Ágrip erinda og veggspjalda

# VistÍs / EcoIce

16. mars 2018
Í fundarsal Hafrannsóknastofnunar
Skúlagötu 4 í Reykjavík

Vistfræðifélag Íslands

# Vistfræðifélag Íslands

Vistís 2018 / EcoIce 2018
Ágrip erinda og veggspjalda

## Stjórn Vistfræðifélags Íslands

Ingibjörg Svala Jónsdóttir, formaður
Tómas Grétar Gunnarsson, varaformaður og ábm. félagsskrár
Gísli Már Gíslason, gjaldkeri
Ágústa Helgadóttir, vefsíðustjóri
Borgný Katrínardóttir, ritari
Erpur Snær Hansen, meðstjórnandi
Jóhann Þórsson, meðstjórnandi

## Undirbúningsnefnd

Agnes-Katharina Kreiling
Anja Nickel
Erpur Snær Hansen
Hildur Magnúsdóttir
Ingibjörg Svala Jónsdóttir
Katrín Björnsdóttir
Theresa Henke

## Vísindanefnd

Borgný Katrínardóttir
Erpur Snær Hansen
Ingibjörg Svala Jónsdóttir
Jóhann Þórsson
Tómas Grétar Gunnarsson

Ráðstefnan fer fram í fundarsal Hafrannsóknastofnunar að Skúlagötu 4 í Reykjavík
Hafrannsóknastofnun er þakkað fyrir rausnarlegan stuðning við ráðstefnuna.

Mynd á forsíðu: Guðrún Lára Pálmadóttir
Umbrot: Snorri Páll Davíðsson (*spd@gresjan.is*)

# Ágrip erinda / Presentations abstracts

## E1 Effects of environmental factors on rockweed (*Ascophyllum nodosum*) in Breiðafjörður, Iceland

**Lilja Gunnarsdóttir**
*Hafrannsóknastofnun*
lilja.gunnarsdottir@hafogvatn.is

Rockweed (*Ascophyllum nodosum*) has been harvested commercially in Breiðafjörður since 1975. Plans to increase harvesting create need for information on growth, biomass and distribution. The aim of this study was to determine effects of physical factors on plant size and biomass. Biomass and plant height were determined at 37 stations in Breiðafjörður. Mean biomass of rockweed in Breiðafjörður was 13.5 kg m-2. Biomass and plant height were significantly related to location. Biomass increased from southwest towards northeast in the fjord. Plant height was inversely related to exposure. The relationship between location, rockweed biomass and plant height is likely explained by different local conditions. Mean biomass of rockweed is high in Breiðafjörður, which is close to the northern distribution limits, where rockweed has a relatively slow growth rate and lacks efficient grazers.

## E2 Ecological impact of the invasive European flounder (*Platichthys flesus*) on European plaice (*Pleuronectes platessa*) on nursery grounds in Iceland

**Theresa Henke**[1,2] og Guðbjörg Ásta Ólafsdóttir[1]
[1] *University of Iceland, Research Centre of the Westfjords*
[2] *University Centre of the Westfjords*
theresa16@uw.is

In recent years the number of alien species that have been introduced to new environments have strongly increased, and their further distribution may be favored by both anthropogenic influence and climate change. In 1999, the European Flounder (*Platichthys flesus*), a flatfish species native to central European coasts, was firstly identified in the southwest of Iceland at the mouth of the Ölfusa river and has since then spread around the country. This project investigated the ecological impact of P. flesus on the native European Plaice (*Pleuronectes platessa*) on nursery grounds. The work focused on two sampling sites representing early and more recent P. flesus establisment; the fjords Borgarfjörður and Önundarfjörður. Fish were caught with a beach seine between July and September 2017. Species composition and juvenile size was measured, and stomach content analysis was used to determine niche breadth of each species and overlap in feeding patterns between species. P. flesus was present in all collected samples, but both species composition and length distribution of P. flesus and P. platessa vary between sites and sampling time. The ecological impact of invasive species on native species is not only evident in potential competition for dietary resources between species but also in direct predation by P. flesus on juvenile P. platessa.

## E3 Trophic interactions of 0-group Atlantic cod and saithe. The effects of size and species on feeding patterns

**Anja Nickel**
*Westfjords/Iceland*
anja@hi.is

The settlement of juvenile fish from the pelagic to the shallow coastal waters is described as a critical stage during their ontogenetic shift, as growth in the first summer and fall may determine winter survival. After the settlement, juveniles of different species and size classes commonly share the same nursery grounds which can lead to inter- and intraspecific competition. Under a scenario of food limitation these competitive effects may effect growth, survival and ultimately year-class recruitment. The current study investigated the diet of 0-group Atlantic cod (*Gadus morhua*) and saithe (*Pollachius virens*) during the first six months after settlement. The fish were caught with a beach seine on a rocky shore in the North-West of Iceland during late summer and fall in 2015 and '16. Results from stomach content and stable isotope analysis revealed a high overlap in the trophic niche, indicating that both species are utilizing the same trophic resources. A clear shift in the diet of cod with increasing fish size and time reflect the settlement phase from the pelagic towards the benthic environment during September and October. The habitat choice for saithe, however, seemed to be driven by the size of the prey items. Thus, the prey size increased with increasing fish size, allowing the biggest individuals highest profitabilities in prey selection. The high trophic overlap during the settlement leads to a high potential for trophic interactions between Atlantic cod and saithe.

## E4 Seasonal changes in abundance of the indicator species Capitella capitata: a two-year study in the intertidal

**Sunna Björk Ragnarsdóttir**[1], Sölvi Rúnar Vignisson [2], Gunnar Þór Hallgrímsson[3] og Halldór Pálmar Halldórsson[4]
[1]*Náttúrustofa Suðvesturlands*
[2]*Þekkingarsetur Suðurnesja*
[3]*Háskóli Íslands*
[4]*Rannsóknasetur Háskóla Íslands á Suðurnesjum*
sunna@natturustofa.is

Ecological indicators are often used to assess the environment since direct documentation of ecosystem changes are often time-consuming and costly. The aim of using specific species as ecological indicators is to get a holistic picture of the health of specific areas or ecosystems with minimal effort. For this approach to be as robust as possible the ecology of the indicator species for the area under investigation must be well documented. The polychaete Capitella capitata is a well-known indicator species for organic pollution in soft sediments and is widely used to study pollution and disturbance. C. capitata is an opportunistic species which tolerates stressors like organic enrichment and other sediment conditions that are often avoided by other infauna species. The intertidal in Sandgerði was sampled monthly for two years to monitor abundance changes in the infauna. Here we focus on the abundance of C. capitata in relation to temperature and spatial scale to investigate if these factors influence the abundance both spatially and seasonally. C. capitata showed different affinity for areas of the intertidal. It was found in all sampled areas but only reached high abundance close to a sewage outlet. Peaks in abundance differ both between height intervals in the intertidal and in some cases between areas. Winter abundance was also different between years. It appears that many factors influence the abundance of C. capitata while distance from pollution source plays an important role in where the species can be found in high numbers year around. When C. capitata is used as an ecological indicator it is important to know how the species abundance changes over time to see if the effect of anthropogenic stressors can be distinguished from natural variation in abundance.

