Nordic Biodiversity Framework

Supplementary material

Iceland
Status and implementation of Targets 1-8 of the Global Biodiversity Framework (GBF)

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Iceland´s specific achievements in implementing the GBF targets

Biodiversity has, in general, not been adequately integrated into Icelandic laws and policy. A detailed evaluation of Icelandic laws and policy is listed here below. Many of the laws relevant to Targets 1-8 do not mention biodiversity but instead put an emphasis on environmental matters and nature conservation. There are a few exceptions from this and biodiversity is well integrated into the legal framework of Nature Conservation Act and the Act on environmental assessment for projects and plans. Some action plans have integrated biodiversity in their policy: Action plan for land reclamation and forestry (Land og Líf) 2022-2026, the National Planning Strategy 2024-2038, Action plan for Agricultural Policy 2024-2040 (Aðgerðaáætlun landbúnaðarstefnu til 2040) and Action plan for climate change (Aðgerðaáætlun í loftslagsmálum) 2024. Furthermore, there are policies in development in, among others, fisheries, aquaculture, wind energy and waste reduction where biodiversity is expected to play a significant role.

Despite these, by the end of 2024, no one from the administration had been working on gathering information for the monitoring framework (GBF indicators).The status of implementation is therefore unknown for targets 1-8 but it is clear that we are not even close to reaching them.

A detailed policy review on targets 1-8 for Iceland is available on biodice.is/nbf-policy

Target 1. Plan and Manage all Areas to Reduce Biodiversity Loss

An environmental impact assessment is required before all spatial planning is accepted and implemented and spatial plans exist for most regions and municipalities. However, biodiversity is not integrated into laws on spatial planning. Ecologically important areas are not a focus of the spatial planning laws and there is no existing goal to bring the loss of biodiversity to zero. Despite this, biodiversity has been integrated and often defined in the national, regional and coastal plans. For example, the protection of biological diversity is defined as one of the key issues in the new National Planning Strategy 2024-2038.

The National Planning Act states that local communities and stakeholders should be consulted and given the chance to influence spatial planning. However, this is not always given priority in the process, but it is necessary to do a "good stakeholder analysis at the beginning, to have a good conversation and to build trust"[1].

One of the major obstacles identified in the workshop was the lack of knowledge about biodiversity within planning authorities, such as municipalities, which affects decision-making. And even when there is interest in biodiversity within municipalities, the authorities do not have the knowledge or resources for successful implementation. This may be a result of the complexities in the administration when it comes to spatial planning. Spatial planning matters span municipalities, the National Planning Agency, the Environmental Agency and three ministries. The municipalities are responsible for creating and updating general-, secondary- and regional plans. In Iceland there are 63 municipalities, 27 of them have less than 1000 inhabitants and 5 of them have less than 100 inhabitants. Inevitably, very small municipalities often lack access to resources necessary for complex spatial planning. Complicating this further are the strong property rights held by landowners, the "suspicion and fear that the state is taking something from you" and the influence of strong community connections. As one workshop participant summarized: it is "*not easy to say no to your neighbors"*[2].

Target 2. Restore 30% of all Degraded Ecosystems

The land reclamation policy and action plan (Land og líf) contains a plan for the active restoration of natural forest and wetland ecosystems. The plan is to restore 50,000 ha of terrestrial, 5,300 ha of wetland ecosystems and 2,500 ha of natural forest before 2026. These projects have proposed funding. The aim of these restoration projects should be restoring and enhancing biodiversity. The action plan, however, mentions carbon sequestration and climate change action as the main goal with the restoration and these initiatives sometimes run counter to biodiversity. Opportunities for joint solutions for protecting biodiversity and restoring ecosystems as important climate actions are often overlooked in understanding, planning, and

[1] See results and report from NBF workshop 1 in Iceland. https://biodice.is/nbf-workshop-in-iceland/
[2] See results and report from NBF workshop 1 in Iceland. https://biodice.is/nbf-workshop-in-iceland/

implementation[3]. There are no plans for restoration of other ecosystems, such as marine and coastal ecosystems.

