Natura 2000 Seminar for the Boreal Region



9-12 October 2023

Nuuksio National Park, Helsinki, Finland

Background Document 4th Boreal Biogeographical seminar

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Event: For more information on this seminar, see the Natura 2000 Communication Wiki: Boreal Region https://biogeoprocess.net/boreal-region-2/

Scan the QR code for the latest documentation for the Boreal seminar:

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1. Introduction: Natura 2000 biogeographical process and the Natura 2000 seminars

The Natura 2000 biogeographical process was launched in 2011 by the European Commission. The objective of the process is to promote knowledge exchange, networking and cooperation on Natura 2000-related issues at biogeographical region level. The regional seminars of Natura 2000 have a great role in networking and cross-border cooperation. Workshops, events, meetings and other actions promote exchange of knowledge and experiences, communication between parties, so that common guidelines and instructions are worked out to maintain and restore endangered species and habitats at European and regional scale.

Previous seminars indicate that member states in the Boreal region are facing similar challenges in management and maintenance of Natura 2000 sites, habitats and species. The Natura 2000 seminars promote cross-border cooperation and a coherent management of Natura 2000 at biogeographical region level. member states are responsible for implementation of Natura 2000, so the seminars are a great opportunity for sharing information and experiences at the biogeographical level. The seminars promote open discussion between interested parties as key stakeholders, expert networks and non-governmental organizations (NGO) are involved.

As the responsibility for implementing Natura 2000 lies with the member states, the seminars create an opportunity for the competent authorities to exchange information and coordinate conservation actions as well as discuss and involve other key stakeholders and expert networks, including NGOs. The Natura 2000 biogeographical process was launched in 2011 by the European Commission. The objective of the process is to promote knowledge exchange, networking, and cooperation on Natura 2000-related issues at biogeographical region level. At the heart of the process lie the Natura 2000 seminars, coupled with a networking programme consisting of workshops, events, or meetings relevant to the objective of the process as well as by other related actions.

1.1. Biodiversity Strategy 2030

The strategic orientation of the process is evolving over time. On 20 May 2020 the European Commission adopted the EU Biodiversity Strategy for 2030 “Bringing nature back into our lives” [1]. It is a comprehensive, ambitious and long-term plan for protecting nature and reversing the degradation of the ecosystems services they provide. Among the high number of the Strategy targets to be achieved by 2030, the two most relevant for the biogeographical process are:

- **Protected areas**: protecting 30% of EU land and 30% of EU marine areas, designating part of them as ‘strictly protected’, and

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1590574123338&uri=CELEX:52020DC0380

- **Conservation status**: having clear conservation objectives and measures in place, taking measures to stop deterioration, and improving the status of at least 30% of all species and habitats not currently in favourable status.

These targets are not legally binding and do not replace the legal obligations on member statesunder the Birds[2] and Habitats[3] Directives. Rather, they represent a political agreement for action to drive their delivery through a new and over-arching context for the Natura 2000 process.

1.2. Pledge and review

As part of the initiative to meet the objectives set out within the Biodiversity Strategy 2030, the European Commission has requested that member states make pledges to show how they will meet the protected area and conservation status targets. These should follow the format and contents agreed[4,5] with the Commission and the European Environment Agency (EEA), using the Excel file template developed by the EEA and the European Topic Centre for Biodiversity (ETC-BD) for pledge submission to the EEA's Reportnet 3 platform. Commission Guidance documents have been produced that provide further clarifications for each of the targets[6,7]. Pledges will be peer reviewed by the Commission, the EEA, and the other member states. A short summary of the pledges received so far is included in chapter 2. The Natura 2000 seminar programme is expected to be a central element of the review process for the pledges (see below).

1.3. Biogeographical Process and Natura 2000 seminars

To provide additional support to member states for the pledge and review process, the scope of the Natura 2000 biogeographical process has been expanded. In addition to helping member states to implement their legal obligations under the EU Birds and Habitats Directives, the process will also help them to implement the targets under the EU Biodiversity Strategy for 2030.

Natura 2000 seminars will therefore support key players in:

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[2] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32009L0147

[3] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A01992L0043-20130701

[4] Format for the protected areas target: https://circabc.europa.eu/ui/group/6f30d1d2-d6f2-4c6e-a4dc-1feb66201929/library/55ebe353-e369-49ab-92b1-4ddab67424b0/details
Format for the status improvement target: https://circabc.europa.eu/ui/group/6f30d1d2-d6f2-4c6e-a4dc1feb66201929/library/395c7cde-e2c4-40b0-9afc-638a214d6b39/details

[5] The reference page on the Central Data Repository which includes all supporting documents and guidelines https://cdr.eionet.europa.eu/help/pledge

[6] Commission guidance on the protected areas targets: https://ec.europa.eu/environment/publications/criteria-and-guidance-protected-areas-designations-staffworking-document_en

[7] Commission guidance on the status improvement targets: https://circabc.europa.eu/ui/group/6f30d1d2d6f2-4c6e-a4dc-1feb66201929/library/bd8a2cd4-f774-4574-bd88-0b1fa012b725/details

- achieving a common understanding on processes and objectives of the targets under the Biodiversity Strategy,
- presenting national pledges related to these targets for a peer review by the Commission, the EEA and the other member states,
- achieving a common understanding on relevant topics, particularly in relation to Natura 2000, to improve and standardise what is done at national level in terms of implementation and management, financing, and monitoring and reporting, to ensure coherence and effectiveness of implementation at supranational levels,
- sharing good practices in regulation, supervision, conservation, restoration with a view to promoting and upscaling them, and facilitating setting up joint projects to support delivery of these objectives, including on management/restoration.

1.3.1. Biogeographical process in the marine regions

The EU Biodiversity Strategy applies equally to the terrestrial and marine environment. Additional work has been put in place to provide better, more focused, support to member statesworking in marine regions[8]. The terrestrial and marine biogeographical processes are complementary, which is essential as the 30% conservation status improvement target does not distinguish between habitats and species in marine and terrestrial regions. There is a strong level of liaison between the two processes, including a joint communications platform and a shared wiki[9].

[8] Support for the Natura 2000 Biogeographical Process in the Marine Regions ENV/2022/OP/0006

[9] https://biogeoprocess.net/

2. The Boreal region

The Boreal region is the largest biogeographical region of geographical Europe and involves five EU member states[10]: Sweden, Finland, Estonia Latvia and Lithuania (Figure 1). The Boreal region is a land of forests and wetlands. Forests cover around 60% of the region and dominate the landscape. To the north, the Boreal taiga forests merge into the Arctic tundra, to the west with the Fennoscandian mountains and, to the south, they gradually turn into the deciduous forests of the Continental region.

The region has relatively flat lands, mostly below 500 m. The coastline and islands around the Baltic Sea and Gulf of Bothnia are also very characteristic of a boreal environment. Centuries of grazing and haymaking have resulted in typical semi-natural habitats of high conservation value, such as the Boreal Baltic coastal meadows and the Nordic alvars.

