Nordic Biodiversity Framework

Supplementary material

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

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GBF targets 1-8 and their connections to EU-level conservation and restoration

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Many EU conservation and restoration commitments are related to GBF targets. This makes GBF target implementation in EU countries more straightforward than in non-EU countries. However, to spot country-specific challenges and strengths, scientific expertise is needed to highlight the unique needs for urgent actions.

Biodiversity agreements such as the GBF have been added to Finland's nature protection law, making it a powerful agreement for environmental policy. Finland also follows EU legislation, which has slowed biodiversity loss in all 27 EU member states, including Finland. An example of new regulation is the banning of hunting birds with lead shot in wetlands, which protects the health of ecosystems and species and prevents around 1 million birds from dying of lead poisoning each year. Another example of a nature-friendly EU policy is the new Nature Restoration Regulation, which put the EU Biodiversity Strategy for 2030 into action. The power of EU law should not be underestimated. However, policy development in EU countries should focus on streamlined plans and determined action. Action is the only way to effective nature policy and the only way to stop the ecosystem degradation and biodiversity crisis.

Many Finnish EU Biodiversity strategy key commitments are relevant to Targets 1-8, and the Finnish Nature Panel has given guidelines on what to consider, what indicators to use, and how to measure improvements in nature to fulfil EU commitments (Lakka et al. 2023). Same actions also fulfil the GBF- targets. However, all GBF- targets and actions are being finalized and still pending official Finnish Government decisions.

TARGET 1: Plan and Manage all Areas to Reduce Biodiversity Loss

A nature emergency should be identified in all sectors, including businesses, municipalities, urban planning in cities and municipalities, agriculture, forestry, mining, fishery, and hunting. Companies and cities have shown positive signs of improving their businesses and actions. However, compensating for the loss of intact wilderness areas or red-listed ecosystems is not enough. Over-compensation for the loss of nature is a future way to fight against the biodiversity crisis. To compensate for biodiversity loss, biodiversity offsetting (BO) and other “no net loss” (NNL) policies guide activities. However, biodiversity offsetting is not enough to

guide harmful exploitative activities in nature, and no net loss is not achieving “no net loss” in nature (Josefsson et al., 2021). Companies can explore the possibility of green roofs, planting native trees and using a reporting tool (European Commission, 2021) or exploring other nature-friendly solutions. At the same time, environmental administration must ensure that the natural values of protected areas on land, sea and freshwater ecosystems are not lost. Finland uses the extent of natural ecosystems, the Red List of Ecosystems and the percentage of land and sea area covered by biodiversity-inclusive spatial plans as headline indicators. All sectors should respect these ecosystems in land use and focus on compensating for loss of nature and putting in action best practices such as the over-compensation.

EU Biodiversity Strategy, Nature Protection: Key Commitment Three by 2030:

3. Effectively manage all protected areas, defining clear conservation objectives and measures, and monitoring them appropriately.

MAIN MESSAGES: I. Conservation regulations and actions should effectively reduce biodiversity loss. The success of the plan must always be measured and monitored. A plan itself does not make positive change happen.

II. High biodiversity importance is not always synonymous with the many species in especially northern countries.

TARGET 2: Restore 30% of all Degraded Ecosystems

Finland should follow the guidelines of the EU Nature Restoration Regulation and respect its responsibility for a significant amount of freshwater resources in Europe. To achieve this goal, it is recommended to use the free-flowing rivers as a complementary indicator and closely monitor the index of coastal eutrophication potential (ICEP), the proportion of fish stocks within biologically sustainable levels, and the pesticide environment concentration in aquatic and terrestrial ecosystems. Finland´s goal is: the loss of biodiversity is halted by 2030 so that nature starts to recover, and being nature positive by 2035. To achieve this, Finland should remove Red Listed species from the list of the hunted animals (Table 1). Finland uses the area under restoration as a headline indicator but equal restoration efforts are needed in a cross country and ecosystems.

