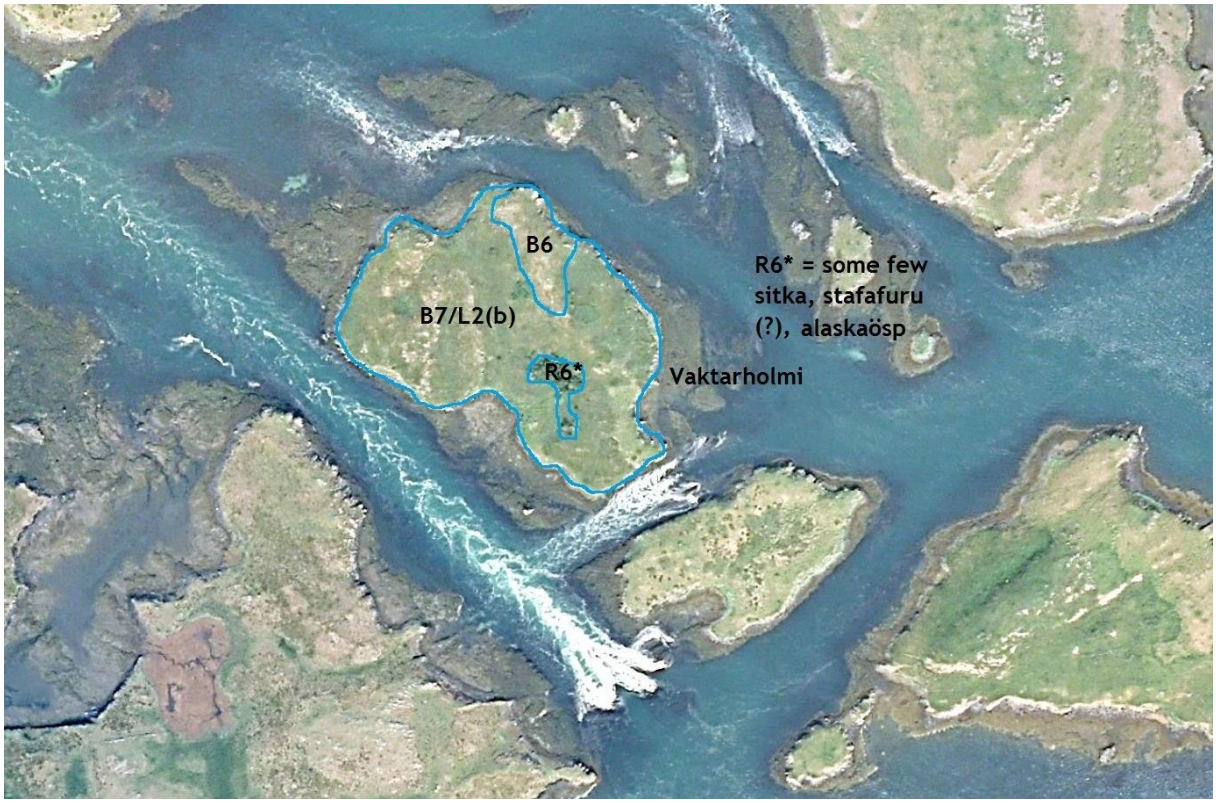

Figure 53. Vegetation types in Vaktarhólmi.

Figure 54. We found *Picea sitchensis* (is: sitkagreni), *Pinus contorta* (is: stafafura) and *Populus trichocarpa* (is: alaskaösp) (R6) in Vaktarhólmi.

Figure 55. No grazing in decades have led to and overgrowing prosses where we can see *Betula pubescens* (is: birki) dominating parts of the Vaktarhólmi.

3.19 Ólafsey

GPS coordinate:	65°03'50.0"N 22°30'15.9"W
Size of island:	78.2 ha
Date:	28.08.14
Mappers:	THC, ÁÁ
Grazing intensity:	No grazing
Overgrowing index:	Low
Special findings:	*Menyanthes trifoliata, Koenegia islandica, Nardus stricta, Parnassia palustris, Huperzia selago, Juncus trifidus, Drosera rotundifolia, Juncus alpinus, Linum catharticum*
Number of species:	69
Birdlife index:	Low
Historical use:	Deserted 1800 (6-8 persons), since then grazed and/or haymaking some decades ago

Ólafsey is one of the biggest islands mapped in this project, 78.2 ha. The landscape varies from sparsely vegetated hills with a high amount of stones and sand to flat, rich grasslands and wetlands in the central parts of the island. The highest point on Ólafsey is 30 metres above sea level. There are foundation walls from houses in the northern part of the island (T5-area) and in the wetland, we found trace of harvesting turf for heating.

The main vegetation type on the stony hillsides of Ólafsey is heathland, dominated by *Empetrum nigrum* (is: krækilyng)*, Alchemilla alpina* (is: ljónslappi) and *Dryas octopetala* (is: holtasóley) mixed with some *Thymus praecox ssp. arcticus* (is: blóðberg)*, Vaccinium uliginosum* (is: bláberjalyng) and *Salix herbacea* (is: grasvíðir), which makes up the legend B6 (figure 56, 57). The vegetation covers on average is under 50%, indicated by the letter "z". The letter "b" means big stones in the vegetation. The main part of the lowlands is defined as level fens dominated by *Eriophorum angustifolium* (is: klófífa) and different species of grass (V3) (figure 58). The wetland was drier than expected due to topography and tend toward grassland probably due to historical land-use like grazing and harvest of turf and grass. The vegetation and landscape is obviously affected by human land use as one get closer to the ruins. We defined this area as fringes (moist land) dominated by grasses and sedges (T5), affected by human activity hence the letter "r". The T5r-area is dominated by *Agrostis capillaris* (is: hálíngresi), *Festuca vivipara* (is: blávingull) and *Luzula multiflora* (is: vallhæra) and some other species like *Calamagrostis stricta* (is: hálmgresi)*, Carex nigra* (is: mýrastör)*, Deschampsia caespitose* (is: snarrótarpuntur)*, Juncus alpinus* (is: mýrasef)*, Juncus articus* (is: hrossanál)*, Parnassia palustris* (is: mýrasóley)*, Rhinanthus minor* (is: lokasjóður) and *Viola palustris* (is: mýrfjóla).