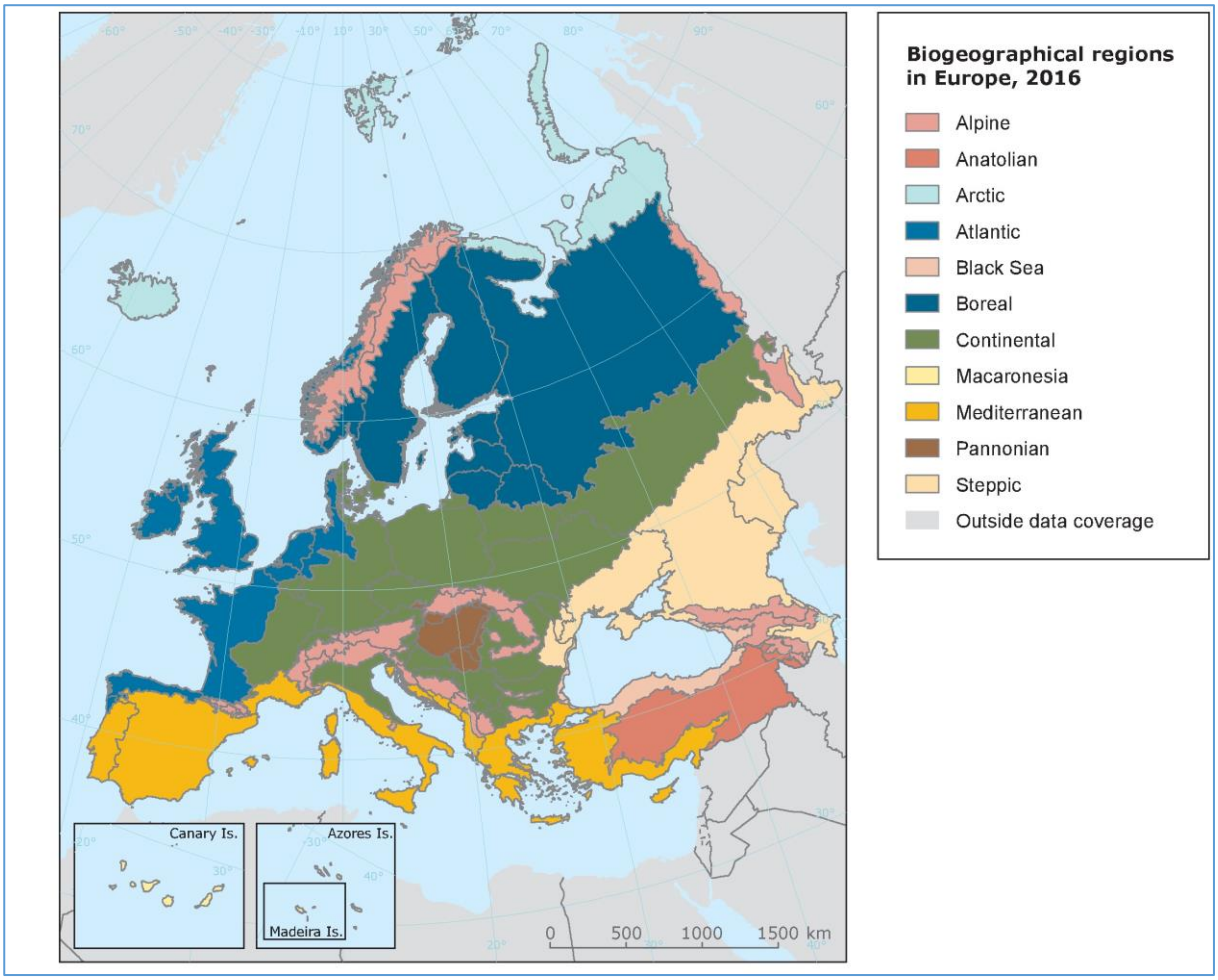

Figure 1: Biogeographical regions in Europe (source: EEA[11], last modified October 2017)

[10] Note that in terms of pure biogeography the Boreal region is considered to include parts of Russia and Biolorussia, as welll as coastal areas of Norway (see Figure 1), all of which are not included in the scope of the Nature Directives.

[11] https://www.eea.europa.eu/data-and-maps/figures/biogeographical-regions-in-europe-2

The Boreal region is relatively rich in species, considering its latitude. Species such as the flying squirrel (*Pteromys volans*), the wild forest reindeer (*Rangifer tarandus fennicus*), the freshwater Saimaa ringed seal (*Phoca hispida saimensis*) and the Baltic ringed seal (*Phoca hispida botnica*) only occur in that region. Lynx, beaver and brown bear are also typical. Sweden and Finland are the only EU countries to host the highly endangered wolverine (*Gulo gulo*). The dominant forest type, known as western taiga, contains both Norway spruce (*Picea abies*) and Scots pine (*Pinus sylvestris*), on a sparse layer of mosses, lichens and ericaceous shrubs on shallow soils. The taiga forests host large mammal species such as Brown Bear, Eurasian Lynx, Grey Wolf, Elk and Reindeer and a range of middle-sized mammal species such as Beaver (*Castor fiber*), Red Squirrel (*Sciurus vulgaris*) and Hare (*Lepus* spp.)[12].

The region is a land of contrasts, with increasingly large urban areas in the south (Stockholm, Riga, Helsinki) and vast areas in the north sparsely populated. The south averages 40 inhabitants/km² whereas the north counts around 2–3 inhabitants/km². Large scale agriculture is mostly concentrated in the south and is becoming increasingly intensive over time.

Photo 1: Boreal landscape (source: Markus Sirkka)

Commercial forestry is the dominant land use throughout the region, so the forest is mostly of reduced conservation value. Many boreal countries have now introduced national programmes to buy up and preserve the remaining 5-10 % of natural old-growth forests. Hunting is a popular recreational activity

[12] Guidelines on Wildernessin Natura 2000, European Commission, 2013, https://www.eea.europa.eu/data-and-maps/figures/biogeographical-regions-in-europe-2

in Boreal region but depend on EU and national legislation. Large carnivores can be hunted based on Hunting Acts in certain MS. Attitudes towards large predators, however, are still an issue of concern, despite dwindling human population figures and the extremely limited number of accidents between man and predator.

It can take up to 35 years for the shallow waters of the Baltic Sea to be fully renewed due to its poor connection to the open sea. This makes the Baltic Sea highly prone to eutrophication. The region may also expect an overall increase in average annual temperature of at least 2°C by 2050. The consequences for ecosystems are difficult to predict but rare species such as the Saimaa ringed seal, arctic fox and forest reindeer are all likely to be affected. Higher temperatures may also lead to an increased release of greenhouse gases from boreal forests and peat deposits.

2.1. The biogeographical process in the Boreal region

The first Natura 2000 seminar for the Boreal region was held in Hämeenlinna, Finland, 28-29 May 2012. Separate working groups discussed the different habitats and management issues and the priority conservation issues facing each of four broad habitat groups.

The second Boreal Natura 2000 seminar took place in Vilnius, Lithuania from 5-7 October 2016. It brought together 86 Natura 2000 practitioners and expert stakeholders from the Boreal region.

The third Natura 2000 seminar for the Boreal region was held in Tallinn, Estonia, in 14-16 October 2019. It brought together 68 participants from 6 member states to discuss and promote transboundary cooperative actions.

The themes of the third seminar were:

- Stakeholder engagement in Natura 2000 via communication, targeting on private landowners and industries in the forestry sector;
- Priorities for action in order to improve prioritization and set objectives for restoration and conservation targets in the Boreal region through the prioritized action frameworks (PAF);
- Natura 2000 and climate change adaption in nature conservation and in integrated management of Natura 2000 sites.

The third day of the Seminar was focused on the habitat working groups (rivers and lakes, wetlands, forests, grasslands) of the Boreal region.

Photo 2: Boreal grassland management (source: Kalev Sepp)

2.1.1. Current conservation status

An overview of the conservation status of habitats and species in the Boreal region is provided by member states reporting under Article 17 of the Habitats Directive, for the period 2013-18[13]. Based on the member states reporting the overall conservation status of species and habitats for the Boreal region has been assessed (for the method please consult Article 17 biogeographical assessments - Methodology).[14] This provides a baseline against which progress towards the conservation status targets for the Boreal region can be assessed. Each habitat or species is assessed as favourable (FV), inadequate (U1), bad (U2) or unknown (XX). In addition, a trend value is reported for each assessment value, deteriorating (D), increasing (I), stable (S), or unknown (Unk). While equivalent information regarding the short and long term trends is also available for bird species, in the same reporting round under Article 12 of the Birds Directive, these data are not reported by biogeographic region and not presented here.

2.1.2. Habitats

Figure 2 shows the combined results of the habitat assessment for the Boreal region. Of the 82 habitattypes occuring in the boreal region almost half of all habitats were reported to have a bad conservation status in the latest reporting period. Over 1/3 of the trend of those habitats not in a good status was either stable or improving.