EU Biodiversity Strategy, Nature Restoration Plan: key commitments 1, 4,7,8 &13 by 2030

1. Legally binding EU nature restoration targets to be proposed in 2021, subject to an impact assessment. By 2030, significant areas of degraded and carbon-rich ecosystems are restored; habitats and species show no deterioration in conservation trends and status; and at least 30% reach favourable conservation status or at least show a positive trend.
4. At least 10% of agricultural area is under high-diversity landscape features.
7. Significant progress has been made in the remediation of contaminated soil sites.
8. At least 25,000 km of free-flowing rivers are restored.

13. The negative impacts on sensitive species and habitats, including on the seabed through fishing and extraction activities, are substantially reduced to achieve good environmental status.

MAIN MESSAGES: I. All ecosystems in Finland are degraded at some level. It is crucial to ensure that by 2030, at least 30 % of areas of degraded terrestrial, inland water, and marine and coastal ecosystems are effectively restored to enhance biodiversity, ecosystem functions and services, ecological integrity, and connectivity. Equality in conservation actions across ecosystems is essential. Finland and other countries should acknowledge that harm is, in many cases, repeatedly caused on land. However, lakes, rivers, and the Baltic Sea receive the most severe and cumulative harmful impact from that action on land, and that harm needs to be restored. II. Sometimes, the best restoration action "treatment" is not to do anything on-site but to block the harmful actions outside the area and use enough strict on-site regulations to protect nature.

TARGET 3: Conserve 30% of Land, Waters and Seas

The majority (89%) of terrestrial protected areas in Finland are smaller than 1km2 in size, and conservation efforts focus primarily on forest ecosystems (METSO program). Finland should guarantee that new protected areas enable connectivity and ensure that all ecosystem types and species are considered equally when selecting new conservation areas. The Finnish Nature Panel recommends that conservation actions should be implemented at the municipality level to ensure equal protection across the country (Lakka et al. 2023).

In this target, Finland has added text: "In terms of cost-effectiveness, it is appropriate to focus initially on the habitats of greatest biodiversity value, i.e. sites that are particularly species-rich or whose management benefits endangered species." This is not the best way to protect nature in Finland. Species-rich ecosystems are not always the best areas and most cost-effective to safeguard biodiversity in Nordic countries. Finland should instead respect the low number of native species and give value to diversity within species. It has been shown globally that there is a high conservation need in areas where diversity within species is high because this valuable biodiversity is underrepresented in current conservation areas (Mills et al., 2018).

EU Biodiversity Strategy, Nature Protection: key commitment 1 & 2 by 2030:

1. Legally protect a minimum of 30% of the EU's land area and 30% of the EU's sea area and integrate ecological corridors, as part of a true Trans-European Nature Network.
2. Strictly protect at least a third of the EU's protected areas, including all remaining EU primary and old-growth forests.

MAIN MESSAGES: I. Finland has a responsibility for European water resources and an obligation to protect them. II. Existing and new conservation should protect the whole biodiversity and ecosystem and not only focus on one species or species group's needs. The ecosystem approach could be one method to identify ecosystems and species' functionality. For example, protect the whole food web, not only top predators like birds. We must ask why

these species exist and whether the energy resources (food) are coming from some other not protected ecosystem like a lake. Conservation actions should always identify the life-sustaining processes and protect them and simultaneously protect areas constantly, not only some limited time of the year.

TARGET 4: Halt Species Extinction, Protect Genetic Diversity, and Manage Human-Wildlife Conflicts

Finland has Nordic fauna and flora, which should be the first priority in conservation actions. Finland uses the Red List Index and the proportion of populations within species with an effective population size > 500 as headline indicators. However, the Finnish Nature Panel also recommends using the Living Planet Index and the potentially disappeared fraction of species (PDF) indicators to halt species extinction in Finland (Lakka et al., 2023). Finland should focus on safeguarding within species diversity and make sure that Red Listed populations have enough genetic diversity to cope with environmental changes.