Ólafsey has been ungrazed for many years. Despite this, the B6-areas or the T5/V3-areas show no sign of overgrowing. The main reason for this is that the soil is less suitable for vegetation to grow compare to other more fertile islands like most of the islands in the west part of the mapping area.

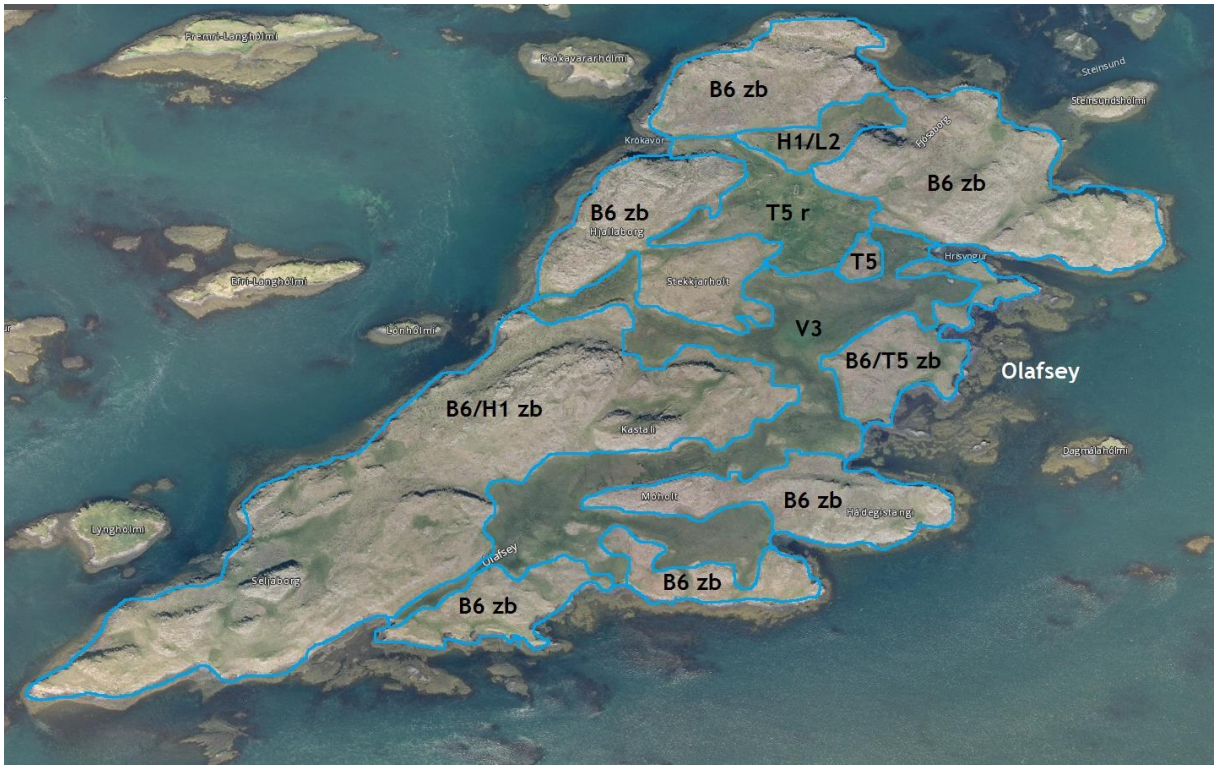

Figure 56. Vegetation types in Ólafsey.

Figure 57. Heathland dominated by *Empetrum nigrum* (is: krækilyng) in Ólafsey.

Figure 58. The main part of the lowlands is defined as level fens dominated by *Eriophorum angustifolium* (is: klófífa) and different species of grasses (V3).

3.20 Stóri Sindingahólmi

GPS coordinate:	65°04'16.1"N 22°29'38.3"W
Size of island:	2.7 ha
Date:	28.08.14
Mappers:	THC, ÁÁ
Grazing intensity:	No grazing or low intensity
Overgrowing index:	Medium. Parts dominated by *Angelica archangelica*
Special findings:	-
Number of species:	45
Birdlife index:	Low. Used to be a big colony of *Larus marinus*
Historical use:	Not known

Stóri Sindingahólmi is located between Brokey and Ólafsey in the east part of the study area. The neighbour island Litli Sindingahólmi is just 100 metres to the south. The size of the island is around 2.7 ha including the northeast part that is connected to the rest of Stóri Sindingahólmi on low tides. *Empetrum nigrum* (is: krækilyng) and *Vaccinium uliginosum* (is: bláberjalyng) together with *Avenella flexuosa* (is: bugðupuntur) are the dominated species found on the entire island. The fact that *Loiseleuria procumbens* (is: sauðamergur) is absent this heathland does not fit into the legend of B2. Instead we made a new legend for this project and the same we used for Arnarey - B20 (chap. 3.2). Other species found in B20 on Stóri Sindingahólmi is *Alchemilla alpine* (is: ljónslappi), *Anthoxanthum odoratum* (is: ilmreyr), *Angelica archangelica* (is: ætihvönn), *Angelica sylvestris* (is: geithvönn), *Carex nigra* (is: mýrastör), *Carex vaginata* (is: slíðrastör), *Cerastium fontanum* (is: vegarfi), *Draba incana* (is: grávorblóm), *Festuca vivipara* (is: blávingull), *Galium normanii* (is: hvítmaðra) and *Salix herbacea* (is: grasvíðir). The south part mostly is dominated by *Angelica archangelica* and *Angelica sylvestris*. Legend L5 indicates the *Angelica*-dominance (figure 60). The species from B20 is still growing together with *Angelica* ssp. so the vegetation legend is a mix of L5 and B20 (figure 59). The L5/B20-area used to be a big greater black-backed gull *(Larus marinus)* colony, but the gulls were absent in 2014. We visited Stóri Sindingahólmi in June as well, but did not find any colony of breeding gulls.