[13] https://tableau-public.discomap.eea.europa.eu/views/PAperbiogeographicalregion/Story1?%3Adisplay_count=n&%3Aembed=y&%3AisGuestRedirectFromVizportal=y&%3Aorigin=viz_share_link&%3AshowAppBanner=false&%3AshowVizHome=n (accessed 11-07-2023)

[14]https://nature-art17.eionet.europa.eu/article17/static/documents/Article%2017%20Assessment%20tool%20methodology.pdf

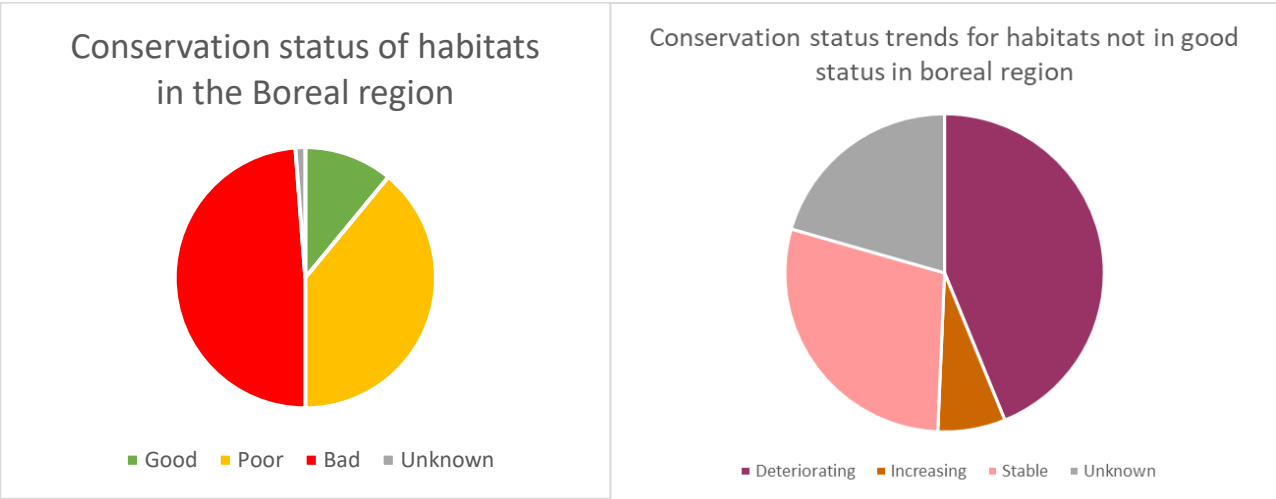

Figure 2: Article 17 reporting for habitats of the Boreal region (Conservation status assesment left, trend information right)

2.1.3. Species

Figure 3 presents the combined results of species assessment for sember state reporting in the Boreal region for the period 2013-18. Of the species occuring in the boreal region around 1/3 was reported to have a good status in the latest reporting period. Furthermore, of those species not in a good status, over 40 % had either a stable or improving trend.

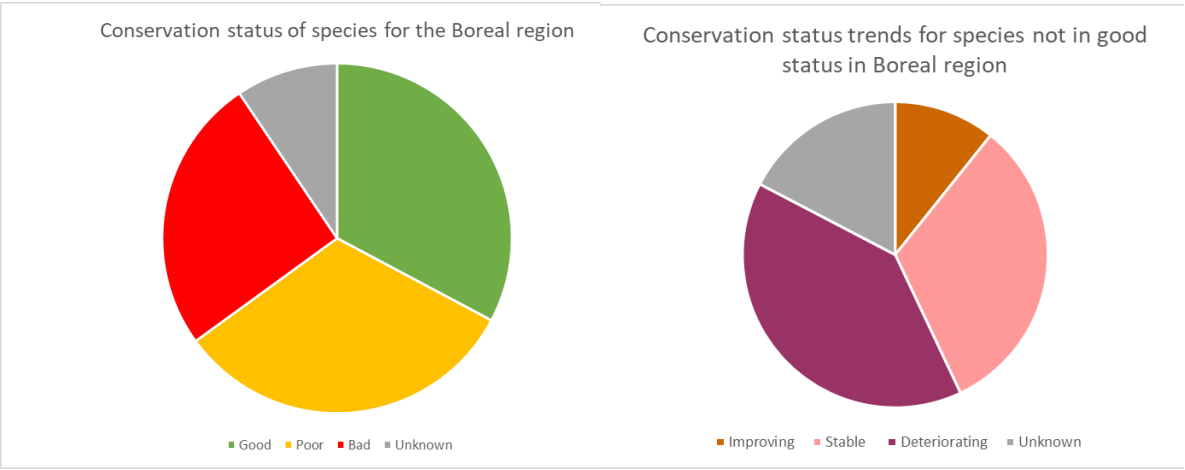

Figure 3: Article 17 reporting for species of the Boreal region (Conservation status assesment left, trend information right)

2.1.4. Current Protected Area coverage

The most recent analysis of terrestrial protected area coverage at biogeographical regions level was conducted by European Environment Agency based on the data reported by the end of 2020 for Natura 2000 sites and in 2021 for nationally designated areas (figure 4) [12]. It combines data for Natura 2000 sites with those for nationally designated areas reported by member states and therefore provides an

overview of the total area that is designated as protected, accounting for overlaps between different designations. Figure 4 shows both the absolute area in square kilometres and the percentage of the total area of a biogeographical region covered by protected areas which can be compared against the 30% protected areas target of the EU Biodiversity Strategy.

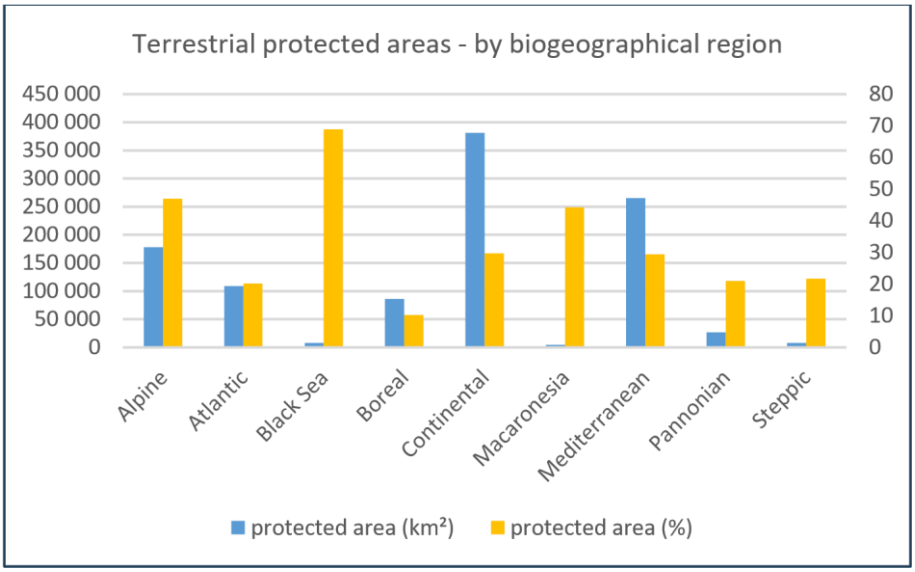

Figure 4: Terrestrial protected areas summarised by biogeographical region

The EEA statistics also show the total area under some protection regime in each member state, accounting for the overlaps between different designations (figures 5 and 6). Figure 5 shows protected area coverage by member state across all of their biogeographical regions (e.g. Sweden includes areas in three regions), while Figre 6 shows protected areas coverage by member state for their areas in the Boreal region specifically. However, it should be noted that these statistics were prepared before the submission of protected area pledges by member states and, therefore, further consideration will be required to reflect the approaches taken by member states with regards to confirming which nationally designated areas should be counted towards the 30% target.