## E5 Lúsasmit á villtum laxfiskum við strendur Íslands

**Eva Dögg Jóhannesdóttir**[1,2] og Skúli Skúlason[2]
[1]*Háskólinn á Hólum*
[2]*Rorum ehf*
edj@rorum.is

Tvær tegundir svokallaðra sjávarlúsa finnast við Ísland, annars vegar laxalús (*Leophtheirus salmonis*) sem kýs helst laxfiska sem hýsla og hins vegar fiskilús (*Caligus elongatus*) sem er ekki eins vandlát á hýsil. Lýsnar eru krabbadýr sem lifa stærsta hluta lífsferils síns sem sníkjudýr utaná fiskum. Laxalúsin hefur átta þroskastig, fyrstu þrjú eru lirfustig sem lifa sem svif í sjó. Á hinum stigunum lifir hún á hýsli, fyrstu tvö stigin er hún föst á hýslinum en getur á seinni stigum fært sig um stað og einnig farið af hýslinum. Á hýslinum nærast lýsnar á á slími, húð og blóði hans sem hefur áhrif á saltjafnvægið í líkama hýsilsins sem og atferli. Einnig geta opnast leiðir fyrir sýkingar af völdum baktería og veira. Með eldi á laxfiskum í sjó hafa sjávarlýs aðgang að hýslum í meiri þéttleika en í náttúrunni. Eldisfiskar eru allt árið í sjó meðan villtur fiskurinn gengur að mestu í ferskvatn að hausti en lýsnar þola ekki ferskvatn. Þannig getur þeim fjölgað meira og sýkt bæði villtan fisk og eldisfisk í meira magni. Mikilvægt er því að vakta smit á villtum fiskum sem og eldisfiskum. Vöktun á lúsum í náttúrunni getur farið fram með rannsókn á svifi fyrir fyrstu þroskastig en veiða þarf villta fiska til að kanna seinni stigin. Reynsla á rannóknum sjávarlúsa hér á landi hefur nú skapast á Vestfjörðum. Í erindinu verður greint frá niðurstöðum þessara verkefna sem og fyrstu niðurstöðum úr rannsókn frá árinu 2017.

## E6 Foraging ecology of presumed herring-specialist killer whales (*Orcinus orca*) in Iceland

**Filipa Samarra** og Gísli Víkingsson
*Marine and Freshwater Research Institute*
fipsamarra@gmail.com

Killer whales are generalists as a species, however populations tend to specialise on specific prey types or even species. Prey choice is tightly linked to social organization and behaviour. As top predators, investigating the foraging ecology of killer whales is important to assess their role in marine ecosystems. In Iceland, observations of aggregations of killer whales in herring grounds led to suggestions of herring specialisation; however, this remained untested. Here, we present studies on the movement patterns and foraging ecology of killer whales using biopsy sampling combined with photo-identification. Of 327 identified whales, 45% were seen in both herring overwintering and spawning grounds, and were thus presumed to follow herring year-round. The remaining 55% were only seen seasonally, with some individuals observed moving to Scotland and preying upon seals and seabirds. Movement patterns correlated with isotopic niche variation, supporting herring specialisation in whales seen in both grounds but diversity in foraging strategies of whales only seen seasonally. Such diversity in movement patterns and prey preferences appears to be maintained over time likely as socially-learnt traditions. Future work identifying the factors driving these differences in movements and resource use will be relevant towards our understanding of how prey predictability may drive predator specialization.

## E7 Breytingar á útbreiðslu og fjölda hvala við Ísland undanfarna þrjá áratugi. Áhrif loftslagsbreytinga?

**Gísli Víkingsson**, Þorvaldur Gunnlaugsson og Sverrir D. Halldórsson
*Hafrannsóknastofnun*
sverrir.daniel.halldorsson@hafogvatn.is

Árið 1987 hófst samstarf þjóða við Norður Atlantshaf um víðtækar hvalatalningar (NASS). Síðasta talningin (2015-2016) var sú sjötta í talningaröðinni og er þessi gagnaröð ein sú umfangsmesta sem til eru um útbreiðslu hvala í heiminum. Umtalsverðar breytingar hafa orðið á fjölda og útbreiðslu ýmissa hvalategunda síðustu þrjá áratugi. Fjöldi langreyða á hafsvæðinu kring-

um Ísland (Mið Norður Atlantshafi) hefur aukist úr 15,200 í 39,300 og hnúfubak hefur fjölgað úr 1,800 í 9,800 á sama svæði. Þessar breytingar endurspegla líklega bæði vöxt í stofninum og tilfærslur í útbreiðslu vegna breyttra umhverfisskilyrða. Hrefnu fækkaði hins vegar mikið á landgrunnssvæðinu við ísland eftir síðustu aldamót eða frá 44,000 árið 2001 í 10,000 2009. Talningarnar 2009 (13,500 hrefnur) staðfestu þá fækkun, sem líklega er afleiðing af minnkuðu framboði mikilvægustu fæðutegundanna sandsíli og loðnu. Útbreiðsla steypireyðar hefur færst norðar samfara hækkandi sjávarhita á síðustu tveim áratugum. Þessar breytingar á útbreiðslu hvala eru ein birtingarmynd mikilla breytinga sem hafa átt sé stað í sjónum við Ísland undanfarna áratugi og lýsa sér m.a. í norðlægari útbreiðslu ýmissa fisktegunda og slæmum varpárangri sumra tegunda sjófugla við sunnanvert landið.

## E8 Northern bottlenose whales and humpback whales respond to experimental exposures of naval sonar with disruption of feeding and avoidance

**Paul J. Wensveen**
*Life and Environmental Sciences, University of Iceland*
*Sea Mammal Research Unit, University of St Andrews*
pjw@hi.is

High-intensity sonar is used by navies worldwide. Naval sonar and other anthropogenic noise is increasingly recognized as a form of marine pollution, although its effects on the acoustically-sensitive cetaceans are still poorly understood. Here I will present results from two large field studies on two species of cetacean that commonly occur in Icelandic waters, the humpback whale and northern bottlenose whale. A total of 25 individuals were instrumented with tags in waters north of Norway and north of Iceland and subsequently subjected to experimental exposures of naval sonar, to record potential changes in behavior before, during, and after sonar exposure. The tags used were either short-term, high-resolution multisensor tags (DTAGs), or medium-term position and depth-recording satellite tags. Cessations of feeding and avoidance of the sound source were common in both species; however, the magnitude of the responses was much greater in the bottlenose whales than in humpback whales. In the most extreme case, bottlenose whales at distances of up to 27 km from the source appeared to stop feeding and travel away from the exposure site for several hours. There were no indications that the distance to the source reduced the response intensity of the whales, an effect that has been observed in other beaked whales in areas with regular naval activity. I will discuss how the outcomes of these studies have direct influence on policies and management of underwater noise.

## E9 Genetic and phenotypic diversity in Arctic charr inhabiting lava caves near Lake Mývatn

**Bjarni K. Kristjánsson**[1], Katja Räsänen[2], Árni Einarsson[3], Moira Ferguson[4] og Camille Leblanc[1]
[1]*Department of Aquaculture and Fish Biology, Hólar University College, Sauðárkrókur, Iceland*
[2]*Department of Aquatic Ecology, Eawag, Dübendorf, Switzerland*
[3]*Mývatn Research Station, Mývatn, Iceland*
[4]*Department of Integrative Biology, University of Guelph, Guelph, Ontario, Canada*
bjakk@holar.is

Biodiversity may occur at multiple levels, including the intra-specific level. Within a species evolutionary and ecologically processes interact to shape the phenotypic and genetic structure of natural populations. To understand how different factors shape biodiversity scientists can compare a high number of related populations, and/or temporally monitor several populations, where the effects of ecological changes on phenotypic and genetic diversity is tracked.

We have studied phenotypic and genetic diversity of Arctic charr (*Salvelinus alpinus*) across six years and twenty lava caves around Lake Mývatn, Iceland. We have used markrecapture studies, population genetics and morphological measurements to follow important traits across populations and years. At the same time we have monitored important ecological factors. We discuss our findings on phenotypic and genetic diversity, how the two are related and how phenotypic changes over years may be related to key ecological factors.