EU Biodiversity Strategy, Nature Restoration Plan: key commitments 1-14 by 2030

1. Legally binding EU nature restoration targets to be proposed in 2021, subject to an impact assessment. By 2030, significant areas of degraded and carbon-rich ecosystems are restored; habitats and species show no deterioration in conservation trends and status; and at least 30% reach favourable conservation status or at least show a positive trend.
2. The decline in pollinators is reversed.
3. The risk and use of chemical pesticides is reduced by 50% and the use of more hazardous pesticides is reduced by 50%.
4. At least 10% of agricultural area is under high-diversity landscape features.
5. At least 25% of agricultural land is under organic farming management, and the uptake of agro-ecological practices is significantly increased.
6. Three billion new trees are planted in the EU, in full respect of ecological principles
7. Significant progress has been made in the remediation of contaminated soil sites.
8. At least 25,000 km of free-flowing rivers are restored.
9. There is a 50% reduction in the number of Red List species threatened by invasive alien species.
10. The losses of nutrients from fertilisers are reduced by 50%, resulting in the reduction of the use of fertilisers by at least 20%.
11. Cities with at least 20,000 inhabitants have an ambitious Urban Greening Plan.
12. No chemical pesticides are used in sensitive areas such as EU urban green areas.
13. The negative impacts on sensitive species and habitats, including on the seabed through fishing and extraction activities, are substantially reduced to achieve good environmental status.

14. The by-catch of species is eliminated or reduced to a level that allows species recovery and conservation.

MAIN MESSAGES: I. Finland should ensure urgent management actions to halt human-induced extinction, especially stopping hunting of Red-Listed species of known threatened species and promoting the recovery and conservation of species, in particular threatened species, to significantly reduce extinction risk and maintain and restore genetic diversity. II. This GBF target 4 is relevant for all EU Nature Restoration Plan key commitments. Finland should make peace with nature and respect that fact, that peaceful human-wildlife interactions are the key element and necessary for our own survival as a Nordic nation.

TARGET 5: Ensure Sustainable, Safe and Legal Harvesting and Trade of Wild Species

To monitor success, Finland uses the proportion of fish stocks within biologically sustainable levels as a headline indicator. In this, Finland should recognise the by-catch problem in commercial fishing (Olin et al., 2021) and respect the distribution areas of Red Listed species (Hyvärinen et al., 2019) and ecosystems (Kontula & Raunio, 2019). Another serious by-catch problem is the annual deaths of endangered Saimaa ringed Seals in fishing nets in Lake Saimaa (Lakka et al., 2023). At least fifteen bird species are reported as by-catch, and more than half of them are Red Listed species. Finland should also ensure that the Red Listed species, such as a European beaver, is not accidentally hunted as an invasive alien Canadian beaver because these two species are very similar in appearance. It is highly recommended to use the Red List Index for used species, the Living Planet Index for used species and the sustainable use of wild species component indicators. This target also highlights the problem of hunting or fishing Red Listed species. Finland should immediately stop this particular action.

EU Biodiversity Strategy, Nature Restoration Plan: key commitments 13-14 by 2030

13. The negative impacts on sensitive species and habitats, including on the seabed through fishing and extraction activities, are substantially reduced to achieve good environmental status.

14. The by-catch of species is eliminated or reduced to a level that allows species recovery and conservation.

MAIN MESSAGES: I. Hunting of threatened species is not sustainable. Finland should ensure that these activities stop. Finland's activities are dangerous not only to local populations in Finland but also to populations of Nordic countries and globally. The reason for deepening nature loss is our inability as humans to give up the benefits gained before any benefits are left. That is the reason why evidence-based environmental policy is urgently needed in Finland. II. Harvesting activities that destroy ecosystems, like bottom trawling in the Baltic Sea or inland waters, are unsustainable. Environmental policy should encourage innovative harvesting methods that respect ecosystems, target species, and other fauna and flora and stop using techniques that are harmful to nature. III. In EU countries, 10 % of the land, water and sea area should be strictly protected. The 10 % strict protected areas should be areas for nature to recover where hunting, fishing or harvesting should not be permitted.