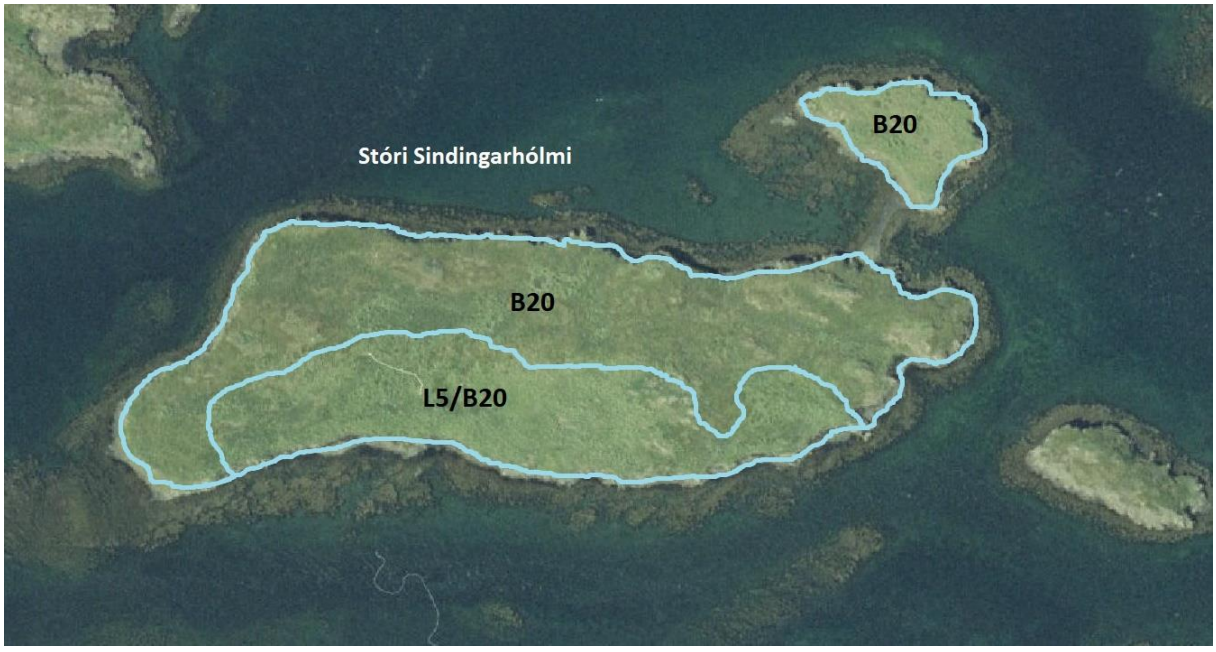

Figure 59. Vegetation types in Stóri Sindingarhólmi.

Figure 60. ***Angelica archangelica*** **(is: ætihvönn) and** ***Angelica sylvestris*** **(is: geithvönn) dominate the L5-areas of Stóri Sindingarhólmi. These areas used to be big colonies of greater black-backed gull** ***(Larus marinus)*****.**

3.21 Litli Sindingahólmi

GPS coordinate:	65°04'10.7"N 22°29'48.3"W
Size of island:	1.1 ha
Date:	28.08.14
Mappers:	THC, ÁÁ
Grazing intensity:	No grazing
Overgrowing index:	Low
Special findings:	-
Number of species:	39
Birdlife index:	Low
Historical use:	Not known

Litli Sindingahólmi is the little neighbour of Stóri Sindingahólmi located between Brokey and Ólafsey in the east part of the study area. The island is 1.1 ha and is low and flat in shape. We found almost the same species on Litli as for Stóri Sindingahólmi with the dominance of *Empetrum nigrum* (is: krækilyng) and *Vaccinium uliginosum* (is: bláberjalyng) together with *Avenella flexuosa* (is: bugðupuntur) (figure 62). The main difference between these two islands is that we did not find *Angelica archangelica* (is: ætihvönn), only *Angelica sylvestris* (is: geithvönn) on Litli Sindingahólmi. The amount of *Angelica sylvestris* was not enough to include the legend L5 (hvönn), so the legend for Litli Sindingahólmi is heathland dominated by *Empetrum nigrum* and *Vaccinium uliginosum* – B20 (figure 61).

Figure 61. Vegetation type in Litli Sindingahólmi.

Figure 62. Dominance of *Empetrum nigrum* (is: krækilyng) and *Vaccinium uliginosum* (is: bláberjalyng) together with *Avenella flexuosa* (is: bugðupuntur) (B20).

3.22 Galtarey

GPS coordinate:	65°02'39.4"N 22°36'33.8"W
Size of island:	8.3 ha
Date:	28.08.14
Mappers:	THC, ÁÁ
Grazing intensity:	No grazing
Overgrowing index:	Low
Special findings:	*Vicia cracca*
Number of species:	42
Birdlife index:	Low
Historical use:	Not known

Galtarey is located some kilometres west of Ólafsey in the outskirt of Álftafjörður. The size of Galtarey is 8.3 ha and is plateau-shaped and almost completely flat. The island rises 10 metres above sea level. The main part of Galtarey is grass-dominated by several species as *Agrostis capillaris* (is: hálíngresi), *Anthoxanthum odoratum* (is: ilmreyr), *Avenella flexuosa* (is: bugðupuntur) and *Festuca richardsonii* (is: túnvingull) making up the vegetation type H1 (figure 63). Herbs found in this grassland were i.e. *Cardamine nymanii* (is: hrafnaklukka), *Cerastium fontanum* (is: vegarfi), *Galium verum* (is: gulmaðra), *Rhinanthus minor* (is: lokasjóður), *Angelica archangelica* (is: ætihvönn) and *Angelica sylvestris* (is: geithvönn) (figure 64). The eastside of Galtarey the dominant species were *Myosotis arvensis* (is: gleym-mér-ei), *Rumex acetosa* (is: túnsúra), *Cochlearia officinalis* (is: skarfakál) and *Vicia cracca* (is: umfeðmingur) which indicated soil with high amounts of nutrients probably from bird droppings over the years. We gave these areas the legend L4 meaning forb meadows consisting of herbs related to activity of bird (bird droppings). *Vicia cracca* was only found in Galtarey within our study area (figure 65).

Angelica archangelica (is: ætihvönn) and *Angelica sylvestris* (is: geithvönn) are dominating together with the L4-species in the central part and on the west side of Galtarey (L5/L4).