## E10 Notkun staðsetningartækja til að kortleggja ferðir sauðfjár í sumargöngu

**Bryndís Marteinsdóttir**[1], Kristín Svavarsdóttir[1], Adam Hoffritz[2,3] og Þóra Ellen Þórhallsdóttir[2]
[1]*Landgræðsla ríkisins*
[2]*Háskóli Íslands*
[3]*Rorum ehf*
bryndis@land.is

Rannsóknir á beitaráhrifum sauðfjár kalla á mat á því hvernig féð nýtir landið, í hvaða gróðurlendi það sækir helst og á hvers konar svæðum það heldur sig. Bændur búa yfir töluverðri þekkingu á hegðun sauðfjár í sumarhögum en aðeins örfáar beinar rannsóknir hafa verið gerðar hérlendis á ferðum og beitarhegðun þess. Þar sem sauðfé heldur sig oft fjarri byggð hefur verið erfitt og kostnaðarsamt að afla slíkra upplýsinga. Á seinustu árum hafa komið á markað tiltölulega ódýr staðsetningartæki fyrir búfénað sem gera það kleift að fylgjast nákvæmlega með sauðfé í sumarhögum. Árið 2017 voru slík tæki fest á 15 kindur sem ganga á Skeiðarársandi með það að markmiði að kortleggja ferðir kindanna yfir sumarið og tengja þær upplýsingar við gróðurkort. Fyrstu niðurstöður sýna að kindurnar dreifast víða um þetta mikla flæmi. Hver kind hefur sitt heimasvæði sem spannar frá tugum upp í hundruði ferkílómetra. Kindurnar halda sig að mestu á lítt grónum svæðum en sækja þó að einhverju marki í betur gróna bletti. Rannsókn okkar gefur til kynna að staðsetningartæki á sauðfé sé öflug leið til að kanna notkun fjár í sumarhögum og er ljóst að þau geta aukið þekkingu okkar á samspili sauðfjár og gróðurs til muna, en slík þekking er grunnur að bættri beitarstjórnun og sjálfbærri landnýtingu. Áætlað er að nýta þessa rannsókn sem grunn að stærra verkefni í samstarfi við bændur um allt land til að kortleggja ferðir sauðfjár í sumarhögum og tengja upplýsingarnar við gróðurfar og aðra umhverfisþætti.

## E11 Skeiðarársandur frá landnámi fram til 1500

**Þóra Ellen Þórhallsdóttir**[1] og Kristín Svavarsdóttir[2]
[1]*Líf- og umhverfisvísindastofnun Háskóla Íslands*
[2]*Landgræðsla ríkisins*
theth@hi.is

Sveitirnar sunnan Vatnajökuls hafa verið vettvangur hrikalegra náttúruhamfara og líklega hefur enginn hluti Íslands breyst jafnmikið frá landnámi. Saga mannlífs í Öræfum hefur verið rakin af rituðum heimildum og fornminjum, jöklabreytingar hafa verið kortlagðar og saga Skeiðarárhlaupa og eldvirkni í Grímsvötnum tekin saman. Hins vegar hefur ekkert verið birt um gróðurbreytingar á Skeiðarársandi en ólíklegt er að þar megi lesa sögu umhverfisbreytinga úr jarðvegi. Við höfum nýtt miðaldaheimildir, m.a. Íslenskt fornbréfasafn og annála, og náttúruvísindalegar rannsóknir til að varpa ljósi á gróður, búsetu og umhverfi á Skeiðarársandi frá fyrstu öldum byggðar og fram til 1500.

Við landnám var Skeiðarárjökull líklega um 10 km styttri en undir lok litlu ísaldar. Megináin, Jökulsá, féll fram um miðjan sand eða nokkru vestar. Á flatlendinu vestan núverandi bæjarraðar í Öræfum voru a.m.k. ellefu bæir. Á austanverðum Skeiðarársandi voru víðáttumiklir birkiskógar og verðmætar engjar, þ.e. votlendi við og á milli jökulkvísla frá Öræfajökli. Vestast á sandinum voru nokkrir bæir. Sumir bæir á sandinum austanverðum voru endurreistir eftir gosið 1362 en um 1500 voru þeir komnir í eyði. Mestur hluti sandsins hefur aldrei verið byggður.

Verkefnið er hluti af viðameiri rannsóknum á umhverfisbreytingum á Skeiðarársandi en þær taka m.a. til gróðurframvindu á sl. áratugum og þróunar vistkerfa, landnámis birkis og áhrifa umhverfisþátta s.s. hlýnandi loftslags og búfjárbeitar, á vistkerfi sandsins.

## E12 Distribution of cow parsley in Reykjavik

**Mervi Orvokki Luoma**[1], Mariana Tamayo[1] og Snorri Sigurðsson[2]
[1]*Háskóli Íslands*
[2]*Reykjavíkurborg*
Snorri.Sigurdsson@reykjavik.is

Purpose of the research is to map the distribution of cow parsley (*Anthriscus sylvestris*), an invasive alien plant, within open areas of the City of Reykjavik. The aim is to identify hot spot

areas with a high abundance of cow parsley. These areas have a high risk of losing native plant species due to the spread of cow parsley. Cow parsley is widely spread throughout Iceland, often creating monocultures that supplant other flora and can enhance soil erosion. It also changes landscape aesthetics. During the summer of 2017, areas with cow parsley were categorized in terms of the plant communities present, type of land, and other plant species that are found growing in the vicinity of cow parsley. The distribution and abundance of cow parsley was assessed in four plot areas; Laugarnes, Vatnsmýri, Elliðaárdalur, and Ægisíða. Preliminary results suggest that cow parsley is most abundant near riversides and streams in Elliðaárdalur and Vatnsmýri, and grasslands and pathways in Laugarnes. Lack of control measures enables further spreading of the plant species, and affects plant diversity. This research generates much needed information on the distribution and impact of cow parsley in the City of Reykjavík. Additionally, it provides baseline data to monitor future changes in distribution and species composition. Furthermore, this is the first time that cow parsley is mapped in the City of Reykjavik, which is essential for developing management and planning actions.

## E13 Impacts of forestry on Icelandic wildlife: do birds avoid forests?

**Aldís Erna Pálsdóttir**[1,2], José A. Alves[1], Jenny Gill[0,3] og Tómas Grétar Gunnarsson[1,2]
[1]*South Iceland Research Center*
[2]*University of Iceland, Faculty of Life and Environmental sciences*
[3]*University of East Anglia*
tomas@hi.is

Many wader populations are declining in the world and it is urgent to conserve the habitat of these species. Birds need a certain amount of area for their territory and sometimes a different habitat for raising their young. Habitat fragmentation is when a continuous area of habitat is separated into smaller units. Forestry is one form of habitat fragmentation for open-habitat species and forestry is widespread in the Icelandic lowlands which is the most important area for many wader populations. Increasing forestry can have a negative effect on the nesting of these species which in turn can affect the breeding output and ultimately the population size. The diverse landscape of Iceland supports a very high number of waders and large proportions of several bird populations such as golden plover (52%) and whimbrel (40%). In this study birds were counted on transects adjacent to forestry plots to examine if common land birds avoid forest or are drawn to them during their nesting period. Species showed variable responses, where most waders and meadow pipit avoided forest edges while other species such as redwing and snipe are drawn to forests.

## E14 A novel approach to estimating carbon loss from drained peatlands in Iceland

**Gunnhildur E. Gunnarsdóttir** og Hlynur Óskarsson
*Landbúnaðarháskóli Íslands*
gunnhildur@lbhi.is

In the last century, the conversion of peatlands to grasslands through drainage was a popular method employed in Iceland to increase agricultural yields. Peatland drainage leads to the release of carbon dioxide into the atmosphere, thereby contributing to global climate change. According to Iceland´s National Inventory Report to the UN climate treaty, the greatest single source of greenhouse gas emissions in Iceland comes from drained land. Only limited research has been done to estimate carbon loss from drained peat soils in Iceland. In this study we introduce a new approach for estimating carbon loss from uncultivated peat soils by using carbon stock changes in conjuntion with tephrochronology. Samples were collected in 11 peatland sites in South and Southwest Iceland that had parts that were drained and parts that were unaffected by drainage. Carbon stocks were estimated using carbon content and bulk density in reference to the depth down to a specific volcanic tephra layer. The difference in carbon stocks between the wet and well-drained areas represented carbon loss since drainage. The results were on par with other studies in Iceland and elsewhere in the boreal climate zone, supporting further use of the presented method. They confirm that carbon loss has been ongoing since drainage.