Table 1. *The list of hunted Red Listed species and the number of hunted individuals from Finland between 2019 and 2023. *All species are from the Finland Red List category in the year 2019, except the Bean Goose (Anser fabalis) status from the year 2015. However, lower goose taxa have been assessed in 2019: Taiga Bean Goose (Anser fabalis fabalis) (VU) and Tundra Bean Goose (Anser fabalis rossicus) (EN). Source: Statistics database, LUKE, Hunting.*

Species	The IUCN Red List Category	Number of hunted individuals in Finland between 2019-2023
Common Eider (*Somateria mollissima*)	Endangered (EN)	4113
Tufted Duck (*Aythya fuligula*)	Endangered (EN)	1018
Eurasian Coot (*Fulica atra*)	Endangered (EN)	133
Bean Goose (*Anser fabalis*)	Vulnerable (VU)*	1425
Eurasian Wigeon (*Anas penelope*)	Vulnerable (VU)	32543
Garganey (*Anas querquedula*)	Vulnerable (VU)	2324 (between 2020-2023). Note: Garganey and Eurasian Teal (*Anas crecca*) were counted together in 2019; 82100 birds were hunted in total.
Northern Pintail (*Anas acuta*)	Vulnerable (VU)	5419
Hazel Grouse (*Tetrastes bonasia*)	Vulnerable (VU)	169800
Willow Ptarmigan (*Lagopus lagopus*)	Vulnerable (VU)	162200
Eurasian Magpie (*Pica pica*)	Near Threatened (NT)	240800
Grey Partridge (*Perdix perdix*)	Near Threatened (NT)	34529
Common Merganser (*Mergus merganser*)	Near Threatened (NT)	3637
Red-breasted Merganser (*Mergus serrator*)	Near Threatened (NT)	32
Long-tailed Duck (*Clangula hyemalis*)	Near Threatened (NT)	3345
Baltic Ringed Seal (*Pusa hispida botnica*)	Near Threatened (NT)	1535
Brown Bear (*Ursus arctos*)	Near Threatened (NT)	1341
Wolf (*Canis lupus*)	Endangered (EN)	163
Finnish Forest Reindeer (*Rangifer tarandus fennicus*)	Near Threatened (NT)	99
Western Polecat (*Mustela putorius*)	Vulnerable (VU)	829
European Beaver (*Castor fiber*)	Near Threatened (NT)	Not known: Finland does not report the number of European Beavers separately. The hunting statistics include similar-looking species, an invasive alien species, a Canadian beaver (*Castor canadensis*), and European beaver. In total, 20500 beavers.

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

Finland uses the rate of invasive alien species establishment as a headline indicator. To properly monitor this target in Finland, it is recommended that these indicators be used: the rate of invasive species impact and the rate of impact, the rate of invasive alien species spread, and the number of invasive alien species introduction events. See more details and examples for target six at the end of the document.

EU Biodiversity Strategy, Nature Restoration Plan: key commitment nine by 2030

9. There is a 50% reduction in the number of Red List species threatened by invasive alien species.

MAIN MESSAGES: I. Chemical conservation actions, such as “chemical toxins,” are not recommended to manage invasive alien species. II. Finland should focus on reducing the rates of introduction and establishment of other known or potentially invasive alien species by at least 50 per cent by 2030 and eradicating or controlling invasive alien species, especially in priority sites, such as Lapland and other areas without or low number harmful invasive alien species. III. Finland should also recognise that Finland has native fauna that looks like an invasive species (Eurasian beaver and North American beaver). Finland should ensure that this kind of introduction never happens again and the near-threatened Eurasian beaver is not hunted accidentally.