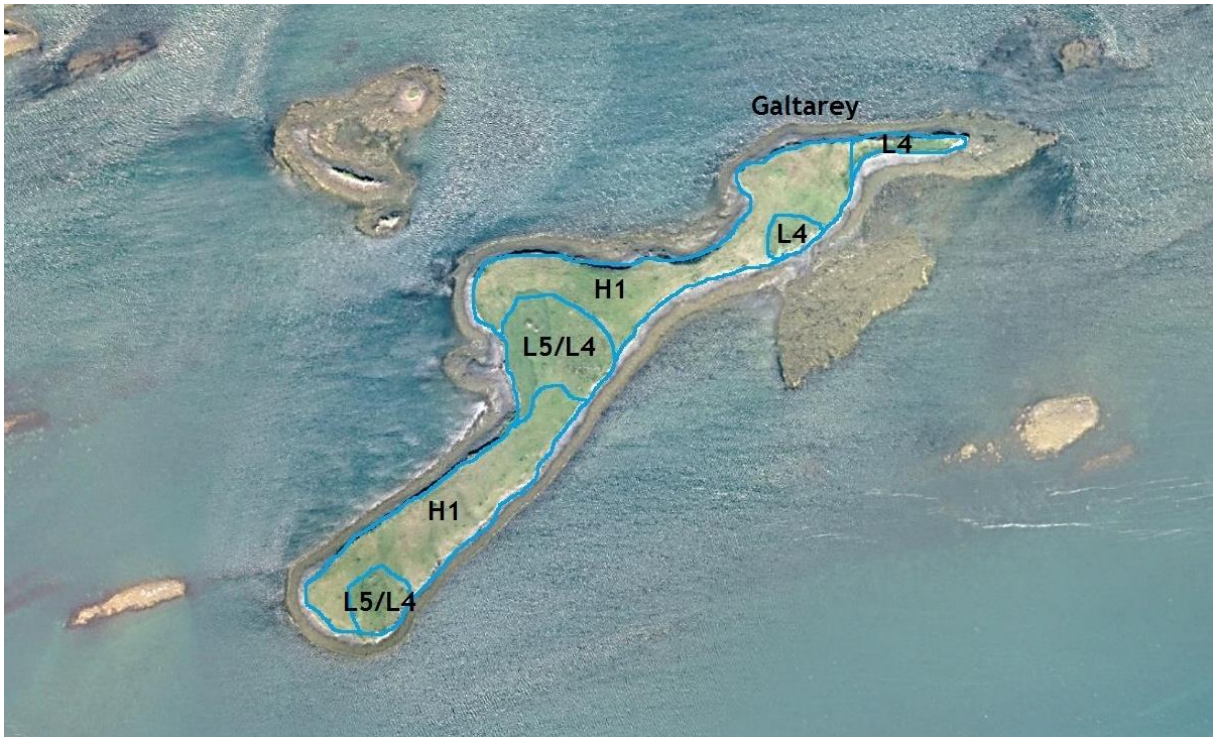

Figure 63. Vegetation types in Galtarey.

Figure 64. Grass-dominated grassland (H1) with a little portion of *Angelica archangelica* (is: ætihvönn) and *Angelica sylvestris* (is: geithvönn).

Figure 65. The eastside of Galtarey we found the domination of species like *Myosotis arvensis* (is: gleym-mér-ei), *Rumex acetosa* (is: túnsúra), *Cochlearia officinalis* (is: skarfakál) and *Vicia cracca* (is: umfeðmingur) (L4). *Vicia cracca* was only found in Galtarey within our study area.

4 Discussion

This study shows at the vegetation types and number (and composition) of plant species differs considerably between different island independent of distance between them. Some islands are covered by grassland (H) dominated by a few species of grasses like *Poa pratensis* (is: vallarsveifsgras) and *Festuca richardsonii* (is: túnvingull). Examples of such islands are Vaðstakksey, Galtarey, Elliðaey and Melrakkaey. Other islands have the domination of grassland (H), but also have a high amount of herbs (L2) like *Cardamine nymanii* (is: hrafnaklukka), *Ranunculus acris* (is: brennisóley), *Rhinanthus minor* (is: lokasjóður) and *Galium verum* (is: gulmaðra). Kiðey, Sellón, Hjallsey and Stakksey are islands that have the mosaique of grassland (H) and forb meadows (L2). Some few islands in this study are dominated by heathland (B) in which *Empetrum nigrum* (is: krækilyng), *Vaccinium uliginosum* (is: bláberjalyng) and *Dryas octopetala* (is: holtasóley) (in basic-rich areas) are the most common species. Ólafsey, Arnarey, Litli and Stóri Sindingahólmi and parts of Landey are dominated by heathland (B). Other islands are more fertile and usually have a mix of different grass species, tall plants like *Angelica archangelica* (is: ætihvönn), *Carex lyngbyei* (is: gulstör) and/or *Leymus arenarius* (is: melgresi) and other species enjoying high levels of nutrients like *Matricaria maritima* (is: baldursbrá), *Stellaria media* (is: haugarfi) and *Cochlearia officinalis* (is: skarfakál). Ljótunshólmi, Loðinshólmi, Vatnsey, Vatnseyjarkálfur, Lónið and Þorvaldsey are examples of such islands. Birdlife was often rich (high score of birdlife index) in islands like those.

The number of plant species varies from eight in Loðinsholmi and Lónið til 100 in Landey. If we would have more time, we probably would find even more species in Landey and other species-rich islands. Why the big differences in vegetation types and number of plant species? One obvious factor is the size of the islands. Larger islands have in general more species than smaller island because of greater complexity in factors like vegetation type diversity, bedrock composition and topography. Other factors that clearly affect the variation in vegetation types and number (and composition) of plant species are birdlife activity, grazing activity and the depth and quality (nutrients) of the layer of soil. In this project, we found some clear trends regarding these factors:

Characteristics of vegetation in areas with high-density of breeding birds:

- The birds fertilize the soil with nutrition (nitrogen)
- Grass-domination (*Festuca richardsonii* and *Poa pratensis*)
- Some few other plant species like *Cochlearia officinalis, Matricaria maritima, Leymus arenarius* and *Angelica archangelica* (nitrophile species)
- The vegetation is often marked by erosion (puffin digging holes)
- No *ericales* (bad tolerance for nitrogen)

Characteristics of vegetation in non-grazedvs. Grazed areas:

- A weak (but up-coming?) overgrowing effect
- You will find trees (*Betula pubescens, Salix* spp.)
- Some species tend to be dominant. *Angelica archangelica, Salix* spp.*, Betula pubescens, Carex lyngbyei* (wet areas) or *Leymus arenarius* (sand-influenced areas)
- Higher species diversity (some species the sheep like very well and will be eaten)
- Heavy grazed islands are often much more grass-dominated