## E15 The effect of whole stream warming on invertebrate drift in Arctic streams

**Gísli Már Gíslason**[1] og Aron D. Jónasson[2]
[1]*Háskóli Íslands*
[2]*Landspítalinn - Háskólasjúkrahús*
gmg@hi.is

To predict responses to stream water warming, we studied insect drift in a upper reach (5.8°C) and a heated up lower reach (9.1°C) of a spring-fed stream and an adjacent warm stream (19-22°C) in a the geothermal area in Hengill volcano, Iceland. Chironomidae larvae dominated the drift in the unheated and heated reaches, being 10 times higher than the second abundant group, Simulium vittatum. Radix balthica (Gastropod) dominated the drift in the warm stream. Density of drifting insects fluctuated in the unheated reach of the streams, but it was stable in the heated reach and the warm stream. Drift density was similar in both reaches, but lower in the warm stream. There was no or little association between the drift of pupae and adults and emergence. Drifting Chironomidae larvae peaked in late June, late July and late August in the cold reach, and in the warm stream in early August. No such peaks were observed in the warmed up reach. Warming up stream water by 3.3°C did not alter invertebrate drift densities. Differences could be related to cover of algae and mosses in the warm-up reach and stream stream.

## E16 Loftslagshlýnun: óvænt þanþol túndrugróðurs á eyjum. The unexpected resilience of island tundra plant communities to climate warming.

**Ingibjörg Svala Jónsdóttir**
*Háskóli Íslands, Líf- og umhverfisvísindastofnun*
isj@hi.is

Tundra plant communities have often been assumed to be fragile systems under great threat by climate warming which is happening at fastest rates at high latitudes. Accordingly, high Arctic communities would show stronger and more rapid changes in response to warming than low Arctic communities. Furthermore, islands generally have smaller species pools than mainland. With each plant functional type being represented by fewer species, plant communities on islands may be expected to be more "fragile" than in mainland ecosystems. Therefore, tundra plant communities on islands at higher latitudes should be more responsive to ongoing environmental changes. However, long-term studies do not provide good support for these general assumptions. On the contrary, some plant communities both in the high and low Arctic seem to be relatively resilient to climate warming. In this talk I will explore some alternative explanations for such unexpectedly high resilience based on data from long-term warming experiments in Iceland and Svalbard in comparison with circumpolar community data of the International Tundra Experiment (ITEX).

## E17 Rannsóknastöðin Rif á Raufarhöfn: Tilgangur, markmið og framtíðarsýn

**Jónína S. Þorláksdóttir**
*Rannsóknastöðin Rif*
jonina@rifresearch.is

Rannsóknastöðinni Rif, sem stofnuð var 2014, er ætlað að skapa jarðveg fyrir rannsóknir og þekkingarsköpun á Melrakkasléttu og Raufarhöfn, byggt á náttúrufarslegri sérstöðu svæðisins, og hvaða áhrif loftslagsbreytingar og aukin umsvif mannsins hafa á vistkerfi norðurslóða. Markmið stöðvarinnar er þríþætt: (1) Að efla og auka náttúrurannsóknir á Melrakkasléttu; (2) Safna saman, halda utan um og miðla upplýsingum um náttúrufar á svæðinu; (3) Styðja nærsamfélagið m.a. í gegnum fræðslu og stuðning við náttúrutengda ferðamennsku.

Nú þegar hefur verið sýnt fram á að þörf er á hinni auknu þjónustu og aðstöðuuppbyggingu sem Rif stendur fyrir og hefur gestum og sjálfstæðum rannsóknaverkefnum í tengslum við starfsemina fjölgað mikið milli ára.

Rannsóknastöðin er hluti af INTERACT, öflugu samstarfsneti rannsóknastöðva á Norðurslóð-

um og er þar beinn þátttakandi í þremur vinnupökkum styrktum af Evrópusambandinu. Snýr einn þeirra sérstaklega að uppbyggingu langtímavöktunar þurrlendis og ferskvatns á Melrakkasléttu eftir forskriftum CBMP (Circumpolar Biodiversity Monitoring Program) sem er lykilverkefni CAFF. Norðurhluti Melrakkasléttu er skilgreindur sem arktískt svæði og hentar því afar vel fyrir slík umsvif auk þess sem svæðið er mjög aðgengilegt. Hér er því kjörið tækifæri til að uppfylla stefnu og skuldbindingar Íslands hvað varðar rannsóknir og vöktun á Norðurslóðum.

## E18 Langtímarannsóknir og vöktun – hugleiðingar um vöktun lykilþátta og verkaskiptingu rannsóknaraðila með hliðsjón af nýlegum náttúruverndarlögum.

**Starri Heiðmarsson**
*Náttúrufræðistofnun Íslands, Akureyrarsetur*
starri@ni.is

Nýleg náttúruverndarlög (2013/60) gera ráð fyrir að efla vöktun náttúru Íslands og skerpa á hlutverki Náttúrufræðistofnunar hvað varðar samhæfingu og skipulagningu vöktunar lykilþátta náttúru landsins. Gildi langtímarannsókna felast ekki síst í samanburðarhæfum gögnum. Á vegum CAFF er unnið að samræmingu á pólhverfum langtímarannsóknum. CBMP (Circumpolar biodiversity monitoring program), pólhverf vöktun líffræðilegrar fjölbreytni, er umfangsmikið verkefni sem leggur áherslu á samhæfanleg gögn og að vöktun byggi á tiltækum gögnum. Markmið verkefnisins er einnig að skapa grunn að samhæfðri langtímavöktun á norðurhjara þannig að samanburður verði hentugri, auðveldara að merkja breytingar og mögulegt að greina orsakir og spá fyrir um afleiðingar. Til að vöktun skili árangri er nauðsynlegt að fjármögnun sé tryggð til langs tíma. Einnig er samstarf mikilvægt þannig að samnýta megi gögn og síðast en ekki síst er það ótvírætt kostur að vakta heilu vistkerfin á ákveðnum stöðum eða svæðum og samtímis fylgjast með ýmsum ólífrænum þáttum s.s. veðurfari. Útnes norðanlands flokkast sem arktísk á gróðurkorti CAFF sem út kom 2003, CAVM (Circumpolar arctic vegetation map). Áhrif loftslagsbreytinga verða líklega hröðust á arktíska svæði landsins og var það einn þeirra þátta sem réði staðsetningu rannsóknarstöðvarinnar Rifs á Melrakkasléttu. Stöðin hefur til umráða jörðina Rif, nyrstu jörð landsins, sem gerir skipulagningu langtímarannsókna mögulega.