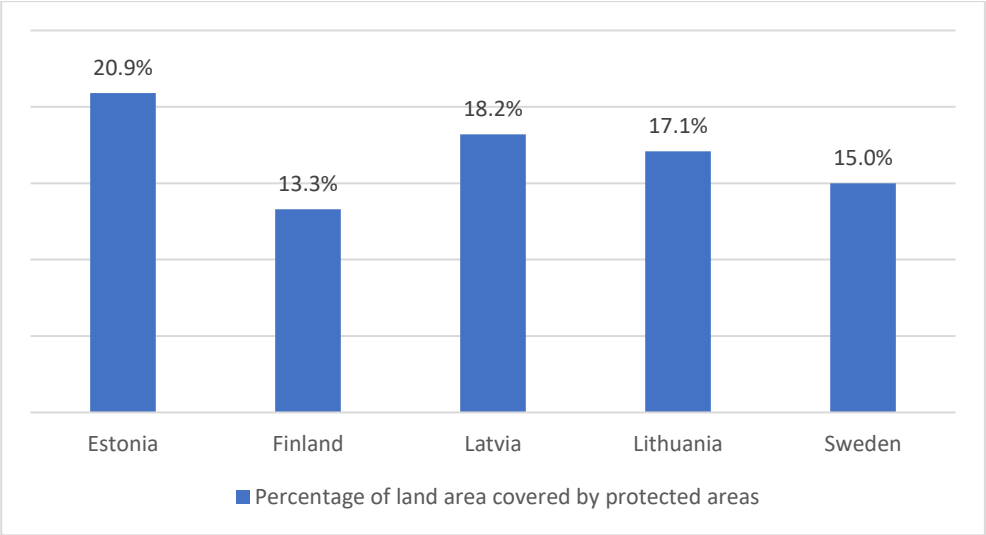

Figure 5: Total terrestrial protected areas coverage by member state (across all regions)

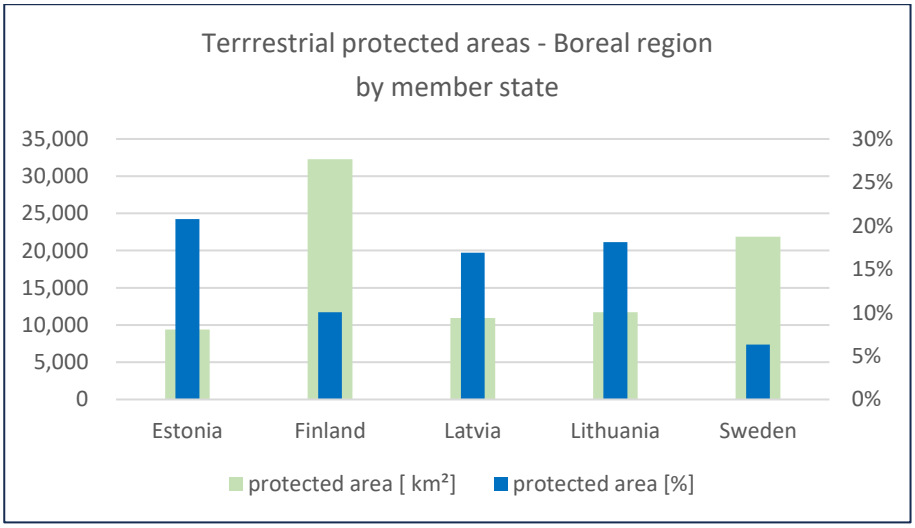

Figure 6: Terrestrial protected areas in the Boreal region, km² and share (%) per member state

Additionally, it is also possible to see the contribution of each member state towards the protected areas network in the region (figure 7). It should be noted, however, that the land area of the member states falling within the Boreal biogeographical region varies quite significantly, with larger member states naturally contributing more towards the total protected areas network.

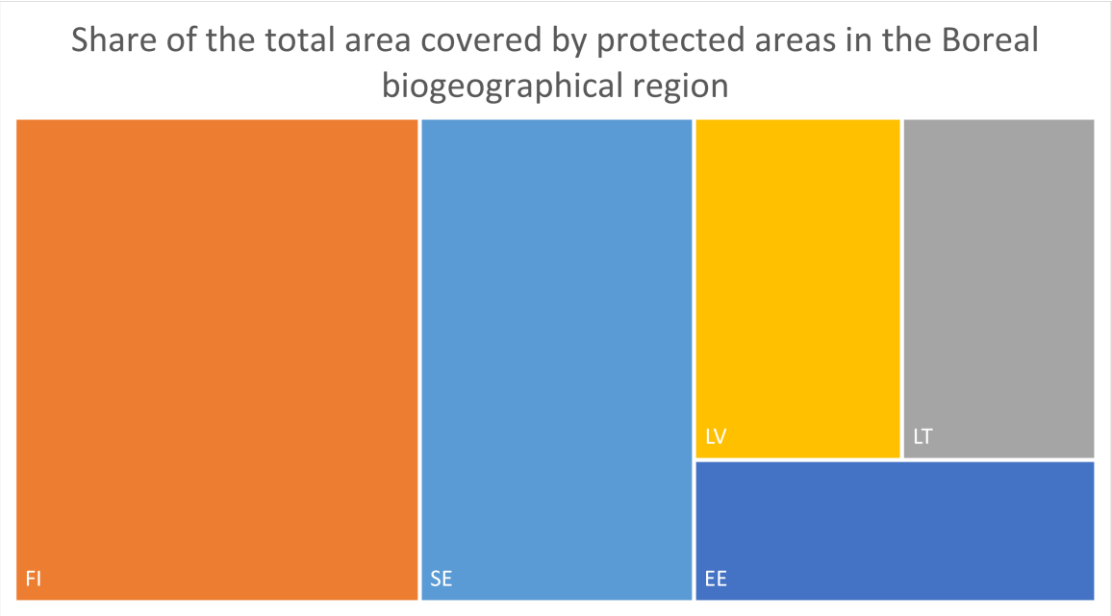

Figure 7: Share of the total area covered by protected areas in the Boreal biogeographical region

2.2. Status of pledges in the Boreal region

Sweden is the only member state in the Boreal region that submitted pledges so far (as of 18 September 2023). It submitted both protected area pledges and status improvement pledges. Both pledges are publicly accessible online[15]. The EEA is still verifying the submissions on technical errors or duplications. During the seminar the preliminary results of the analysis of the Swedish pledges will be presented.

For various reasons, the other four member states in the Boreal region (Finland, Estonia, Latvia, Lithuania) have not yet submitted any pledges.

2.2.1. Preliminary analysis of the protected area pledge

In terms of protected areas pledges, a preliminary analysis has been undertaken to look at the question of the current baseline (in terms of national land area covered by protected areas) through reviewing the reporting by the member states regarding nationally designated areas which should be counted towards the 30% target. This will be further discussed during the seminar, and it is hoped that such discussion will help understand better the approaches taken by the countries in this regard.

Furthermore, a preliminary analysis of the Swedish pledges regarding future protected and strictly protected areas has been undertaken, the results of which will also be discussed during the seminar. While it was possible to calculate some trends for the Boreal

[15] https://reportnet.europa.eu/public/dataflow/703 and https://reportnet.europa.eu/public/dataflow/705

biogeographical region, a more comprehensive assessment can only be done once the pledges from all countries in that region have been received.

2.2.2. Preliminary analysis of the conservation status improvement pledge

The following member state-level assessment has been undertaken of the pledges submitted by Sweden.

- completeness of the pledge, i.e. whether all Habitats Directive species and habitats in unfavorable status or birds species in non-secure status are included in one of the categories of the pledge (non-deterioration or improvement)
- whether the pledge matches the expectation that 30 % of species and habitats currently in non-favourable or non-secure status are expected to show (at least) a positive trend by 2030
- for which species and habitats member states consider that deterioration cannot be halted (see Table 1)

The results of this assessment will be presented during the seminar.

Table 1 list the species for which deterioration is considered unavoidable in Sweden.

Name	group
Clangula hyemalis	birds
Falco columbarius	birds
Calidris temminckii	birds
Tringa erythropus	birds
Asio otus	birds
Luscinia luscinia	birds
Turdus iliacus	birds
Phylloscopus sibilatrix	birds
Phylloscopus trochilus	birds
Ficedula hypoleuca	birds
Carpodacus erythrinus	birds
Calcarius lapponicus	birds
Acanthis flammea [cabaret and exilipes]	birds
Clangula hyemalis	birds
Mergus serrator	birds
Lyrurus tetrix tetrix	birds
Vertigo angustior	HD species
Astacus astacus	HD species
Lepus timidus	HD species
Lycopodium spp.	HD species
Botrychium simplex	HD species

The following questions specifically focus on the Boreal region part of the Swedish territory:

- which species and habitats in the Boreal region of Sweden are covered by pledges for non-deterioration or improvement by 2030?
- What is the current conservation status and trend of species and habitats under the Habitats Directive pledged for improvement, based on the latest Article 17 reporting -pledged in the Boreal region?

The results of this assessment will be presented during the seminar.

3. Themes selected for the fourth Natura 2000 seminar for the Boreal region

In addition to discussion of the progress with the pledge and review process, this Natura 2000 seminar for the Boreal region will consider four themes that are of common concern across member states. The themes were selected following discussion between the host country and the European Commission.

- Theme 1: Planning of restoration and management
- Theme 2: Pollinators Initiative in the Boreal context
- Theme 3: Old growth forest – what are criteria for old growth forest?
- Theme 4: Protected area prioritization in the context of climate change

The following sections provide background information on each theme, along with an overview of the objectives for seminar discussions.