TARGET 7: Reduce Pollution to Levels That Are Not Harmful to Biodiversity

Pollution is one of Finland's most significant environmental problems but environmental policies can quickly and positively affect it. The change in the use/sale of pollutants can positively impact nature, biodiversity and human health. Finland should take this target and the needed policy actions very seriously. In GBF content, pollution means chemical toxins (e.g., pesticides, biocides) as well as nutrients, heavy metals, noise, light and plastic. How these pollutants behave in nature varies greatly. That is why many indicators are needed to monitor the pollution status. As forestry is extensive in Finland, pollution from this sector (e.g., fertilizer and pesticides) should also be carefully monitored and cut down. Cities have a considerable role and potential to make excellent decisions regarding this target because they can decide not to use chemical pesticides to protect nature and humans.

This target calls for the risks posed by pesticides and such chemicals to be reduced by half. Eutrophication is a recognised problem in Finland, so the component indicator “fertiliser use” should be one of the indicators. Finland’s aim: “The risks of pollution will be reduced to a level that is not detrimental to biodiversity by 2030”, needs more indicators and direct information on the use of pollutants per year. A positive policy action would be a pesticide tax in Finland, which Denmark, Sweden, and Norway have already used to cut down chemical sales (Nielsen et al., 2023). Poisonous chemicals should be better regulated because they influence human health and are used in agroecosystems, boreal forests and cities. There must be a price tag for

poisoning nature. Forest owners should profit from choosing not to use fertilisers or pesticides and selling organic raw materials, including timber. The state could support the life-sustaining measures rather than collect fees for the nature-positive activities.

Finland uses the index of coastal eutrophication potential and the pesticide environment concentration as headline indicators. However, a low level of monitoring pesticide concentrations in the environment is insufficient to get a complete picture of the chemicals. Currently, Finland records pesticides to two registers: one for plant protection products and the other for biocide. Instead, Finland should use indicators for the total use of pesticides per year and report the pesticide use per area of cropland and forests annually. Other valuable indicators would be: the name, amount/volume/concentration of highly hazardous pesticides by type (per land/marine area), the floating plastic debris density (by micro and macro plastics), the plastic debris density, the trends in loss of reactive nitrogen to the environment, the trends in nitrogen deposition and the underwater noise pollution.
EU Biodiversity Strategy, Nature Restoration Plan: key commitments 1, 3, 7 & 10 by 2030

2. The decline in pollinators is reversed.

3. The risk and use of chemical pesticides is reduced by 50% and the use of more hazardous pesticides is reduced by 50%.

7. Significant progress has been made in the remediation of contaminated soil sites.

10. The losses of nutrients from fertilisers are reduced by 50%, resulting in the reduction of the use of fertilisers by at least 20%.

12. No chemical pesticides are used in sensitive areas such as EU urban green areas.

MAIN MESSAGES: I. Finland needs a pesticide tax to control the amount of chemical toxins that end up in Finnish nature. Finland should follow the example of other Nordic countries and implement a pesticide tax immediately. II. Nutrients used in agriculture and forestry end up in rivers, lakes and, finally, the Baltic Sea. Rapid growth on land means death in waters. The run of water from land contains the nutrients, chemical toxins and humic substances that change the aquatic ecosystems and turn lakes nutrient-rich, dark, and hostile for life. Finland, together with 195 other countries, should reduce excess nutrients lost to the environment by at least half, including through more efficient nutrient cycling and use. In Finland's case, forestry operators should take this target seriously, because Finland has an enormous dich network to carry all nutrients and chemical toxins to inland waters and the Baltic Sea. III. EU Nature Restoration Plan's key commitment 12 points out that urban areas are sensitive, and no chemical pesticides should be used in urban green areas. This is a severe warning of how poisonous these chemicals are. Finland should protect its citizens and nature and allow the use of chemical pesticides only for limited areas to avoid known risks and the unknown risks that these chemical toxins cause together.