## E19 Rjúpan og gildi langtíma vöktunar

**Ólafur K. Nielsen**
*Náttúrufræðistofnun Íslands*
okn@ni.is

Langtíma vöktun er ein af fáum leiðum sem við höfum til að meta ástand fuglastofna. Slík vöktunarverkefni má einnig nota til að greina stofnbreytingar fugla og mögulega áhrifavalda í þeirri atburðarás. Langtíma vöktun er skuldbinding og örugg aðstaða úti á mörkinni fyrir þá sem sinna slíkum verkefnum auðveldar alla vinnu. Melrakkaslétta á Norðausturlandi er mjög fuglríkt svæði og hentar vel til vöktunar fuglastofna. Það sem einkennir svæðið eru lífríkar fjörur og grunnsævi, auðug strandvötn og votlendi og inn til landsins víðfeðm heiðalönd. Melrakkaslétta er mikilvægur viðkomustaður farfugla á leið til og frá varplöndum á Grænlandi og Kanada, og aragrúi fugla verpir á svæðinu, m.a. eru þar nokkrar sjófuglabyggðir, lífrík votlendi með vaðfuglum og öndum, og í heiðinni aragrúi mófugla. Rannsóknastöðin Rif á Raufarhöfn hefur gjörbreytt aðstöðu þeirra sem vilja stunda hvers konar lífríkisrannsóknir á Melrakkasléttu og þar á meðal fuglarannsóknir. Höfundur hefur fengist við rannsóknir á rjúpu (*Lagopus muta*) á þessu svæði frá 1981 og í erindinu verður fjallað um hvernig þessar gagnaraðir sem safnað hefur verið nýtast til að ráða í stofnstærð, stofnþróun, afföll, heilbrigði rjúpunnar og tengsl rjúpunnar við mögulega áhrifavalda innan fæðuvefsins (rándýr, sníkjudýr, fæða).

# Ágrip veggspjalda / Poster abstracts

## V1 Assessing the invertebrate diversity in Icelandic springs - eDNA versus morphological species identification

**Agnes-Katharina Kreiling**[1,2], Snæbjörn Pálsson[2], Jón S. Ólafsson[3] og Bjarni K. Kristjánsson[1]
[1]*Hólar University College*
[2]*University of Iceland*
[3]*Marine and Freshwater Research Institute*
kreiling@holar.is

In the light of current climate change and increasing loss of biodiversity, it is important to incorporate new methods into biodiversity assessment. The use of environmental DNA (eDNA) is a promising approach for advanced freshwater monitoring, but its applicability still remains to be tested for a range of habitats and taxonomic groups. Invertebrate diversity in cold and warm freshwater springs in Iceland was assessed using both eDNA and morphological species identification. DNA was extracted from water samples and the ribosomal 18s and the mitochondrial COI region in eukaryotes sequenced, as well as the ITS region in fungi and the ribosomal 16S region in bacteria. Morphological identification was restricted to order and family level for most invertebrate taxa and to genus and species level for Chironomidae (*Diptera*), Trichoptera, and Ostracoda. The genetic samples were analyzed addressing a much broader range of taxonomic groups, including fungi, bacteria, and ciliates. However, reference databases - especially for invertebrate sequences – are still incomplete and do in most cases not allow a reliable assignment to species level. A larger number of species and a finer resolution was obtained in invertebrate samples identified by morphological characters, particularly within the family Chironomidae, than in eDNA samples.

## V2 Distribution and Management of Heracleum species in Reykjavík, Iceland.

**Danielle Elizabeth Beauchemin**[1,2], Mariana Tamayo[1] og Snorri Sigurðsson[1,2]
[1]*University of Iceland*
[2]*Reykjavíkurborg*
mlt@hi.is

Invasive alien species can negatively impact ecosystems in a number of ways that include declines in biodiversity, economic losses, human health issues, and risks to native species. Given these impacts, the City of Reykjavík, Iceland, is concerned about three alien hogweed species: Heracleum mantegazzianum, H. persicum, and H. sphondylium. To assess this concern, these species were mapped between May and August 2017 on both managed and unmanaged sites within the city borders of Reykjavík, using ArcGIS. This information was then compared with distribution data from 2016. Moreover, the study focused on the area of Laugarnes: where vegetation cover was measured and efforts to eradicate H. mantegazzianum were implemented in June 2017. Furthermore, media outreach and distribution of fact sheets at homes where the hogweed species were present were used to raise public awareness. Key findings include the need for early detection and implementation of eradication and control efforts to reduce the threats and costs of hogweed. The data also suggests that if these three hogweed species are left unmanaged, they will continue to invade vulnerable areas in Reykjavík, such as schoolyards and wilderness areas- resulting in an increased risk to human health and environmental degradation. By identifying hot spots of hogweed species distribution, the City of Reykjavík can target these areas and adopt more focused and effective management strategies. Finally, these results reveal the importance of public interaction and participation to increase community awareness in order to implement future management decisions regarding invasive species.

## V3 Is the farmer´s dream a wader´s nightmare?

**Lilja Jóhannesdóttir**[1], Tómas Grétar Gunnarsson[1], Jennifer A. Gill[2] og José A. Alves[1,3]
[1]*Rannsóknasetur Háskóla Íslands á Suðurlandi*
[2]*University of East Anglia, Bretlandi*
[3]*University of Aveiro, Portúgal*
liljajoa@gmail.com

Agriculture has extensively affected and changed ecosystems around the globe, 40% of land in the world and 75% of global water consumption is used for agriculture and agricultural intensification has negatively affected biodiversity, causing crash in populations across taxa. The extent of the negative consequences of agriculture can depend on the willingness of the stakeholders to take part in conservation. Knowledge on what farmers are willing and able to do is crucial for successful conservation management. 62 farmers in Iceland were questioned about their intentions regarding farming practices, whether they find birdlife important and whether they would be willing to participate in actions aimed at improving bird conservation. Most of farmers questioned think it is very important to have rich birdlife on their land but most of them are unlikely to take special consideration to birds in land management, even if they get financial compensation. Most farmers do intend to increase their cultivated land, which could have negative consequences for birds, but nearly all of them think it is important to have rich birdlife on their land and are willing to participate in some action aimed at bird conservation.

## V4 Post-zygotic mechanisms of reproductive isolation in Thingvallavatn Arctic charr

**Kalina Hristova Kapralova**, Lieke L. Ponsioen, Arnar Palsson, Bjarni K. Kristjanson, Zophonías O. Jónsson og Sigurður Sveinn Snorrason
*University of Iceland, Life and Environmental Sciences, Sturlugata 7, 101 Reykjavik*
khk2@hi.is

Studying the evolution and the maintenance of reproductive barriers is difficult and the details of the underlying mechanisms are poorly understood. Systems where closely related species or populations of the same species that have undergone adaptive divergence, come into contact, are natural test beds for research on these mechanisms. The Arctic charr (*Salvelinus alpinus*) of lake Thingvallavatn is ideally suited for studies of divergence and the evolution of reproductive barriers. The lake was formed at the end of the last glacial epoch just 11-10 thousand years ago and despite its young age it now harbours four morphs of Arctic charr whose distinct variation in life history characteristics, behavior and trophic morphology suggest rapid adaptive diversification, possibly followed by or causing build-up of reproductive barriers. Here we focus on the two smaller Thingvallavatn morphs, a planktivorous- (PL) and a small benthivorous-charr (SB), which have diverged along the limnetic - benthic ecological axis. While their spawning overlaps spatially and temporally, presenting ample opportunities for cross-mating, they constitute distinct populations, which suggests effective reproductive barrier(s). The morphs are genetically distinct, they differ in all linkage groups with some genomic regions of stronger separation. The central hypothesis underlying our investigation is that reproductive isolation between SB and PL charr is partly due to strong negative selection against hybrids. Our findings so far show that hybrid individuals grow slower and have extreme (transgressive) craniofacial morphology when compared to pure cross individuals. We are currently looking into the expression of essential developmental genes and regulatory RNAs during myogenesis and chondrogenesis in hybrid and pure cross individuals.