Target 3. Conserve 30% of Land, Waters and Seas

Multiple types of protected areas exist in Iceland with different levels of protection. However, in many cases, the main aim of these areas is nature conservation in a general sense where biodiversity is a byproduct of the protection but not given special focus (e.g., Thingvellir National Park[4,5].

When it comes to marine protected areas (MPAs), the Ministry of Environment, Energy and Climate has not established a new one since 2007. There are currently four MPAs conserving unique biodiversity or geological formations at two hydrothermal vents and two strictly protected islands. They conserve unique biodiversity or geological formations. These cover 0.07% of Iceland's exclusive economic zone (EEZ) with additional areas being considered for other effective area based conservation measures (OECM), bringing the number up to 1.6%. These OECMs are closed off from harmful fishing equipment and conserve the biodiversity in vulnerable ecosystems, such as coral and sponge beds, as well as relatively untouched areas. The Minister of Food, Agriculture and Fisheries can establish more areas that are closed off from certain fishing equipment. In 2023, several areas were closed to conserve fragile ecosystems and biodiversity. These areas and other important marine areas can be made MPAs by the Minister of Environment, Energy and Climate but this has not been done, due to a lack of communication between the two ministries and a lack of interest in marine protected areas from the Minister of Environment, Energy and Climate. For better implementation of biodiversity goals in current protected areas, better assistance, funding, restraint, more positive incentives, and clear policies must be provided[6].

Target 4. Halt Species Extinction, Protect Genetic Diversity, and Manage Human-Wildlife Conflicts

The Red List of the Icelandic Institute of Natural History (2018) was compiled according to the IUCN guidelines. The Icelandic Red List contains 41 birds species, 20 species of land and marine mammals, and 56 species of vascular plants. However, these species do not represent all species in each of these categories in Iceland. The most notable gaps are invertebrate

[3] See a detailed review on Icelandic policy: https://biodice.is/nbf-policy/
[4] see for example Act on Thingvellir national park (47/2004) where biodiversity is not integrated
[5] See a detailed review on Icelandic policy: https://biodice.is/nbf-policy/
[6] See results and report from NBF workshop 1 in Iceland. https://biodice.is/nbf-workshop-in-iceland/

species and non-vascular plants (mosses and lichen), which have not been assessed since 1996. Current management plans primarily aim for the conservation of certain species such as many domestic agricultural animals (sheep, horse, goat), salmonids and other fish species, birch trees, and some marine mammals. Some of these species are threatened (on IUCN or national lists), such as the Icelandic goat breed[7].

Regulations on the conservation of forests and on fishing equipment are ways in which human actions are managed to protect species[8]. For example, European eel (*Anguilla anguilla*, CR) and Atlantic halibut (*Hippoglossus hippoglossus*, EN) cannot be fished without a special permit. Others are more strictly protected like Spiny dogfish (*Squalus acanthias*, VU), Porbeagle (*Lamna nasus*, VU) and basking shark (*Cetorhinus maximus*, VU) as well as marine mammals such as North-Atlantic right whale (*Eubalaena glacialis*, CR), blue whale (*Balaenoptera musculus*, EN) and sperm whale (*Physeter macrocephalus*, VU). Some efforts have been made to conserve and restore genetic diversity within certain notable Icelandic species such as the downy birch (*Betula pubescens*) and the Icelandic goat breed as well as wild Atlantic salmon (*Salmo salar*) which are important in aquaculture and fish breeding. Human-wildlife conflicts have been mostly managed by restricting human activity by closing certain marine areas and banning certain fishing equipment. Human-wildlife conflict linked to farms is often managed with financial funding to farmers, as in the case of crops ruined by whooper swans (*Cygnus cygnus*).

Target 5. Ensure Sustainable, Safe and Legal Harvesting and Trade of Wild Species

Iceland is a member of CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora). Poaching sometimes occurs in Iceland by the taking of rare eggs from wild birds (gyrfalcon for example) and smuggling them out of the country. The extent of this kind of poaching is not known.