TARGET 8: Minimize the Impacts of Climate Change on Biodiversity and Build Resilience

As a forest-rich country, the above-ground biomass stock in forests (tonnes/ha) is an excellent indicator of changes in different types of nature because forestry practises significantly impact aquatic ecosystems in Finland. While continuous forest cover builds resilience, monoculture ecosystems in forestry and agriculture build instability in nature and can increase the risk for disease outbreaks and extreme events. For example, disease outbreaks in fur farming and migratory birds in Europe can shake societal stability and may cause unexpected economic and irreversible biodiversity losses. Most concerning is that the Finnish government is not taking the global nature emergency seriously. The GBF webpage states (as of 18 March 2025) that Finland's main policy measures or actions necessary to achieve the national target will be added later once the related actions are approved by the government.

EU Biodiversity Strategy, Nature Restoration Plan: key commitments 3-6 & 8-11 by 2030

4. At least 10% of agricultural area is under high-diversity landscape features.
5. At least 25% of agricultural land is under organic farming management, and the uptake of agro-ecological practices is significantly increased.
6. Three billion new trees are planted in the EU, in full respect of ecological principles.
8. At least 25,000 km of free-flowing rivers are restored.
9. There is a 50% reduction in the number of Red List species threatened by invasive alien species.
10. The losses of nutrients from fertilisers are reduced by 50%, resulting in the reduction of the use of fertilisers by at least 20%.
11. Cities with at least 20,000 inhabitants have an ambitious Urban Greening Plan.

MAIN MESSAGES: I. Finland should move from a single-species economy to a multi-species economy in forestry and agriculture while minimising the negative impacts of climate action on biodiversity and fostering positive impacts. II. Storms and flooding can cause significant damage, but trees (e.g., *Betula pubescens, Prunus padus*) can prevent flood damage by slowing the flow of rainwater, reducing erosion and absorbing rainwater. Cities and companies could put effort into planting native trees in places with high flooding risk, and report planted trees using the EU MapMyTree -data tool. III. Many of the EU Biodiversity Strategy Nature Restoration Plan's key commitments are related to this GBF target. Countries should strive for order in nature, which means that species can choose where they occur without humans forcing them to move. This may appear chaotic to humans, but precisely, it enhances nature's stability to withstand extreme events and ongoing environmental changes.

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

Introduction

An invasive alien species (IAS) has spread to new areas with human intervention. Invasive alien species are animals, plants, pathogens and other organisms that are non-native to an ecosystem, which may cause environmental harm or negatively affect human health. They can have significant negative impacts on the economy. The total cost of invasive species was EUR 7.94 billion in Nordic countries: Norway (EUR 3.07 billion), Denmark (EUR 2.09 billion), Sweden (EUR 1.38 billion), Finland (EUR 1.06 billion) and Iceland (EUR 24.20 million) (Kourantidou et al., 2022). The monetary cost of biological invasion is underestimated in Nordic countries (Kourantidou et al., 2022). The economic impact was estimated to be at least EUR 12 billion annually in the EU (European Commission 2013); globally, the annual cost of a biological invasion was estimated to be EUR 402.1 billion in 2019 (IPBES 2023). The Kunming Montreal Biodiversity Framework contains the commitment to prevent and manage established invasive alien species and decrease the rates of introduction and establishment of other known or potential invasive alien species by at least 50 % by 2030.

Invasive alien species impact native biodiversity via the decline or elimination of native species through predation, competition, or the transmission of pathogens (Hyvärinen et al., 2019), or harming the ecosystem or ecosystem functions (Kontula & Raunio, 2008). Invasive alien species are one of the direct drivers of biodiversity loss (IPBES 2019). They have caused 1 215 local extinctions of native species (IPBES 2023). Their compounding effect is likely to exacerbate the negative impacts on native flora and fauna in the Nordic countries, as seen in different ecosystems, including boreal forests (Venäläinen et al., 2020), the Baltic Sea archipelago (Jauni et al., 2023a), and Arctic freshwater ecosystems (Ruokonen et al., 2018). Invasive alien species are a socioeconomic problem in Nordic Countries because they impact fisheries, forestry and agriculture (Thor et al., 2023; Kourantidou et al., 2022), which are essential livelihoods in the North.