Characteristic of vegetation in areas with thin layer of soil:

- Vegetation dominated by mosses (*Racomitrium* spp.), *Empetrum nigrum*, *Alchemilla alpina*, *Festuca vivipara*, *Dryas octopetala* (basic ground) and *Luzula multiflora*.
- Vegetation cover is often less than 50%. Stones or solid rocks dominates
- Little chance of overgrowing

To conclude, this project documents a great diversity and variation in vegetation types and number (and composition) of plant species among the 22 islands mapped in Breiðafjörður, West-Iceland. The main factors affecting the variations are birdlife activity that will provide the vegetation with nutrients, the grazing intensity by the sheep (and some horses) that will maintain grassland and prevent overgrowth of species like *Angelica archangelica, Salix spp.* and *Betula pubescens,* and the fact that changes in land-use affect the dynamic of vegetation types.

To maintain a high diversity in vegetation types and species of plants it is important to find a balanced grazing intensity in those islands that require management. High grazing intensity will lead to grass-dominated grassland with few herb species and possibly soil erosion. Low (or no) grazing intensity will lead to domination of some few tall herbs, *Salix spp.* and/or *Betula pubescens* as overgrowing species, or at least potential overgrowing species. Furthermore, climate change can accelerate overgrowing processes. Breiðafjörður is very similar to the archipelago of Helgeland, Norway. The change in land-use related to the vacating of many islands of Helgeland during 1950-1980 led to a tremendous and highly perceptible overgrowing of the culture landscape. People left and with the sheep and other grazing animals removed from the islands, overgrowing started, many bird species disappeared and the diversity of plant species and vegetation types were highly reduced (Aune & Carlsen 2011, Carlsen et al. 2011, 2013). Vega archipelago got its UNESCO world heritage status in 2004 because of the unique values in the culture landscape and because of the unique tradition of eider farming. After 2004 the overgrowing process stopped and was reversed. People reintroduced sheep to the islands that used to be grazed and people started to harvest grassland islands again. There was also a recovery of eider farming and down collecting. Management plans were written to ensure the restoring to be optimal in case of biodiversity and grazing capacity (i.e. Carlsen et. al 2009, Carlsen & Bär 2016, 2018) and the unique values in the culture landscape seems to be ensured for the future. The link between Vega and Breiðafjörður is conspicuous with the similarity in the unique archipelago with thousands of islands, islets and skerries, the unique culture landscape, the high diversity of plants and birds, the tradition of eider farming, the history of land use and so on. Breiðafjörður was put on the tentative list of UNESCO in 2011 (http://whc.unesco.org/en/tentativelists/5585/) and has the outstanding universal values (OUV) needed to become a world heritage site. To manage and take care of the great values in the culture landscape of Breiðafjörður, land use has to continue in terms of grazing. To find the perfect balance of optimal grazing, research is needed to document effects to vegetation types and plant and bird biodiversity.

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Internet URL:

Já hf: www.ja.is

Loftmyndir ehf: www.map.is

Flóra Íslands: www.floraislands.is

Appendix 1. List of plants found in islands of Breiðafjörður

Latin	Íslendsk	Kiðey	Sellón	Lyngey	Sellátur	Hjallsey	Stakksey	Landey	Ljótunshólmi	Loðinshólmi	Vatnsey	Lónið	Gimburey	Þorvaldsey	Melrakkaey	Elliðaey	Vaðstakksey	Arnarey	Vaktarholmi	Ólafsey	Stóri Sindigahólmi	Litli Sindingahólmi	Galtarey
Achillea millefolium	Vallhumall							1															
Agrostis capillaris	Hálíngresi					1		3							3	3	2	1		2		1	2
Agrostis stolonifera	Skriðlíngresi		1	1	1			2	1	1						1		1		1		1	
Agrostis vinealis	Týtulíngresi					1																	
Alchemilla alpina	Ljónslappi							2										1	1	3	1		
Alchemilla filicaulis filicaulis	Hlíðamaríustakkur	1					1	1										1		1			
Alchemilla sp	Maríustakkur sp																			1			
Alchemilla wichurae	Silfurmaríustakkur																	1					
Angelica archangelica	Ætihvönn	2	1	1	1	1	1	1	1		3	3	1	1	3	1	1	1	1	1	2		1
Angelica sylvestris	Geithvönn						1	1											3		3	3	1
Anthoxanthum odoratum	Ilmreyr	3	3	3		2	3	2								1		2	1		1		2
Arctostaphylos uva-ursi	Sortulyng							1															
Armeria maritima	Geldingahnappur	1		1	2	1		1								1	1	1	1	1	1	1	1
Atriplex glabriuscula	Hrímblaðka		1	1	1	1		1		2	1		1	1		1		1	1	1		1	1
Avenella flexuosa	Bugðupuntur	2	2	2		1	3	1										3	3	1	3	3	2
Betula pubescens	Birki							1										1	1				
Bistorta vivipara	Kornsúra	1		1			1	1														1	
Botrychium lunaria	Tungljurt	1	1	1	1		1	1										1	1	1			
Calamagrostis stricta	Hálmgresi		1			1		1						1	1	1		1		1	1		
Callitriche palustris	Vorbrúða															1							
Caltha palustris	Hófsóley		1					1															
Cardamine nymanii	Hrafnaklukka	3	3	3	1	2	3	2							1	1		3	2	1	1	1	2
Carex bigelowii	Stinnastör	1	1	1	2		1	1												1			
Carex canescens	Blátoppastör																	1					
Carex capillaris	Hárleggjastör			1				1										1					
Carex lyngbyei	Gulstör	1	1	1	3	2		1			3	3	2	3	1	3	1			1			
Carex maritima	Bjúgstör			1																			
Carex nigra	Mýrastör	1	1	1	1	1	1	1					1	1	1	1		1		1	1	1	1
Carex nigra x lyngbyei	Mýrastör x gulstör												2	2									
Carex panicea	Belgjastör			1									1	1				1					
Carex pilulifera	Dúnhulstrastör			1																			
Carex rariflora	Hengistör	1	1	1		1		1								1				1			
Carex sp.	Stör sp	1																					
Carex vaginata	Slíðrastör					1		1										1	1	1	1	1	
Cerastium alpinum	Músareyra	1	1	1		2	1	1										1					
Cerastium fontanum	Vegarfi	1	1	2		1	1	2					2	1	1	2	1	2	1	1	1	1	2
Cochlearia officinalis	Skarfakál	1	1		1		1		1	3	1	2	1	1	1	1	1		1		1	1	1
Coeloglossum viride	Barnarót																		1				
Cystopteris fragilis	Tófugras	1						1										1					
Deschampsia caespitosa	Snarrótarpuntur	1						1							1		1			1	1		
Draba incana	Grávorblóm	1	1	1	1	2	1	2								1		1	1	1	1		1
Draba norvegica	Hagavorblóm							1												1			1
Draba verna	Vorperla						1	1										1					
Drosera rotundifolia	Sóldögg																			1			
Dryas octopetala	Holtasóley							1											1	3	1	1	
Empetrum nigrum	Krækilyng					1	1	2										3	3	3	3	3	
Epilobium palustre	Mýradúnurt							1												1			1
Equisetum arvense	Klóelfting							2								1		1					
Equisetum fluviatile	Fergin							1															