3.1. Theme 1: Planning of restoration & management

3.1.1. Context

On 20 May 2020 the European Commission adopted the EU Biodiversity Strategy for 2030 "Bringing nature back into our lives". It is a comprehensive, ambitious and long-term plan for protecting nature and reversing the degradation of the ecosystems services they provide. Among the number of the Strategy targets to be achieved by 2030, the two most relevant for member states and the biogeographical process are:

- **Protected areas**: protecting 30% of EU land and 30% of EU marine areas, designating 10% as 'strictly protected', and
- **Conservation status**: having clear conservation objectives and measures in place, taking measures to stop deterioration, and improving the trend of at least 30% of all species and habitats not currently in favorable condition.

These targets are not legally binding and do not replace the legal obligations on member states under the Birds and Habitats Directives. Rather, they represent a political agreement for action to drive their delivery in the new and over-arching context of the EU Biodiversity Strategy for 2030.

As part of the initiative to meet the objectives set out within strategy, the European Commission has requested that member states make pledges to show how they will meet the protected area and conservation status targets.

Moreover, the more recently proposed EU-Nature Restoration Law (June 2022) requests action to restore at least 20% of degraded ecosystems by 2030. The law will be legally binding and has large implications for all EU member states and conservation organisations. There is a huge task ahead for all member states to prepare nature restoration plans, within two years of adoption of the Nature Restoration Law.

The discussion of the NRL in the European Parliament has led to several adjustments and amendments of the original text. Still, it has been adopted, and currently technical meetings of the Commission with the member states are ongoing for an agreed law text. It is foreseen that the adjusted law text will be voted on under the Spanish presidency still the second half of 2023. Implementing the law will no doubt require significant additional resources for strategic planning and on-the-ground implementation of restoration and management measures, both in financial and human resource terms.

3.1.2. Objectives of the thematic session

Considering the above, the objectives of this thematic session are to discuss and reach a common understanding on the following questions:

- Are there any specificities in the way that restoration and management is being organised that can trigger a more effective and more successful planning and implementation on the ground?
- What is needed to scale-up restoration and management efforts? How could we promote any identified best-practises in terms of planning and implementation, to help achieve the ambitious Biodiversity Strategy targets for protected areas and status improvement?
- How can we co-operate in the boreal region, locally and across sectors, to scale up restoration?

3.1.3. Common issues, challenges, and examples for national approaches

Cross sector cooperation / scale issues

On the European, national and regional levels different sectoral policies are being developed and implemented. Horizontal and cross-sector integration of these sectoral policies is needed. So is vertical integration, understood as a translation from sectoral policies into integrated management plans at regional level or site level (e.g. the management plan of a Natura 2000 site). Sundseth[16] describes several case studies on creating synergies between the Water Framework Directive, the Marine Strategy Framework Directive and the Habitats and Birds Directives, demonstrating how various elements of the Directives have been coordinated in practice, either at the level of the River Basins or across the different authorities responsible for their respective implementation. Every country operates in a different way depending on their administrative set-ups, and their geographical, environmental and socio-economic contexts. Clearly one therefore cannot simply replicate what was done in one country and expect it to work in another[16]. The recent proposal for a Nature Restoration Law, although largely in line with existing legislation, may also allow for further integration of measures to improve the conservation status of species and habitats.

Conflicting interests / legal obstacles

There can be conflicting interests even among nature conservation objectives themselves and priorities thus need to be agreed upon (e.g., if the re-introduction of system dynamics leads to some species

[16] Sundseth, K. (2015) Working towards creating synergies between the WFD, MSFD and the Habitats and Birds Directives: selected case studies. Ecosystems LTD /N2K GROUP – October 2015.

disappearing while others maintain or enhance their conservation status). In such contexts, developing stakeholder engagement may help identify and prevent or solve conflicts. Alternatively, consolidating areas can benefit more species and habitats: e.g., the establishment of buffer zones can decrease the nitrogen load in Natura 2000 sites and thus improve their conservation status. At the same time, expanding areas through a buffer zone contributes to the Protected Area targets, provided that the additional buffer zone has a legal status (not necessarily as Natura 2000) and has aims for conservation. Larger areas with more system dynamics are more robust and allow for co-existence of species and habitats that would be excluded in smaller areas. However, an approach is also needed here that allows stakeholders to take on a new role, e.g., farmers that become active in conservation and find a viable business model in combining production and conservation functions.

Upscaling of measures, increased learning

The clear ambition to improve the conservation status requires an upscaling and learning process based on past experiences. Much information, but also expertise and knowledge, can be found in specific LIFE projects. The current LIFE-IP Projects (see par. 4.3) also bring together the experts and authorities, thus bridging the gap which sometimes exists between policy and practice. The 30+ years of conservation projects in the LIFE database can however be an important source of inspiration for specific, lesser-known species groups or habitat types.

3.1.4. Ideas on opportunities for cooperative work and follow-up

Issues and challenges described in chapter 3.1.3 on horizontal and cross-sector integration with conservation policies; on identifying and preventing, or solving conflicts and legal obstacles in a participative process and on upscaling and learning process based on past experiences refer to the opportunities in cooperatively working in the Boreal region. In addition, expectations to member states on submitting National Restoration Plans to the Commission give additional potentiality to collaboration on their delivery plans of the targets, especially biogeographic region wise. This would include both planning, as well as monitoring and progress reporting technicalities.

3.1.5. Cases and best practices – additional references

Several LIFE projects the objective of which was restauration and management of certain habitats, have been carried out in the Boreal region. For example, restauration of Boreal western taiga woodlands in Sweden (LIFE13 NAT/SE/000065), reconnection of the fragmented landscape of Fennoscandian wooded pastures in Sweden (LIFE15 NAT/SE/000772 LIFE BTG), creation of an ecological network in Lithuania by realising corridors linking Natura 2000 sites, improvement of the conservation status of species of the boreal forests and bog woodlands in Finland (e.g. beetles, flying squirrel), and wooded meadow restauration in Estonia and Latvia. Some projects concentrated on restauration of aquatic habitats (LIFE18 NAT/SE/000268; LIFE18 NAT/SE/000742).

Several LIFE projects developed guidelines and training courses, which helped to raise knowledge about the habitat and species richness as well as promote communication between conservationists,

landowners, land managers and the public. The Swedish project LIFE RestoRED (LIFE19 NAT/SE/000172) is a good example that helped to share knowledge and experience in habitat restoration and management favoring pollinators and raising awareness of their importance.

Several management plans for Natura 2000 sites were developed that will be used for long-term conservation of the restored habitats. The Estonian project LIFE-IP ForEst&FarmLand (LIFE18 IPE/EE/000007), has been designed for implementing the Estonian Prioritised Actions Framework (PAF) for Natura 2000 relating to forests and agricultural land, developing and introducing best practices for the management of the national Natura 2000 network. LIFE projects have been useful for improving a geodatabase for protected species and establishing new electronic monitoring forms for threatened species. Ultimately, this will help to improve national reporting as required by the EU Habitats Directive and Birds Directive.