One key commitment of the Kunming Montreal Biodiversity Framework is to reduce the rates of introduction and establishment of other known or potential invasive alien species by at least 50 % by 2030. Finland had 29 harmful invasive alien species, eight species groups, and two hybrid species on the national list of harmful invasive alien species in 2024 (Table 2). Fifteen of them are plants, four mammals, eight amphibians, two molluscs, and one hybrid bird. The eight species groups included alien carnivores, alien water frogs, alien raptors, alien crows and jays, alien owls, alien falcons, chipmunks, and alien bats. To reach the 50 % goal, Finland should: I) freeze the establishment of new invasive alien species populations (Table 2) and II) prioritise the removal of populations where dispersal (e.g., seed dispersal) for new areas is fast (e.g., close to ditches, rivers, inland waters and Baltic Sea) immediately. Mechanical removal techniques for alien species are recommended to protect native fauna. Chemical treatments

can harm the native fauna (Moore et al., 2012; Eloranta et al., 2021), especially when used close to aquatic ecosystems, (e.g., glyphosate) (Feng et al., 1990).

Tabel 2. Finland's national list of harmful invasive alien species in 2024 (Vieraslaji.fi 14.11.2024).

Species	Latin name	Environment			Plant	Mammal	Bird	Amphibian	Mollusca	Hybrid species
		Terrestrial	Freshwater	Marine						
Garden lupin	*Lupinus polyphyllus*	x			x					
Nootka lupin	*Lupinus nootkatensis*	x			x					
Japanese rose	*Rosa rugosa*	x			x					
	Sorbaria sorbifolia	x			x					
Japanese knotweed	*Reynoutria japonica*	x			x					
Canada goldenrod	*Solidago canadensis*	x			x					
Giant goldenrod	*Solidago gigantea*	x			x					
	Solidago altissima	x			x					
Giant knotweed	*Reynoutria sachalinensis*	x			x					
Orange jewelweed	*Impatiens capensis*	x			x					
	Acer pseudoplatanus	x			x					
Aleutian ragwort	*Jacobaea cannabifolia*	x			x					
	Spiraea alba	x			x					
	Reynoutria ×bohemica	x			x					
Canadian waterweed	*Elodea canadensis*		x		x					
American mink	*Neogale vison*	x	x			x				
Sable	*Martes zibellina*	x				x				
Beech marten	*Martes foina*	x				x				
Wolfdog		x				x				x
Lesser white-fronted goose	*Anser erythropus hybrid*	x	x				x			x
Edible frog	*Pelophylax esculentus*		x					x		
Lake frog	*Pelophylax ridibundus*		x					x		
Pool frog	*Pelophylax lessonae*		x					x		
Yellow-bellied toad	*Bombina variegata*		x					x		
Agile frog	*Rana dalmatina*		x					x		
Northern leopard frog	*Lithobates pipiens*		x					x		
European tree frogs	*Hyla arborea*		x					x		
Sand lizard	*Lacerta agilis*		x					x		
Spanish slug	*Arion vulgaris*	x							x	
	Krynickillus melanocephalus	x							x	

One key commitment of the EU Biodiversity Strategy for 2030 is to decrease the number of Red-Listed Species threatened by invasive alien species by 50 % (European Commission 2020). Invasive alien species threatened 63 endangered and near-threatened species in Finland in 2019 (Hyvärinen et al., 2019). EU countries will be responsible for ensuring that the number of endangered and near-threatened species threatened by invasive alien species decreases by 50 %. This means that invasive alien species in the next Finland Red List should threaten a

maximum of 31 endangered and near-threatened species. Finland will publish the next Red List of threatened species in 2029.

Indicators

Headline indicators: Rate of invasive alien species establishment. National list of harmful invasive species: 29 species in 2024.

Component indicators: Rate of invasive alien species spread. Figure 1 shows the distribution map for all invasive species and maps for the four most harmful invasive alien species in Finland in 2024.

Complementary indicators: Red List Index impacts of invasive alien species. Number impacted Red Listed species: 63 species in 2019.