Latin	Íslendsk	Kiðey	Sellón	Lyngey	Sellátur	Hjallsey	Stakksey	Landey	Ljótunshólmi	Loðinshólmi	Vatnsey	Lónið	Gimburey	Þorvaldsey	Melrakkaey	Elliðaey	Vaðstakksey	Arnarey	Vaktarholmi	Ólafsey	Stóri Sindigahólmi	Lilti Sindingahólmi	Galtarey
Equisetum pratense	Vaffelfting	1	1	1	1		1	1					1					1		2	1		
Eriophorum angustifolium	Klófífa	1	1	1		1		2								1		1		2	1		
Eriophorum scheuchzeri	Hrafnafífa																	1					
Erigeron borealis	Jakobsfífill		1	1			1	1										1	1	1			
Euphrasia frigida	Augnfró			1				1							1	1			1	1		1	
Festuca ovina ?	Saudvingull ?	1		1		1		2								1							1
Festuca richardsonii	Túnvingull	1	2	2	3	3	2	2	3	3	3	3	2	2	2	3	2	1	1	1	1	1	2
Festuca vivipara	Blávingull	2		1		1	1	2								1		1	1	3	1	2	1
Filipendula ulmaria	Mjaðjurt							1															
Galium normanii	Hvítmaðra	2	1	2	1	1	2	1										1	1	1	1	1	
Galium uliginosum	Laugamaðra			1																			
Galium verum	Gulmaðra	2	2	2		1	2	1							1	1	1	2	2	1			2
Gentianella amarella	Grænvöndur							1								1				1			
Gentianella aurea	Gullvöndur																	1					
Gentianella campestris	Maríuvöndur		1	1	1			1										1		1			
Geranium sylvaticum	Blágresi																	1	1				1
Hieracium spp.	Undafífill	1		1				2							1	1	1	1	1	1	1	1	1
Hierochloë odorata	Reyrgresi	2	1	2		1	2												1		1		1
Hippuris vulgaris	Lófótur	1			2			1								1							
Honckenya peploides	Fjöruarfi	1		1		1		1	1				1	1		1							
Huperzia selago	Skollafingur																			1			
Juncus alpinus	Mýrasef																			1			
Juncus articus	Hrossanál	1						1												1			
Juncus bufonius	Lækjasef							1								1	1						
Juncus filiformis	Þráðsef		1	1												1					1		
Juncus trifidus	Móasef							1												1			
Juniperus communis	Einir																	1	2				
Kobresia myosuroides	Þursakjegg							2															
Koenegia islandica	Naflagras							1												1			
Lathyrus japonicus	Baunagras																	2	1		1		
Leontodon autumnalis	Skarifífill	1		1				2								3				1	1		
Leymus arenarius	Melgresi	1			1	1	1	1	3	1	2	3			1	1	1	1	1				1
Ligusticum scoticum	Sæhvönn			1		1	1	1										1		1	1	1	1
Linum catharticum	Villilín																	1		1			
Luzula multiflora	Vallhæra	2	2	2	1	2	1	3							1	1		2	1	3	1	1	
Luzula spicata	Axhæra	1	1	1		1	1	1										1	1	1		1	1
Matricaria maritima	Baldursbrá		1	1	1	1	1	1		2	1	1	1	1	1	1	1	1	1	1	2	1	1
Matricaria matricarioides	Hlaðkolla																2						
Menyanthes trifoliata	Horblaðka							1												1			
Mertensia maritima	Blálilja		1			1		1					1	1									
Minuartia rubella	Melanóra					1		1															
Montia fontana	Lækjagrýta	1																					
Myosotis arvensis	Gleym-mér-ei	1	1	1			1	1								1		1					2
Myosotis stricta	Sandmunablóm	1		1		1	1	1										1					
Nardus stricta	Finnungur																	1		1			
Oxyria digyna	Ólafssúra																	1					
Parnassia palustris	Mýrasóley							1												1			
Picea sitchensis	Sitkagreni																		1				
Pinguicula vulgaris	Lyfjagras							1										1		1			