Table 2: Some examples of projects relevant for planning of restoration and management

Project title	Project code
LifeTaiga - Reintroduction of burning in Boreal western taiga woodlands, https://www.lansstyrelsen.se/vastmanland	LIFE13 NAT/SE/000065
LIFE BTG - Bridging the Spatial and Temporal Gaps in Threatened Oak Habitats, https://lifebridgingthegap.se/english/	LIFE15 NAT/SE/000772
LIFE OSMODERMA - Ecological network for *Osmoderma eremita* and other species dependent on veteran trees, https://naturalit.lt/en/objectives-actions/	LIFE16 NAT/LT/000701
Beetles LIFE - One small step for a man, one giant leap for the charismatic flagship species, https://www.metsa.fi/en/project/beetles-life-eng/	LIFE17 NAT/FI/000181
Flying Squirrel LIFE - Co-operation for improving the conservation of the Flying squirrel in Europe, https://www.metsa.fi/en/project/flying-squirrel-life/	LIFE17 NAT/FI/000469
LIFE CONNECTS - River connectivity, habitats, and water quality towards restored ecosystem services	LIFE18 NAT/SE/000742
LIFE RestoRED - Restoration of EU Redlisted Annex I habitats, dependent on grazing or hay cutting in Natura 2000 sites in Sweden	LIFE19 NAT/SE/000172
Rivers of LIFE - Restoration for Improved Resilience, Biodiversity and Status in Boreal Rivers, https://webgate.ec.europa.eu/life/publicWebsite/index.cfm?fuseaction=search.dspPage&n_proj_id=7222	LIFE18 NAT/SE/000268
ForEst&FarmLand - Adaptive community-based management of forest and farming landscapes to improve the conservation status of Natura 2000 habitats and species, https://life.envir.ee/et/life-ip-forestfarmland	LIFE18 IPE/EE/000007

Project title	Project code
WOODMEADOWLIFE - Restoring and promoting a long-term sustainable management of Fennoscandian wooded meadows in Estonia and Latvia, https://keskkonnaamet.ee/en/project-woodmeadowlife	LIFE20 NAT/EE/000074 WOODMEADOWLIFE
LIFE CONNECTING MEADOWS - Restoring and connecting semi-natural meadow habitats on Muhu island, https://life.envir.ee/et/life-connecting-meadows	LIFE19 NAT/EE/001006
LIFE FOR SPECIES - Threatened species in Latvia: improved knowledge, capacity, data, and awareness, https://webgate.ec.europa.eu/life/publicWebsite/project/details/5373	LIFE19 GIE/LV/000857
LIFE-IP LatViaNature - Optimising the Governance and Management of the Natura 2000 Protected Areas Network in Latvia, https://va.lv/en/research/projects/optimising-governance-and-management-natura-2000-protected-areas-network-latvia	LIFE19 IPE/LV/000010
PAF-NATURALIT - Optimizing the management of Natura 2000 network in Lithuania, https://lifeprojektai.lt/en/life-projects/lithuanian-life-projects/optimizing-the-management-of-natura-2000-network-in-lithuania-life-ip-paf-naturalit/	LIFE16 IPE/LT/000016

3.2. Theme 2: *Pollinators Initiative in the Boreal context*

3.2.1. Context

The decline in wild pollinators and its consequences on food security, human health, quality of life and ecosystem functioning raises strong concerns across society. In Europe, four out of five crop and wild-flowering plant species depend, at least to some extent, on animal pollination delivered by of insect species. The tangible benefits for the economy of pollinators are particularly visible in food production since animal pollination contributes an estimated €5 billion per year at least to the EU's agricultural output. However, many of the essential benefits that pollinators provide remain unquantified, such as their contribution to nutrition security and health, or when maintaining ecosystem health and resilience by pollinating wild plants.

Yet, pollinating insects have declined dramatically in diversity and abundance in the last decades, with many of them being threatened by extinction. This puts at risk ecosystem functioning, and consequently economic activities and human wellbeing, which depend on them. According to the European European Red List[17], populations of around one in three bee, butterfly and hoverfly species are declining. Moreover, one in ten bee and butterfly species, and one in three hoverfly species are threatened with extinction. These figures are alarming, and the full picture is not yet known. The major

[17] https://www.eea.europa.eu/data-and-maps/data/european-red-lists-2/european-red-list

threats to wild pollinators include land-use change (including urbanisation), intensive agricultural management practices (including pesticide use), compounding effects of agro-chemicals, environmental pollution (including light pollution), invasive alien species and climate change.

In 2018, the Commission adopted the first-ever EU framework to address the decline of wild pollinators – the EU Pollinators Initiative . This initiative set long-term objectives for 2030 and a comprehensive set of actions to be implemented in the short-to-medium term. The Pollinators Initiative puts in place specific policy tools to address pollinator decline, mobilises cross-sectoral action and proposes a more effective monitoring of pollinators. This initiative has complemented existing measures beneficial to pollinators under several EU policies, in particular the Birds and Habitats Directives, EU legislation on pesticides, the Common Agricultural Policy (CAP), cohesion policy, and research and innovation policy.

3.2.2. Objectives of the thematic session

The Commission's Communication from 2018 sets strategic objectives and a set of actions to be taken by the EU and its member states to address the decline of pollinators in the EU and contribute to global conservation efforts.

Although the diversity of pollinators is slower in the Boreal biogeographical region, many culturally significant wild fruits (Blueberries (*Vaccinium* spp.), Cranberries (*Vaccinium macrocarpon*), Lingonberries (*Vaccinium vitis-idaea*), Cloudberry (*Rubus chamaemorus*), Raspberries and Blackberries (*Rubus* spp.)) in the boreal region fully depend on insect pollination. The current session will look at the constraints and opportunities for the conservation and restoration of wild pollinator communities in the Boreal context, attempting to provide clarification on the following questions:

1. Which measures are needed to implement the EU pollinators initiative in the Boreal biogeographical region context?
2. How can we foster transnational collaboration to support the implementation of the EU initiative?
3. How should we monitor the progress and impact of the EU initiative?

3.2.3. Common issues and challenges

For the member states in the Boreal region to deploy effective conservation and restoration measures for pollinator populations, it is necessary to map the distribution, state and trends of pollinators with an appropriate spatial and temporal detail. First, a comprehensive monitoring system should be established. Improved monitoring and the establishment of adequate metrics and baselines is essential to enable progress towards maintaining functional pollinator populations in the Boreal region. In addition, the main threats to pollinator decline should also be monitored. Member state level action in the Boreal region is needed to monitor the abundance and diversity of wild pollinators and to evaluate policy, conservation and restoration effectiveness. Governments should support citizen science and NGO led monitoring programmes, but should also establish and implement sufficient pollinator

abundance monitoring to enable comparative metrics. Secondly, research and innovation activities will continue to be needed to generate actionable knowledge based on systematically collected data and information, supported by the EU framework programme for research and innovation – Horizon Europe – as well as national research efforts. Thirdly, the conservation of pollinator species and habitats should be improved. Pollinator conservation should be well integrated into the management of protected areas, in particular the Natura 2000 network. Fourth, actions will be needed to restore pollinator habitats in agricultural landscapes and mitigate the impacts of pesticide use on pollinators, as well as to tackle climate change and other causes of pollinator decline. Sixth, mobilising society and promoting strategic planning and cooperation will be needed at all levels. This should be underpinned by effective communication, mobilisation, and networking activities. Public participation in the monitoring and conservation of pollinators should be further promoted.

3.2.4. Ideas on opportunities for cooperative work and follow-up

Establishing a boreal pollinator expertise centre, with experts of all boreal countries being tasked to contribute through:

a. information sharing: establish platforms for sharing best practices, data, and research findings among Boreal region countries;
b. sharing goals: develop common conservation goals and targets across national boundaries. Joint initiatives could focus on restoring shared habitats, such as large forested areas or wetlands;
c. Funding Mechanisms: Explore options for joint funding mechanisms to support cross-border pollinator conservation projects. The Nordic Council, for instance, could allocate funds for collaborative efforts.

In summary, the conservation of pollinators in the Boreal biogeographical region requires a multi-faceted approach that encompasses habitat restoration, reduced pesticide use, public awareness, research, and cross-border collaboration. Monitoring progress and impact should involve a combination of ecological, economic, and social indicators to assess the effectiveness of conservation efforts.

3.2.5. Cases and best practices – additional references

Three LIFE projects targeted pollinators in the Boreal region. Two of these projects are from Estonia. The main objective of ForEst&FarmLand (LIFE18 IPE/EE/000007) project (2020-2029) is to implement the Estonian Prioritized (PAF) for Natura 2000, with a focus on those actions needed for forest and agricultural ecosystems. One of its targets is to create an action plan to support pollinators. The project emphasizes the importance of integrating pollinator conservation into broader conservation and land management efforts. The second Estonian project (LIFE19 NAT/EE/001006) is focusing on the restoration of semi-natural grasslands, including alvars, wooded meadows, and coastal meadows, on Muhu Island. The project (2020-2025) aims to increase the number of pollinators through habitat restoration.

A Swedish project (LIFE19 NAT/SE/000172) is focusing on the restoration of traditional meadows in Natura 2000 sites. It includes various management actions favoring pollinators and raising awareness of their importance.