## V5 Provisional species of common whelk Buccinum undatum based on mtDNA COI are supported by morphology

**Hildur Magnúsdóttir**[1,2], Snæbjörn Pálsson[1], Kristen Marie Westfall[3,4], Zophonías O. Jónsson[1] og Erla Björk Örnólfsdóttir[2]
[1]*Líf - og umhverfisvísindadeild, Háskóli Íslands*
[2]*Fiskeldis - og fiskalíffræðideild, Háskólinn á Hólum*
[3]*Vör - Sjávarrannsóknarsetur við Breiðafjörð, Ólafsvík*
[4]*Núverandi heimilisfang: DFO, Pacific Biological Station, Canada*
him5@hi.is

Geographical patterns in morphology can arise from direct environmental control of physiological processes and body shape, differential adaptation to changing biological surroundings or random changes in distinct populations. Marine gastropods are ideal subjects on which to explore these ideas, by virtue of the remarkable intra-specific variation in life-history traits and morphology often observed across relatively small spatial scales. Moreover, quantifying demographic connectivity and identifying distinct population boundaries of harvested marine species is essential for their management and conservation purposes. Here, quantifying the spatial patterns and connectivity of the ubiquitous N-Atlantic common whelk (*Buccinum undatum*), we sought to test whether trait differentiation in long-lived benthic gastropod species follows genetic differentiation between populations which varies from subtle to large differentiation predating the onset of Ice Age about three Myr ago. Furthermore we analyse whether the differentiation is dependent on geographic distance and/or environmental variability. A species-wide comparison of morphological and genetic patterns was made on whelks from both sides of the Atlantic: Canada, Greenland, Iceland, Faroe Islands and UK, while fine-scaled phenotypic variation in shell morphology and colour was assessed in whelk from Breiðafjörður Bay in W-Iceland. Genetic divergence was analysed using mitochondrial genes and microsatellites. Morphology was analysed using both geometric and traditional morphometrics and colour was analysed with categorical and digital analysis.

## V6 Uppgræðsla skurðsára í endurheimtu votlendi: Athugun á gildi fræslægju til endurheimtar staðargróðurs

**Gunnhildur E. Gunnarsdóttir**, Hlynur Óskarsson og Járngerður Grétarsdóttir
*Landbúnaðarháskóli Íslands*
hlynur@lbhi.is

Undanfarna tvo áratugi hefur verið unnið að endurheimt mýrlendis hér á landi. Endurheimtarframkvæmdir leiða til þess að þar sem áður voru skurðir og ruðningar situr eftir gróðurlaust yfirborð (skurðsár), ber jörð. Rannsóknir á endurheimtum mýrlendum hafa sýnt fram á að slík gróðurlaus svæði ná stundum ekki að gróa upp án inngripa. Aðstæður sem þessar eru óákjósanlegar þar sem hætta er á því að í mikilli rigningatíð geti jarðefnin hreinlega skolast úr skurðunum en dæmi eru þekkt um slíkt. Til þess að uppgræðsla skurðsára mýrlendis teljist árangursrík þarf svæðið að gróa upp til fulls en einnig þarf gróðurþekjan að endurspegla votlendisgróður umhverfisins. Hér á landi hefur uppgræðsla og endurheimt staðargróðurs verið framkvæmd með ýmsum aðferðum í margvíslegum vistgerðum þurrlendis og í flestum tilfellum borið góðan árangur. Hins vegar hafa aðferðir við uppgræðslu og endurheimt staðargróðurs í mýrlendi hér á landi ekki verið sérstaklega prófaðar. Í þessari rannsókn var gildi fræslægju-aðferðinnar (green-hay/seed-hey) við lokun skurðsára kannað á nýlega endurheimtu mýrlendi á Suðurlandi með því að bera saman árangur sjálfgræðslu annars vegar og dreifingar fræslægju hins vegar. Ári eftir dreifingu fræslægju einkenndist gróðurinn sem komið hafði til aðallega af votlendistegundum. Fræslægjan hafði marktækt jákvæð áhrif á þekju og tegundafjölda æðplantna en var einnig sérstaklega árangursrík hvað varðar mosaþekju.

## V7 Endurnýjun næringarefna nærri botni í Arnarfirði og Ísafjarðardjúpi

**Sólveig R. Ólafsdóttir,** Alice Benoit-Cattin og Magnús Danielsen
*Hafrannsóknastofnun*
magnus.danilesen@hafogvatn.is

Kynntar eru rannsóknir á næringarefnum og súrefni í Arnarfirði og Ísafjarðardjúpi. Einangrað botnlag myndast neðan þröskuldsdýpis í Arnarfiði snemma sumars. Stöðugt gengur á súrefnisstyrk í því lagi þegar líður á haustið og styrkur næringarefna vex vegna niðurbrots lífræns efnis. Í Arnarfiði mældist styrkur súrefnis niðri við botn á bilinu 165 til 174 $\mu$mól L-1 en var 210 til 254 $\mu$mól L-1 í Ísafjarðardjúpi. Styrkur ammóníum mældist allt að 2,6 $\mu$mól L-1 við botn í Arnarfiði og þar mældist einnig hár styrkur fosfats og kísils. Kísillinn leysist upp við þessar aðstæður og kemst í lausn á ný. Merki voru um að afnítrun ætti sér stað í setinu.

## V8 Pöddulíf í Skúmey

**Hrafnhildur Ævarsdóttir**
*Vatnajökulsþjóðgarður*
hrafnhildur@vjp.is

Skúmey á Jökulsárlóni byrjaði að koma undan Esjufjallaröndinni á Breiðarmerkurjökli í kringum 1979-1980. Eyjan var öll komin undan jöklinum árið 2000 og var jökullinn lengst viðloðandi norðausturhluta eyjarinnar. Í Skúmey hefur myndast einstakt tækifæri til þess að rannsaka frumframvindu gróðurs og hvernig landnám tegunda fer fram þegar nýtt land kemur undan jökli. Segja má að eyjan sé eins konar Surstey innan Vatnajökulsþjóðgarðar.
Í þessari rannsókn var leitast við að kortleggja pöddulíf í Skúmey. Hvaða tegundir væru til staðar og hverjar væru ríkjandi í vistkerfinu en engin slík rannsókn hefur áður farið fram. Níu fallgildrur voru settar niður í þremur 10x10m reitum sem valdir voru handahófskennt í eyjunni. Gildrurnar voru settar niður í maí, júní, júlí og ágúst. Í hverjum reit voru þrjár gildrur í hvert skipti sem hafðar voru í sólahring í senn.
Helstu hópar padda sem fundust í Skúmey voru tvívængjur, áttfætlur, bjöllur, mítlar og mordýr. Flestar þær tegundir sem fundust í fallgildrunum mátti búast við í vistkerfi sem þessu en fáeinar tegundir voru ódæmigerðar fyrir það búsvæði sem Skúmey bíður upp á.

## V9 Skeiðarársandur: lifandi rannsóknastofa fyrir framvindurannsóknir

**Kristín Svavarsdóttir**[1] og Þóra Ellen Þórhallsdóttir[2]
[1]*Landgræðsla ríkisins*
[2]*Líf- og umhverfisvísindastofnun Háskóla Íslands*
kristins@land.is

Miklar breytingar hafa orðið á Skeiðarársandi undanfarna áratugi og eru hlutar sandsins að breytast úr auðn í gróið land. Rannsóknir á landnámi og þróun gróðurs á Skeiðarársandi hófust sumarið 1998 og hafa nú staðið í tvo áratugi. Megintilgangur þeirra er að auka skilning okkar á ferlum frumframvindu og að varpa ljósi á hvað ákvarðar gróðurmynstur á fyrstu stigum hennar. Unnið hefur verið á mjög stóru svæði milli Gígjukvíslar og gamla Skeiðarárfarvegsins en áhersla lögð á efri hlutann. Mestu breytingarnar hafa orðið ofarlega á sandinum, upp frá þjóðvegi 1 þar sem birki hefur numið land og breiðist nú hratt út. Víða er sandurinn þó lítt gróinn og gróðurkort sem unnið var með fjarkönnun árið 2003 sýndi að 70% sandsins var með $<$5% gróðurþekju. Vel gróið land er að finna á þremur svæðum, þurrt mosagróið land með birki efst á sandinum við þjóðveg 1 og norður að gömlu jökulgörðunum, um miðjan sand er rakameiri mosavaxin tunga sem nær frá SV til NA og votlendi er syðst á sandinum næst ströndinni. Meðal verkefna sem unnin hafa verið á Skeiðarársandi má nefna greiningu á þáttum sem ákvarða landnám plantna í frumframvindu, að nýta jökulker til að meta þátt frædreifingar frá fjarlægum uppsprettum, fjölþættar rannsóknir á landnámi, stofnvistfræði og útbreiðslu birkis og áhrif sauðfjárbeitar á vistkerfi á lítt grónu landi. Niðurstöður okkar sýna að hraði og stefna gróðurframvindu er mjög breytileg þrátt fyrir það hversu einsleitur Skeiðarársandur er.