The Strategy for Agriculture to 2040 states sustainable use of wild species and land use within the limits of ecosystems, especially related to sheep grazing, to be one of the main aims of agriculture. Sustainable use of fish stocks is also presented as the aim of fisheries management. To prevent bycatch of marine mammals or fish species, certain fishing equipment has been banned. Customary sustainable use is allowed with the personal use of some wild species, such as seal and eel, and people are free to fish for personal consumption with a fishing rod.

Interestingly, ecosystem approach is mentioned in relation to the sustainable use of wild species in the Strategy and Vision for the Future of Fisheries (Auðlindin okkar) by the Ministry of

[7] https://agrogen.is/bufe/islenska-geitin/
[8] See for example action plan for land reclamation and forestry (Land og líf) and regulation no. 807/2011.

Food, Agriculture and Fisheries, but is not mentioned in other policies. Target 10 further addresses the issue of Sustainable fisheries but that target is not in the scope of this project.

Target 6: Reduce the Introduction of Invasive Alien Species by 50% and Minimize Their Impact

Icelandic policies and legislation are very weak and sometimes inadequate when it comes to Invasive Species management.

Seven Invasive Alien Species (American mink *Neogale vison*, Nootka lupine *Lupinus nootkatensis*, Cow parsley *Anthriscus sylvestris*, Heath star moss *Campylopus introflexus*, Spanish slug *Arion vulgaris*, the white-tailed bumblebee *Bombus lucorum* and Acute Bladder Snail *Physella acuta*) and 25 potential Invasive Alien Species are found in Iceland according to the NOBANIS database (www.nobanis.org). The species lists and information in the database has not been updated for more than a decade and needs to be updated. A comprehensive overview of invasion costs, management and policies in Iceland and comparison with other Nordic countries has been made (Kourantidou et al., 2022). A detailed expert report of Invasive Alien Species and possible invasive species is found in the article's Supplementary material File 3). Observed economic costs ($25.45 million) were reported only for American mink. The authors of (Kourantidou et al., 2022)[9] argue that no sufficient national plan or strategy on Invasive Alien Species has been made in Iceland. Despite legal efforts to limit the imports of alien species, many newly established non-native species have been observed in different Icelandic habitats in recent years. A persistent problem is the lack of adequate, updated official species lists of alien and invasive species as well as risk assessments for their impact and spread. Species lists found in international databases on alien and/or invasive alien species in Iceland are either vastly outdated, inaccurate, or simply wrong.

Many alien tree species are used in forestry in Iceland today and none of these species are officially considered invasive at this point. Lodgepole pine *Pinus contorta* is however considered a potentially invasive species (nobanis.org) in Iceland and new studies show signs of spreading from plantations. Although afforestation programs with alien tree species might have a negative ecological impact in Icelandic terrestrial natural ecosystems, no control or mitigation measures have been taken against them (Kourantidou et al., 2022).

The issue of alien species in forestry is a high-conflict topic in Iceland and many Icelandic ecologists fear that alien tree species, especially lodgepole pine, will spread into natural habitats and cause a high future management cost (Kourantidou et al., 2022 -supplementary material).

White paper on nature conservation 2011. (Chapter 17. Alien species)

[9] Kourantidou et al (2022). The economic costs, management and regulation of biological invasions in the Nordic countries. Journal of Environmental Management

How is the target being implemented?
The mapping of the introduction pathways of alien species is either complete or planned for forestry, agriculture (regarding pathogens), aquaculture (only for salmon) and for shipping routes. In forestry plans, the introduction of invasive alien species will be prevented with an assessment of possibly invasive tree species. In agriculture, a quarantine or a risk assessment is needed when animals or plants are imported, mostly to prevent pathogens and genetic mixing. Pathogen spread in aquaculture is prevented by disinfecting all equipment imported and measures to prevent salmon from escaping net pens. Within the pollution jurisdiction of Iceland, the release of ballast water is banned. The importation of animals (except fish and invertebrates used in aquaculture) is banned without a special permit.