Table 4: Some examples of projects relevant for pollinators initiative in the Boreal context

Project title	Project code
ForEst&FarmLand - Adaptive community-based management of forest and farming landscapes to improve the conservation status of Natura 2000 habitats and species, https://life.envir.ee/et/life-ip-forestfarmland	LIFE18 IPE/EE/000007
LIFE RestoRED - Restoration of EU Redlisted Annex I habitats, dependent on grazing or hay cutting in Natura 2000 sites in Sweden, https://www.liferestored.se/restaurering-av-natur/livsviktiga-pollinerare/	LIFE19 NAT/SE/000172
LIFE CONNECTING MEADOWS - Restoring and connecting semi-natural meadow habitats on Muhu island, https://life.envir.ee/et/life-connecting-meadows	LIFE19 NAT/EE/001006

3.3. Theme 3: Old growth forest – what are criteria for old growth forest?

3.3.1. Context

Primary and old-growth forests are ecosystems where signs of past human use are minimal or absent and ecological processes operate dynamically and with little impairment by anthropogenic influences[18]. Such forests in the EU are rare, often small, and fragmented.

The EU's biodiversity strategy to 2030 recognizes the value of primary and old-growth forests, and calls for their strict protection. The process of developing guidelines for the definition, mapping, monitoring and strictly protecting the EU's remaining primary and old-growth forests is coordinated by the Working Group on Forest and Nature which is a sub-group of the Coordination Group on Biodiversity and Nature.

Through its Joint Research Centre, the Commission published a study on primary and old growth forests that includes an overview of existing definitions, a compilation of all available mapping resources on primary and old growth forests in the EU, information on the value of primary and old growth forests, and knowledge gaps[18].

To align itself with the ongoing global process under the Food and Agriculture Organization (the Commission proposes to use the FAO's latest definition of primary forests to report primary forest

[18] Barredo, J., Brailescu, C., Teller, A., Sabatini, F.M., Mauri, A., & Janouskova, K. (2021) Mapping and assessment of primary and old-growth forests in Europe. European Commission, Joint Research Centre: EC Publications Office DOI: doi/10.2760/797591

areas, enable the use of comparable definitions and reduce reporting burden): Naturally regenerated forest of native tree species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed. As regards old growth forest, a new definition is proposed that builds on the work by Erik Buchwald[19] and is applicable at forest stand level: 'A forest stand or area consisting of native tree species that have developed, predominantly through natural processes, structures and dynamics normally associated with late seral developmental phases in primary or undisturbed forests of the same type. Signs of former human activities may be visible, but they are gradually disappearing or too limited to significantly disturb natural processes[20]

Table 5. Area of primary forests in EU countries belonging to Boreal biogeographic region. Forest area according to FOREST EUROPE (2020). Excerpt from Barredo et al (2021)

Country	Forest area 2020 [1,000 ha]	In forest [1,000 ha]	In other wooded land [1,000 ha]	In forest and other wooded land [1,000 ha]	Primary forests (FAO, 2020) [1,000 ha]	Primary forests (Sabatini et al. 2020) [1,000 ha]
Estonia	2,421	52	2	55	52	0
Finland	22,409	203	11	214	203	2,814.6[a]
Latvia	3,391	17	0	17	17	4,8
Lithuania	2,187	27	0	27	27	32
Sweden	27,98	2,249	1,075	3,324	2,249	3,165[b]

(a) Note that this area is most likely overestimated. A more accurate extent would be ~1 Mha.

(b) Note that Sabatini et al. (2020)[21] indicate the existence of 2.4 Mha of potential (unconfirmed) primary forests in Sweden. Therefore, the number in the table is likely underestimated.

The reported extent of primary and old-growth forests in the EU is 3.7 ha or 2.4% of the total forest area, however being unevenly distributed with 90% located in Sweden, Bulgaria, Finland and Romania. Using collected mapping data, it has been calculated that 93% of the documented primary and old-

[19] Buchwald, E. (2005). A hierarchical terminology for more or less natural forests in relation to sustainable management and biodiversity conservation. Proceedings of the Third Expert Meeting on Harmonizing Forest-related Definitions, 11-19 January 2005, FAO, Rome

[20] COMMISSION STAFF WORKING DOCUMENT (2023). Commission Guidelines for Defining, Mapping, Monitoring and Strictly Protecting EU Primary and Old-Growth Forests. https://ec.europa.eu/transparency/documents-register/detail?ref=SWD(2023)62&lang=en

[21] Sabatini, F. M., Bluhm, H., Kun, Z., Aksenov, D., Atauri, J. A., et al. (2020). European Primary Forest Database (EPFD) v2.0. bioRxiv, 2020.2010.2030.362434, doi:10.1101/2020.10.30.362434.

growth forests in the EU fall within Natura 2000 sites, and 87% within strictly protected areas, i.e. IUCN categories Ia, Ib and II[22].

Further work on old-growth forest has since been shared, such as a study from 2021 carried out by the European Forest Institute, which reviewed scientific evidence to inform policy implementation. There are there also some Boreal studies available, like by Biro et al (2022)[23].

3.3.2. Objectives of the thematic session

The EU Biodiversity Strategy for 2030 requires that 10% of EU land area, including all remaining primary and old-growth forests, should be subject to strict legal area protection by 2030 at the latest. A Commission Staff working document on the protected area targets recommended that 10% of strict protection should also be achieved for each of the Biogeographical regions across the EU. This leads us to the following questions:

- How can we best identify old growth forests in the Boreal biogeographical region for the target of 10% of strictly protected areas?
- Can we reach a common view and more harmonization of indicators or criteria for old growth forest in the Boreal region?
- Are the EU's indicators of old growth forests applicable across member states in the Boreal region, as well as across biogeographical region boundaries?
- The precautionary principal application. The working document states: "In line with the precautionary principle, member states should without delay strictly protect those forest areas for which there is a strong probability, on the basis of the currently available information, that they meet definitions and criteria set out in this document".

3.3.3. Common issues, challenges, and approaches

In order to devise a proper conservation policy, as well as implementation and monitoring system, an operational definition with indicators and criteria of old-growth forests is required. In the Boreal region the focus on old-growth forests is most common, which is mostly approached as late-successional forests, which contain structures and species which distinguishes them from forests of younger age classes. These features include deadwood and old trees approaching their natural longevity, which is often much higher than the rotation cycle for a given tree species. Alternatively, primary forests are considered relatively intact forests following natural dynamics, are naturally regenerated, composed by native species, and especially, show no indication of human activities.

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[22] Barredo, J., Brailescu, C., Teller, A., Sabatini, F.M., Mauri, A. and Janouskova, K., Mapping and assessment of primary and old-growth forests in Europe, EUR 30661 EN, Publications Office of the European Union, Luxembourg, 2021, ISBN 978-92-76-34229-8, doi:10.2760/13239, JRC124671

[23] Biró, M., Molnár, Z., Öllerer, K., Demeter, L., & Bölöni, J. (2022). Behind the general pattern of forest loss and gain: A long-term assessment of semi-natural and secondary forest cover change at country level. Landscape and Urban Planning Vol. 220, Pages 104334. DOI: https://doi.org/10.1016/j.landurbplan.2021.104334

It is important to note that areas of primary and old growth forests alone will not suffice to reach the 10% quota of strict protection called for by the EU Biodiversity Strategy, at the mean in EU. However, in the Boreal region the share of such forest is much higher than in all other biogeographical regions. So, what should be the optimal share of old growth habitats, and which habitat types to be included into 10% quota. At the same time, it should be noted that proposed strictly protected areas can also encompass other (sometimes) man-made systems, such as species rich grasslands: key is that ecological processes are leading.

In cooperation with the member states, the Commission has developed a list of indicators for old growth forests that can be adapted to the different forest types and existing levels of naturalness of such forests in the EU[24]. Given this variety, the document recommends that thresholds for each indicator should be developed at the national and/or regional level. While Member States will use their own methodology to conduct the identification of old growth forests, these methodologies should be built on the list of common indicators and be consistent with the common definition.

A mapping of primary and old growth forests should take place once the methodology for their identification and mapping has been developed at the national level. This will need to be coordinated at national level to ensure consistency and comparability. At a minimum, Member States who have already identified their primary and/or old growth forests should cross check with the EU's criteria and indicators the indicators of old growth forests.

One of the foreseeable issues is that existing data and the mapping/assessment of primary and old growth forests are not always kept in a single national repository. There is often a gap between the data available to the public and the data available for private forests. Member States that have not organized this data in a coordinated manner should therefore start to properly consolidate and integrate all data available (from forest owners, universities, communities, authorities, etc.).