## V10 Stochasticity dominates plant community assembly in primary succession

**Bryndís Marteinsdóttir**[1], Kristín Svavarsdóttir[1] og Þóra Ellen Þórhallsdóttir[2]
[1]*Landgræðsla ríkisins*
[2]*Háskóli Íslands*
bryndis@land.is

Initial plant establishment is one of the most critical phases in ecosystem development, where an early suite of physical, biological and stochastic factors may affect successional trajectories and rates. The objective of this study was to determine the importance of these factors in shaping early plant community assembly on a glacial outwash plain, Skeiðarársandur, in SE Iceland using a trait based approach. We used data on vascular plant assemblages at two different spatial scales sampled in 2005 and 2012, and compiled a dataset on seven functional traits linked to species dispersal abilities, establishment and persistence for all species within these assemblages. Trait-based null model analyses were used to determine the processes that influenced plant community assembly from the regional species pool into local communities, and to determine dependency of these processes on local environment or time. On both scales, random processes dominated the assembly. However, in some communities, there was evidence of non – random assembly. The relative importance of different processes varied spatially and temporally and the variation was linked to local soil conditions. While stochasticity dominated assembly patterns of our early successional communities we also found evidence of deterministic assembly. The results indicated that as soil conditions improved, environmental constraints on assembly became weaker and the assembly became more dependent on species availability.

## V11 GróLind: Matog vöktun á gróður- og jarðvegsauðlindum Íslands

**Bryndís Marteinsdóttir**, Elín Fjóla Þórarinsdóttir, Guðmundur Halldórsson, Jóhann Þórsson, Kristín Svavarsdóttir, Magnús Þór Einarsson og Sigþrúður Jónsdóttir
*Landgræðsla ríkisins*
bryndis@land.is

Vöktunarverkefninu GróLind er ætlað að skila heildarmati á ástandi gróður- og jarðvegsauðlinda landsins með reglubundnum hætti, og þróa sjálfbærnivísa fyrir nýtingu auðlindanna. Verkefnið byggist á samkomulagi milli atvinnuvega- og nýsköpunarráðuneytisins, Bændasamtaka Íslands, Landgræðslu ríkisins og Landssamtaka sauðfjárbænda(Ls). Verkefnið er fjármagnað til 10 ára í gegnum núverandi búvörusamninga að frumkvæði Ls. Landgræðsla ríkisins er með yfirumsjón þess en jafnframt skipar ráðherra fimm aðila í faghóp sem starfar með stofnuninni að framgangi verkefnisins. Þekking okkar á ástandi vistkerfa er brotakennd. Ýmsar upplýsingar eru til um gróður og ástand vistkerfa en litlar upplýsingar liggja fyrir um virkni vistkerfa og það hvernig hún breytist frá einum tíma til annars. Góðar upplýsingar um slíka þætti, og um áhrif mismunandi landnýtingar á þá, eru grundvöllur að sjálfbærri landnýtingu. Í þessu verkefni er bæði lögð áhersla á vöktun á ástandi gróðurs og nýtingu á hverjum tíma. Í ljósi þess að umhverfisbreytingar eiga sér stað á mismunandi mælikvörðum þá verður gagna aflað með mælingum í reitum og sniðum og einnig flygildum og gervitunglum. Jafnframt verður lögð áhersla á miðlun upplýsinga og samstarf við hagaðila. Auk vöktunar munu sjálfbærnivísar landnotkunar verða þróaðir. Þeir verða byggðir á rannsóknum, fyrirliggjandi þekkingu og niðurstöðum vöktunarverkefnisins. Þessa þekkingu verður svo hægt að nýta til að stuðla að sjálfbærri landnýtingu í samstarfi við hagaðila.

## V12 What´s on the menue? – Harbour seal (*Phoca vitulina*) diet estimated by DNA metabarcoding and hard-part analysis

**Sandra M. Granquist**[1,2,3], Rodrigo Esparza-Salas[4], Erlingur Hauksson[1], Olle Karlsson[4], Ingibjörg G. Jónsdóttir[1] og Anders Angerbjörn[3]
[1]*Hafrannsóknarstofnun*
[2]*Selasetur Íslands*
[3]*Department of Zoology, Stockholm University*
[4]*Swedish Museum of Natural History*
sandra@hafro.is

Ecological knowledge on relationships between marine predators and prey species is crucial for evidence based management practices. Widely, pinnipeds are culled to reduce the potential effect of their predation on commercial fish stocks, despite scarce understanding of the consequences for populations and human harvest. Recently, a severe decline has been observed in the Icelandic harbour seal population. Yet, harbour seals in Iceland are culled in river mouths to reduce their possible effect on salmonid stocks, although evidence for importance of salmonids in seal diet is lacking. There is a need for increased research effort along with improved methods to estimate seal diet. We investigated the diet of harbour seals in an estuary in NW Iceland during June-September in 2010 and 2011 by DNA metabarcoding analysis and classical morphological analysis (otoliths and bones) from faeces. Despite salmon, trout and char availability in the study area, we found no evidence of salmonids in the harbour seal diet. The most important prey species were sand eels, flatfishes, gadoids, herring and capelin. Results from molecular and morphological analysis were similar in regards of important prey species, but species diversity was lower in the morphological analysis and 37.5% of the samples included prey items that were unidentifiable by morphological analysis. Our findings contributes to the methodology for investigating marine mammal diet and have essential conservation implications.

## V13 The effects of shrub encroachment on avian communities in lowland Iceland

**Sigurður Björn Alfreðsson**[1,2], Ingibjörg Svala Jónsdóttir[2] og Tómas Grétar Gunnarsson[1]
[1]*South Iceland Research Centre, University of Iceland, Lindarbraut 4, 840 Laugarvatn, Iceland*
[2]*Institute of Life and Environmental Sciences, University of Iceland, Sturlugata 7, 101 Reykjavík, Iceland*
tomas@hi.is

Iceland is a volcanic island in the North-Atlantic Ocean where landscapes transform dramatically due to periodic volcanic activity. Anthropogenic factors have also left their mark on the land. Since settlement vegetation cover has gone from 60% to 27% and natural birch forests from 15-20% cover to 1% . However, since the 1980s Iceland has seen a great increase in vegetation cover, most likely due to changes in land use patterns and recognition of Iceland's erosion problem resulting in conservation efforts. In 1985 a quota system was introduced for sheep and their numbers almost halved between 1980 and 1995. Following this decrease in sheep numbers was a smaller increase in the horse and cattle population. Alongside these changes in Iceland, global drivers such as higher temperatures, increased CO2 and atmospheric nitrogen seem to favour woody plants in grassy vegetation. Shrub encroachment in grassy biomes has been widely reported over reported over the last century, but little is known how it is affecting the various taxa. The aims of this study was to estimate the effect of shrub encroachment on internationally important bird populations in lowland Iceland. Bird numbers were compared between shrub plots and adjacent control plots and the effect of shrub succession within shrub plots on bird numbers was assessed. Snipe, Meadow pipit and Redwing were significantly more abundant on shrub plots. Whimbrel, Golden plover, Oystercatcher and Redshank were more abundant on control plots. Dunlin and Black-tailed godwit showed no significant difference. Dunlin, Golden plover and Black-tailed godwit decreased as shrubs grew larger while the redwing numbers increased. The results suggest that ongoing shrub encroachment has the potential to greatly affect wader populations which have their global stronghold in Iceland.