In Finland, the most harmful invasive alien plant species to Red-Listed species are garden lupin (*Lupinus polyphyllus*), and Japanese rose (*Rosa rugosa*) (Lakka et al., 2023, Figure 1). It is estimated that 72 and 48 Red List species are threatened by garden lupin and Japanese rose, respectively (Jauni et al., 2023b). The most harmful invasive alien mammals are the American mink (*Neogale vison*) and the raccoon dog (*Nyctereutes procyonoides*) for the Red Listed species (Figure 1).

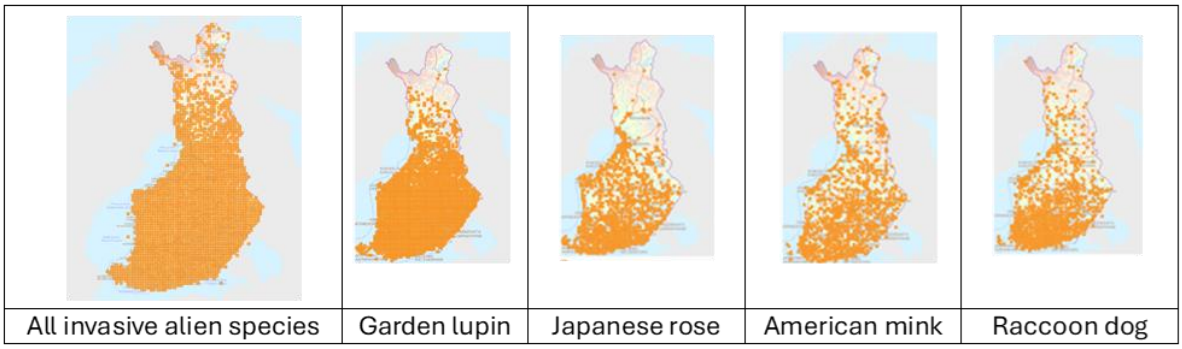

Figure 1. Observations of invasive alien species in Finland. On the left are observations of all invasive alien species in Finland. Other maps are observations of the four most harmful invasive alien species for Red Listed species. (Vieraslaji.fi 14.11.2024)

Current status of an invasive alien species (IAS) in Finland

Finland's status of invasive alien species in 2024 and 2025: the number of harmful invasive alien species (national list (29 species/39 in total, Tabel 2), EU list of harmful invasive alien species (89 species, not all in Finland yet), regulated plant pests (55 species). These three lists are Finland’s baseline of harmful invasive alien species in 2024 and 2025.

Recommendations

- The areas in Lapland (Figure 1) where no observations of invasive alien species have been made are biologically valuable because their native fauna has not yet been disturbed by invasive alien species. Finland's management actions regarding invasive alien species should prioritize stopping the establishment of any invasive alien species in this unique area.
- The areas on land, inland waters and sea, which are still uncolonised by harmful invasive species, are potential conservation areas.
- Chemical removal of invasive alien species is not recommended as it adversely affects native fauna.

Finland: Lessons learned from Iceland and Denmark

Finland should follow Iceland's example of how Icelandic ministries and stakeholders work together. Insufficient engagement by different ministries may partly explain a delay in reporting and the low implementation rates of GBF targets in Finland. Natural emergencies such as biodiversity loss and environmental change operate nationally and globally. The best thing is that we can take nature-positive action in all sectors. Ministries preparing national decisions must know international issues and agreements that cut across societies. A nature-positive decision that affects the whole society and across sectors can make a significant positive change for species and humans living in Finland, which can be identified using indicators.

Finland should follow Denmark´s example and implement a pesticide tax on chemical toxins. Pesticide tax works in other Nordic countries (Nielsen et al. 2023); there is no reason why it won't work in Finland. Finland as a society would get benefits which are related to human health and sustainability in the agricultural and forestry sectors, which can be Finland´s strength in business now and in the future. Naturally, lowering the amount of chemical toxins entering nature would significantly benefit the Finnish flora and fauna and reduce the cost of cleaning contaminated lands.

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