If an alien species is introduced, a plan to prevent establishment exists only for pathogens in agriculture and aquaculture and for salmon that escapes net pens. The eradication of established invasive alien species is the obligation of the responsible party to prevent biodiversity loss. The Environmental Agency holds the power to eradicate invasive species, however, no response plan exists for implementation. In response to this gap, a collaborative group with representatives from MAST (Icelandic Food and Veterinary Authority), Tilraunastöð Háskóla Íslands í meinafræði að Keldum (The Institute for Experimental Pathology), Náttúrufræðistofnun (Icelandic Institute of Natural History), Umhverfisstofnun (the Environment Agency of Iceland) and Hafrannsóknastofnun (Marine & Freshwater Research Institute) has issued a Response Plan for when non-native wild animals are found. This refers to vertebrate species that are not part of the wild Icelandic animal population, but it does not apply to whales and birds.

Target 7. Reduce Pollution to Levels That Are Not Harmful to Biodiversity

Many acts and regulations exist regarding pollution in agriculture, aquaculture, forestry and land reclamation, shipping and water and sewage matters. Reducing the negative effects pollution has on biodiversity is not the aim of these laws but rather conserving ecosystems or the environment. Plastic recycling, monitoring microplastics in the ocean, reducing microplastic pollution with, for example, better sewage treatment, coastal cleanups and bringing all fishing gear back to shore are other aims of the action plan on plastic pollution.

Through the EEA agreement, Iceland has committed to implementing the European Union directive on single-use plastic products. A portion of the provisions has already been implemented, such as the ban on certain single-use plastic items and the requirement for retailers to charge a fee for single-use plastic containers.

Treatment of sewage/wastewater in Iceland is a problem and despite several laws and regulations, little has been done with the municipalities regarding treatment facilities. Often, the solution to the sewage problem was to build a longer pipe into the ocean. Iceland is facing constraints regarding implementation of the EU's River Basin Management Plan (RBMP). The

ICEWATER project recently got a LIFE grant that will, among other things, develop ways to improve wastewater treatment using sustainable solutions.

Target 8. Minimize the Impacts of Climate Change on Biodiversity and Build Resilience

Biodiversity is only mentioned in the government's action plan on climate issues in relation to land reclamation and forestry: increasing the resilience of ecosystems to climate change (Act no. 155/2018) and the adaptation of forests to climate change (Act no. 33/2019). The action plan also calls for the mapping and monitoring of the effects of climate actions on biodiversity. It is important to note that all climate actions can have either positive or negative effects on biodiversity. It is therefore necessary to ensure that the effects of all climate actions on biodiversity are positive and contribute to its conservation. It is not enough to focus solely on carbon sequestration, as in the Paris Agreement, but attention must also be given to the restoration and protection of biodiversity.

Land use is one of the largest contributors to Iceland's emissions, accounting for about 62% of total emissions in 2022. The largest cause of these emissions are degraded ecosystems, such as drained wetlands and soil erosion. Ecosystem restoration (e.g., in wetlands) and increasing vegetation cover are strong actions to reduce emissions and increase carbon sequestration. These actions also contribute to improving ecosystems' ability to adapt and enhance the services that ecosystems provide to humans and other living organisms. Ecosystem restoration and better land use is mentioned in the action plan for agriculture as a method for lowering emissions in agriculture (target 2.3 of the action plan for agriculture). It is important that land reclamation and forestry are carried out using an ecosystem approach, nature-based solutions, and sustainability as guiding principles, such as avoiding the use of invasive species. Equally important is that the objectives of these actions are restoration or conservation of biodiversity alongside climate actions. Special attention needs to be paid to forestry, which is considered a strong climate action. In Iceland, forestry often uses invasive species that have become aggressive and reduced biodiversity in other countries (Nuñez et al., 2017)[10]. It is necessary to ensure that the goal of these actions is to restore ecosystem functionality to meet the targets of GBF, as well as other international agreements. In this context, it is worth noting the increased requirements from the European Union for the use of native species in restoration and climate actions.

[10] Kourantidou et al (2022). The economic costs, management and regulation of biological invasions in the Nordic countries. Journal of Environmental Management

With the exception of forests to climate change, most of the actions in the Action plan for land reclamation and forestry have not yet begun in Iceland, only have a proposed budget but no secured funding.