## V14 Timing the annual cycle of a sub-arctic migrant: phenological flexibility and potential effects on breeding performance

**Camilo Carneiro**[2,1], Tómas Grétar Gunnarsson[1] og José Alves[2,1]
[1] *University of Iceland*
[2] *University of Aveiro*
j.alves@uea.ac.uk

Timing the annual cycle of a sub-arctic migrant: phenological flexibility and potential effects on breeding performance Camilo Carneiro1,2*, Tómas G Gunnarsson2 & José A Alves1,2 1CESAM, Dep. Biology, University of Aveiro, Campus de Santiago, 3810-193 Aveiro, Portugal 2South Iceland Research Centre, University of Iceland, Lindarbraut 4, Laugarvatn IS-840, Iceland * Email: camilofcarneiro@gmail.com Keywords: annual cycle; migration; breeding; timing flexibility; individual level; warming temperatures Abstract Current changes in species' phenology, demography and distribution, have thus far been mostly investigated at the population level. However, individual level responses are key to mechanistically understand those patterns. Advances in laying dates due to warming temperatures have been reported in many migratory bird species and although several populations have demonstrated some level of flexibility, individuals tend to be highly consistent in time (and space) during the annual cycle. For wader species travelling to high latitudes to breed, suitable conditions only occur during a relatively short period, so it can be expected that individuals initiate nesting as early as possible in order to maximize the probability of breeding successfully, which decreases with seasonal declines in resource availability. The Icelandic whimbrel (*Numenius phaeopus islandicus*) is a long distance migrant, breeding mostly in Iceland and undertaking long direct flights to/from the wintering areas in West Africa, with some individuals making a stopover in Western Europe in the return journey. During the last three years the average temperature in the breeding grounds has been increasing, which could possibly affect the timing of breeding and subsequent events of the annual cycle for Icelandic whimbrels. Here, we (1) first explore the flexibility in timing of breeding in the Icelandic whimbrel population; then investigate (2) the consistency in timing of migratory stages (departure and arrival from/to winter and breeding sites) and breeding at the individual level; and finally (3) assess the potential effects of spring migration strategy and timing on breeding success.

## V15 Annual and diel sound production activity of cod (*Gadus morhua*) and other Gadidae species in northeast Icelandic coastal waters.

**Elie Retailleau** [1] og Edda E. Magnúsdóttir[2]
[1] *European Institute of Marine Science*
[2] *Department of Life- and Environmental Sciences, University of Iceland*
eddaem@hi.is

Many fish species produce low frequency sounds, especially during courtship behaviours, spawning and in agonistic interaction. The trait is widespread within the Gadidae family of which cod is among the best studied species. Long-term underwater acoustic recordings were collected off the NE-coast of Iceland during January–September 2010 to collect and describe the variation in signal types produced by cod in this relatively understudied area. Additionally, the annual and diel acoustic activity in production of the different sound types was investigated. The preliminary findings showed that two types of cod sounds were mainly detected in the recordings. These sound types were impulsive sounds (grunts) and pulse trains (knocks) and resemble previously described cod sounds. There was a clear increase in cod acoustic activity just before and during the reported spawning season of this species, i.e. in February and March. Another peak in acoustic activity was observed during the fall. Although not significant on the p-level, sounds seemed more frequent at night than during other light regimes. These seasonal and diel trends of sound production are consistent with previous studies. In order to investigate the functional use of sound production of wild cod visual observations during acoustic activity are important next steps. Such information will allow for successful passive acoustic monitoring of cod and other fish species in remote areas.

## V16 Effects of herbivore grazing on decomposition rate in Icelandic soils

**Katrín Björnsdóttir**[1], Isabel C. Barrio[1] og Ingibjörg Svala Jónsdóttir[1,2]
[1] *University of Iceland*
[2] *The University Centre in Svalbard*
isj@hi.is

Tundra ecosystems are undergoing rapid environmental changes with warming climate. While many studies focus on the impacts of climate warming on tundra ecosystems, not as many include the impacts that herbivores can have on the ecosystems responses. Vertebrate herbivore pressure is predicted to increase with warming climate. Since herbivores can counteract some responses of tundra ecosystems to climate warming, investigation on plant-herbivore interaction is essential for understanding these ecosystem responses to a changing world. The aim of this study was to examine how herbivore grazing affects decomposition rate in Icelandic soils where short term fence manipulation was applied. The impacts of herbivore grazing on decomposition rate was assessed in five different habitats in the sub-Arctic Iceland, using fences to exclude grazing. Protocols from the Tea Bag Index were used in order to estimate decomposition rate. Two types of commercially available tea were used to represent dead plant material. 576 tea bags were buried into the ground in 48 plots (fences and controls) and the decomposition rate estimated as biomass weight loss over three months and one year. Excluding vertebrate herbivory did not affect decomposition rates in Iceland. The lack of herbivory impact on the decomposition rate most likely reflects the short experimental period and emphasizes the importance of long-term monitoring of herbivore impacts on ecosystem responses.

## V17 An assessment of the trophic ecology of escaped farmed rainbow trout (*Oncorhynchus mykiss*) in relation to native salmonids in the Westfjords, Iceland

**Olivia Simmons** [1,2] og Guðbjörg Ólafsdóttir[2]
[1] *University Centre of the Westfjords*
[2] *University of Iceland, Research Centre of the Westfjords*
olivia16@uw.is

Aquaculture is an important industry in the Westfjords, where one common species to farm is rainbow trout. Wherever there are fish farms, there tend to be fish escapes, and the Westfjords is no exception. The goal of this research was to compare the trophic ecology of escaped rainbow trout with two native salmonid species, Arctic charr (*Salvelinus alpinus*) and sea trout (*Salmo trutta*). There were three main objectives: (1) establish a baseline of trophic ecology for the Arctic charr and sea trout in the Westfjords, (2) estimate trophic overlap for the rainbow trout, and Arctic charr, and the sea trout, and (3) attempt to determine the number of escape events for the rainbow trout. Arctic charr and sea trout were collected throughout the summer of 2017 via gillnets from locations throughout the Westfjords. The stomach contents were analysed and three sets of tissues (liver, muscle, and scale) were taken for stable isotope analysis. Rainbow trout stomach contents data and tissue samples were provided by Fiskistofa, from fish caught in 2016. A principle components analysis and GLMM was used to compare the stomach contents of the three species. Bayesian standard ellipses and GLMM was used to compare trophic overlap between the three species. K-means cluster analysis was used to determine the number of rainbow trout escape events. Results indicate that there is high trophic overlap between all three species and suggest that most or all of the rainbow trout may have come from one escape event.

## V18 The ecology of peace: Preparing Colombia for new political and planetary climates

**Alejandro Salazar**[1,2], Adriana Sanchez[3], Jeffrey S. Dukes[4] et al.
[1] *University of Iceland, Institute of Life- and Environmental Sciences*
[2] *Purdue Climate Change Research Center, Purdue University, West Lafayette, IN, USA.*
[3] *Programa de Biología, Facultad de Ciencias Naturales y Matemáticas, Universidad del Rosario, Bogotá, D.C., Colombia.*
[4] *Department of Forestry and Natural Resources, Purdue University, West Lafayette, IN, USA.*
salazar@hi.is

Colombia, one of the world's most species-rich nations, is currently undergoing a profound social transition: the end of a decades-long conflict with the Revolutionary Armed Forces of Colombia, known as FARC. The peace agreement process will likely transform the country's physical and socio-economic landscapes at a time when humans are altering Earth's atmosphere and climate in unprecedented ways. Here, we highlight ways in which these transformative events will combine to shape the ecological and environmental future of Colombia. We also discuss the risks of creating perverse development incentives in these critical times, and the great benefits, for the country and the world, if Colombia can navigate through the peace process in a way that protects its own environment and ecosystems.