Latin	Íslendsk	Kíðey	Sellón	Lyngey	Sellátur	Hjallsey	Stakksey	Landey	Ljótunshólmi	Loðinshólmi	Vatnsey	Lónið	Gimburey	Þorvaldsey	Melrakkaey	Elliðaey	Vaðstakksey	Arnarey	Vaktarholmi	Ólafsey	Stóri Sindigahólmi	Litli Sindingahólmi	Galtarey
Pinus contorta	Stafafura																		1				
Plantago lanceolata ?	Selgresi ?	1		1			1						1										
Plantago maritima	Kattartunga	1		1	1	1	1	1			1	2	1			1		1	1	1	1	1	1
Poa alpina	Fjallsveifsgras					1										1							
Poa pratensis	Vallarsveifgras	2	2	1	2	3	1	3	3	3	3	3	3	3	3	1	3	1	1	1	1	1	1
Polypodium vulgare	Köldugras	1																1	1				
Populus trichocarpa	Alaskaösp																		1				
Potentilla anserina	Tágamura	1	2	1	3	1		1					1	1	1	2		1		1		1	1
Potentilla cranzii	Gullmura				1			1										1		1		1	
Potentilla palustris	Engjarós	1	1			1		1										1		1	1		
Puccinellia maritima	Sjávarfitjungur			1																			
Puccinellia retroflexa	Varpafitjungar																	1					
Ranunculus acris	Brennisóley	1		1	1	1	1	1	1		1		1	1	1	1		2	1	1	1		1
Ranunculus hyperboreus	Trefjasóley															1	1						
Ranunculus reptans	Flagsóley							1															
Rhinanthus minor	Lokasjóður	1	1	1	1		1	1					1		1	1		2	1	1	1	1	2
Rhodiola rosea	Burnirót	1															1	1	1	1	1	1	1
Rorippa islandica	Kattarjurt							1									1						
Rubus saxatilis	Hrútaber																	1	1				
Rumex acetosa	Túnsúra	3	2	2	1	2	1	2	1				2	2	1	2	2	2	1	1	1	1	1
Rumex longifolius	Njóli		1	1	2		1	1	1		2		1	1	1	1	2						1
Sagina nodosa	Hnúskakrækill			1				1								1	1		1	1	1	1	1
Sagina procumbens	Skammkrækill															1		1					
Sagina subulata	Broddkrækill			1				1												1			1
Salix arctica	Fjallavíðir							1										1					
Salix herbacea	Grasvíðir	1	1	1			1	2										1	2	1	1	1	1
Salix lanata	Loðvíðir							1											1				
Salix phylicifolia	Gulvíðir						1	1											2			1	
Salix sp.	Víðir sp																				1	1	
Saxifraga cespitosa	Þúfusteinbrjótur						1	1										1	1		1	1	
Saxifraga rivularis	Lækjasteinbrjótur	1																					
Saxifraga rosacea	Toppasteinbrjótur			1			1	1															
Saxifraga sp	Steinbrjótur sp																			1			
Sedum acre	Helluhnoðri		1	1			1	1										1	1		1	1	1
Silene acaulis	Lambagras		1	1		1	1	1										1		1		1	
Silene uniflora	Holurt	1	1	1		1	1	1	1				1			1	1	1			1		1
Spectabilia sp.	Túnfífill sp.						2						1	1				1					
Stellaria media	Haugarfi	1	1	1	1			1	2	1	2		2	1		1	3						
Taraxacum crosea	Túnfífill sp.	1	1	2	1		1						1	1				1					
Taraxacum spp.	Túnfífill	2		1		1	1	1	1				1	1	1	1			1		1		1
Thalictrum alpinum	Brjóstagras			1			1	1										1	1	1	1		
Thymus praecox ssp. arcticus	Blóðberg	1		1		2	1	2								1		2	1	2	1	1	1
Trichophorum cespitosum	Mýrafinnungur		2	3			1	1										1					
Vaccinium uliginosum	Bláberjalyng							1										3	3	1	3	3	
Vicaria alpina	Ljósberi																	1					
Vicia cracca	Umfeðmingur																						2
Viola canina	Týsfjóla		1	1				1								1		1		1			
Viola palustris	Mýrfjóla		1	1	1			1												1			
Viola tricolor	Þrenningarfjóla		1	1														1					

Appendix 2. List of birds found in the different islands during breeding season

Bird species [a]	Íslenska	Kiðey	Sellón	Lyngey	Sellátur	Hjallsey	Stakksey	Landey	Ljótunshólmi	Loðinshólmi	Vatnsey	Lónið	Gimburey	Þorvaldsey	Melrakkaey	Vaðstakksey	Elliðaey
Puffin	Lundi	-	-	-	B	-	-	-	B	B	B	B	B	B	B	B	>4000
Black guillemot	Teista	-	-	-	B	2	B	10	-	-	-	-	-	B	B	B	5-7
Great black-backed gull	Svartbakur	15	10	B	1-3	2	1	20-30	-	-	-	-	-	1	B	B	5
Glaucous gull	Hvítmáfur	-	-	-	-	-	-	B	-	-	-	-	-	-	-	B	1
Lesser black-backed gull	Sílamáfur	50	B	5	B	4	3	>600	-	1	-	-	B	-	B	B	3
Herring Gull	Silfurmáfur	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Common gull	Stormmáfur	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
Kittiwake	Rita	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<600
Black-headed gull	Hettumáfur	5-10	-	-	16	-	1	-	-	-	-	15	-	-	-	-	-
Arctic skua	Kjói	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Artic tern	Kría	-	30-50	-	B	50	-	10-15	-	-	-	>100	-	50-70	-	-	100
Fulmar	Fýll	30	-	20	B	-	20	30	-	-	-	-	-	-	-	B	B
Common eider	Æður	B	50	B	B	B	B	B	?	>20	B	30-50	>20	50	B	B	100
Mallard	Stokkönd	-	-	-	B	-	-	2	-	-	-	-	-	1	-	-	1
Red-breasted merganser	Toppönd	-	-	-	-	-	-	-	-	-	B	-	-	-	-	-	-
Eurasian wigeon	Rauðhöfði	-	-	-	B	-	-	-	-	-	-	B	-	1	-	-	-
Eurasian teal	Urtönd	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
Greylag goose	Grágæs	B	5	5	B	1	3	10-15	-	1	-	-	B	B	B	B	10
Oystercatcher	Tjaldur	B	2	B	B	2	5	10-15	-	-	-	B	B	B	B	?	>5
Common Redshank	Stelkur	B	B	B	B	-	-	B	-	-	-	B	-	B	-	?	B
Common snipe	Hrossagaukur	B	B	-	B	-	-	10-20	-	-	-	-	-	B	B	?	B
Red-necked phalarope	Óðinshani	B	B	-	B	-	-	-	-	-	-	-	-	B	-	-	B
Common ringed plover	Sandlóa	-	B	-	B	B	-	2	-	-	-	-	-	-	-	-	1-2
Dunlin	Lóuþræll	-	B	-	B	-	-	B	-	-	-	-	-	B	-	-	?
Whimbrel	Spói	-	-	-	-	-	-	5	-	-	-	-	-	-	-	-	-
Black-tailed godwit	Jaðrakan	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
Snow bunting	Snjótittlingur	B	?	-	B	?	-	B	-	-	-	-	-	B	?	B	B
Meadow pipit	Þúfutittlingur	B	B	-	B	?	-	B	-	-	-	-	-	B	?	?	B
White wagtail	Maríuerla	B	B	B	B	B	B	B	-	-	-	-	-	B	?	?	B
Eurasian wren	Músarindill	-	-	-	-	-	-	B	-	-	-	-	-	-	-	?	?
Northern wheatear	Steindepill	B	-	-	-	-	-	B	-	-	-	-	-	-	?	?	B
Common starling	Stari	-	-	-	-	-	B	B	-	-	-	-	-	-	-	-	-
Common Raven	Hrafn	-	-	-	-	-	-	-	-	-	-	-	-	-	-	B	1
European Shag	Toppskarfur	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
Red throated diver	Lómur	-	-	-	B	-	-	-	-	-	-	B	-	1	-	-	1-3
Birdlife index [b]		M	M	M	H	M	M	H	L-M	M	M	H	M	M-H	L-M	M-H	L-M

[a] The bird species found in the different islands are either:
non-breeding (-), breeding, number of pairs uncertain (B), breeding, number of pairs given as count (i.e. 5, 5-10, >5 [more than 5]), status unknown (?)

[b] Birdlife index: low (L), medium (M), high (H). Islands that we gave birdlife index “Low” is not included in this attachent

NOTATER

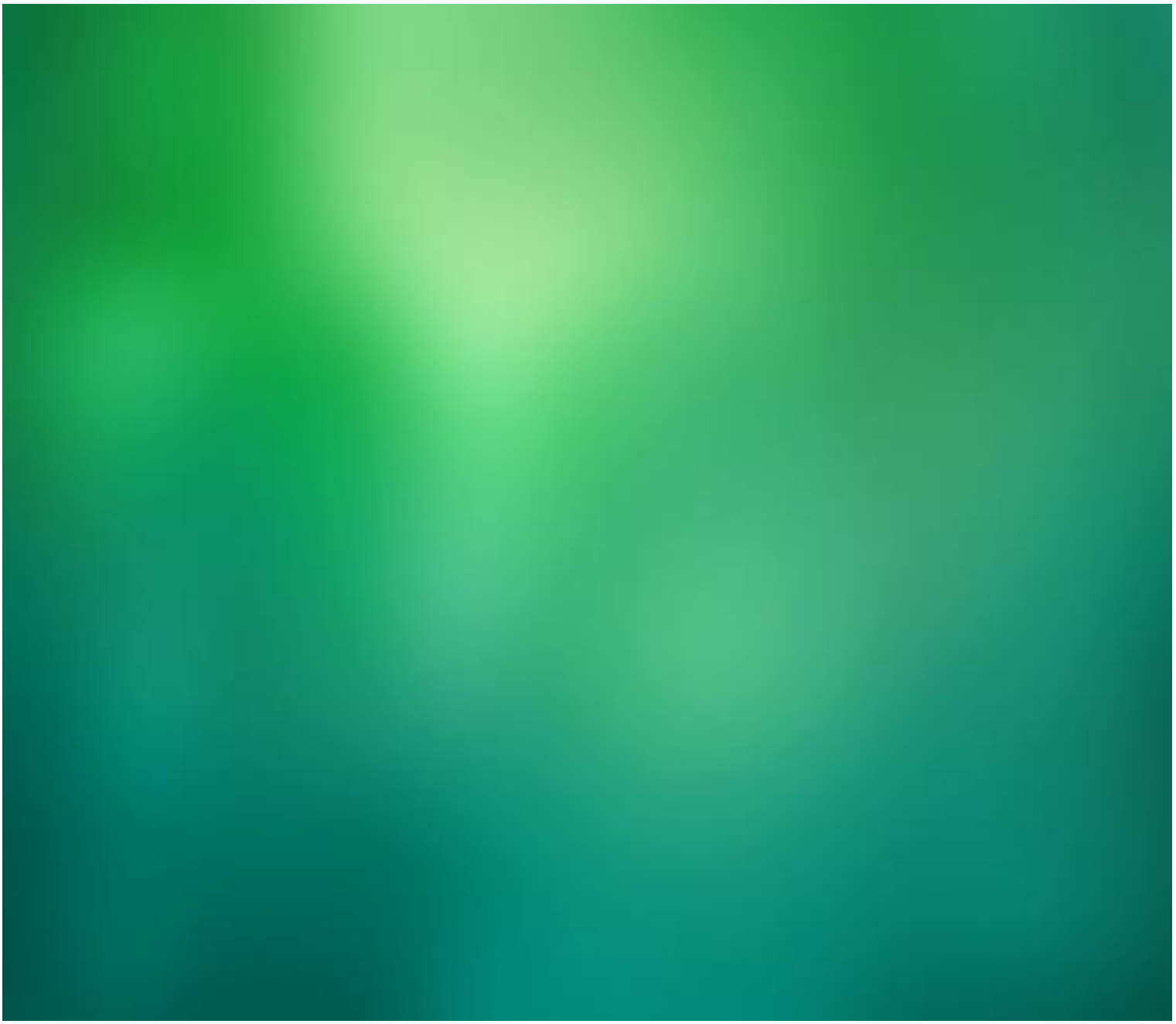
NIBIO
NORSK INSTITUTT FOR BIOØKONOMI

Norsk institutt for bioøkonomi (NIBIO) ble opprettet 1. juli 2015 som en fusjon av Bioforsk, Norsk institutt for landbruksøkonomisk forskning (NILF) og Norsk institutt for skog og landskap.

Bioøkonomi baserer seg på utnyttelse og forvaltning av biologiske ressurser fra jord og hav, fremfor en fossil økonomi som er basert på kull, olje og gass. NIBIO skal være nasjonalt ledende for utvikling av kunnskap om bioøkonomi.

Gjennom forskning og kunnskapsproduksjon skal instituttet bidra til matsikkerhet, bærekraftig ressursforvaltning, innovasjon og verdiskaping innenfor verdikjedene for mat, skog og andre biobaserte næringer. Instituttet skal levere forskning, forvaltningsstøtte og kunnskap til anvendelse i nasjonal beredskap, forvaltning, næringsliv og samfunnet for øvrig.

NIBIO er eid av Landbruks- og matdepartementet som et forvaltningsorgan med særskilte fullmakter og eget styre. Hovedkontoret er på Ås. Instituttet har flere regionale enheter og et avdelingskontor i Oslo.



Forsidefoto: Thomas Holm Carlsen

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