3.3.4. Ideas on opportunities for cooperative work and follow-up

Making old-growth forests definitions operational with indicators and criteria creates multiple opportunities for cooperative work in the Boreal region. There will be a need for adapting the EU recommended continuous and/or old-growth forest definitions for the Boreal region. Further, cooperative work may also be needed on defining, comparing and harmonising criteria and indicators for different Boreal Forest types and existing naturalness levels. Likewise, the mapping of criteria-based habitats could be a joint expert process in the biogeographic region. Use of the same imagery could result in an up-to-date map of potential old growth forests. Such a map may require joint field visits for ground truthing and for agreeing on a common definition of strict protection.

[24] COMMISSION STAFF WORKING DOCUMENT (2023). Commission Guidelines for Defining, Mapping, Monitoring and Strictly Protecting EU Primary and Old-Growth Forests. https://ec.europa.eu/transparency/documents-register/detail?ref=SWD(2023)62&lang=en

3.3.5. Cases and best practices – additional references

Some LIFE projects targeted directly or indirectly old growth forest habitats. For example, the Finnish project (LIFE17 NAT/FI/000469) concentrated on the endangered species flying squirrel, a species that is linked to old growth forests. On the other side, one of the aims of the Latvian project (LIFE19 IPE/LV/000010) is to work out novel forest habitat restoration and management methods for Latvia, including old forests.

As examples of best practices, the Estonian project LIFE-IP ForEst&FarmLand (LIFE18 IPE/EE/000007) improves the quality of forest habitats through restoration projects for wet and dry forest habitats, and prepared action plans for wet and dry forests.

Table 6: Some examples of projects relevant for old growth forest – criteria and implementation

Project title	Project code
Flying Squirrel LIFE - Co-operation for improving the conservation of the Flying squirrel in Europe, https://www.metsa.fi/en/project/flying-squirrel-life/	LIFE17 NAT/FI/000469
LIFE-IP LatViaNature - Optimising the Governance and Management of the Natura 2000 Protected Areas Network in Latvia, https://va.lv/en/research/projects/optimising-governance-and-management-natura-2000-protected-areas-network-latvia	LIFE19 IPE/LV/000010
ForEst&FarmLand - Adaptive community-based management of forest and farming landscapes to improve the conservation status of Natura 2000 habitats and species, https://life.envir.ee/et/life-ip-forestfarmland	LIFE18 IPE/EE/000007
LIFE Prognoses - Protection of Old Growth Forests in Europe: Natural heritage, Outline, Synthesis and Ecosystem Services, https://www.joanneum.at/en/digital/reference-projects/life-prognoses-protection-of-old-growth-forests-in-europe-natural-heritage-outline-synthesis-and-ecosystem-services	LIFE20 PRE/BE/000011
PAF-NATURALIT - Optimizing the management of Natura 2000 network in Lithuania, https://lifeprojektai.lt/en/life-projects/lithuanian-life-projects/optimizing-the-management-of-natura-2000-network-in-lithuania-life-ip-paf-naturalit/	LIFE16 IPE/LT/000016

3.4. Theme 4: Protected area prioritization in the context of climate change

3.4.1. Context

Theme 4 „Protected area prioritization in the context of climate change“ is a follow up of a thematic session held in the previous Boreal Seminar in 2019. The discussion during that seminar concentrated on the different approaches of priority setting, sharing knowledge of best practice tools and discussing obstacles and challenges of prioritization action.

Prioritization tools have been found useful for considering which species and habitat types are in higher urgency to improve/restore their conservation status. Relevant information about endangered species and habitats has been available at European scale (national and regional Red Lists, Article 17 data, Article 12 data for bird species, Article 8 of the Habitats Directive, etc.), but there still remain the need for an agreed approach for identifying priorities and associated measures at EU or biogeographical region level.

The aim of the EU Nature Directives is to maintain and restore natural habitats and species of EU importance at a favorable conservation status. This objective is also inherent to the Conservation Status improvement pledges that member states are supposed to develop as part of their committments for the EU Biodiversity Strategy for 2030.

Article 8 of the Habitats Directive sets out the need for strategic planning for financing Natura 2000, so that all Member States need to work out their Prioritized Action Framerworks (PAFs) to define funding needs and priorities. Strategic planning is also needed to prioritize targeted habitats and plan actions in accordance with Natura 2000 financial requirements and other relevant EU funding programmes and instruments.

In May 2022, the Commission published a revised guidance Document on “Financing Natura 2000 - EU Funding Opportunities in 2021-2027”. The document was designed to help the Member States strengthen the uptake of EU funds for the management and restoration of their Natura 2000 sites. By the time of the seminar, a prioritized action framework (PAF) for Natura 2000 has been established in all Boreal member states (Estonia, Latvia, Lithuania, Sweden, Finland). I.e. Member states should have a strategic plan and guideline for their conservation efforts and priorities.

One of the major difficulties for any small or larger scale conservation and restoration planning and strategies is Climate Change and its effects on our ecosystems and their dynamics. With high uncertainty of the magnitude of its effects, climate change adaption is clearly one of the greatest strategical challenges of the upcoming period and one of the biggest threat to biodiversity, next to land use pressures. Inside the network of protected areas, land-use pressures can be regulated to some extent. However, climate change has no borders. In addition to habitat level methods for adaptation to a changing environment we urgently need large scale strategic views and prioritization and planning tools to be able to optimize our response to the coming changes. Spatial planning at various scales and across sectors is necessary with Protected Area managers having a critical role.

Species distribution models (SDMs) can be used to anticipate how species' ranges will shift and ecosystems will likely change under the altered climatic conditions. These models can be used to assess which parts of a species' current range will become climatically unsuitable, where new suitable areas are likely to emerge, and whether the species is facing expansions or contractions in its range. The models also help us to understand which parts of a species' current habitat are most important to preserve, so that individuals have the potential to disperse to new areas. Information about a species' current and future locations and associated connectivity needs can also be factored into prioritization tools to identify critical locations that support Nature's adaptation to Climate Change.[25]

Past studies have shown that around 60% of European species are expected to lose suitable climate inside currently protected areas[26]. Only protected areas in the high-latitude Fennoscandia and Britain, and in mountains such as the Alps, the Pyrenees and the Carpathians are expected to gain more species than lose them in the future. Loss of suitable climate is expected to be more severe in Natura 2000 sites as these tend to be located on more flat areas where climate changes faster. Only in Finland and Sweden are more habitat directive species expected to gain suitable climate than to lose it.

Climate Change evidently leads to ecosystem transformations and changes in species' abundances and distributions. This reorganization of nature ultimately results in different types of habitats that are now described in the Nature Directive, meaning that we need to prepare for the changes also at the administrative level. Our current or historic reference types for ecosystems and habitats are likely to need updating, although there is a high uncertainty of the direction of change for different ecosystem types as well as for different regions. How fast will the domination of different tree species change? What are the effects on grassland species or needed management pressure? Will the natural slow transition from aapa mires to raised bogs become faster as boreal peatlands become dryer or will we see whole new transitional peatland types? How well is changing nature and possible novel transitional states protected by our legislation and directives?

Alternative responses to changes in any (eco)system can be described as a continuum of three basic options: Resist change, Accept change, or Direct change, R, A, or D. It is however not self-evident when to choose different reactions nor what the strategy should be based on. The Resist-Adapt-Direct framework has been adopted and developed e.g. by the United States National Park Service[27].

This session will provide examples of possible prioritization analyses using data on climate change threats and nature irreplaceability. The ongoing EU-funded Horizon project NaturaConnect[28] will showcase how species' future distribution shifts can be incorporated to prioritization tools to increase the climate resilience of protected area networks. A spatial analysis approach for RAD-based planning

[25] Virkkala R, Heikkinen RK, Fronzek S, Leikola N.(2013) Climate change, northern birds of conservation concern and matching the hotspots of habitat suitability with the reserve network. PLoS One, 20;8(5):e63376. doi: 10.1371/journal.pone.0063376.
[26] https://www.eea.europa.eu/soer/2015/europe/biodiversity
[27] https://www.nps.gov/subjects/climatechange/resistacceptdirect.htm
[28] naturaconnect.eu

presented in the session is currently in development in Finland. The results are hoped to support knowledge-based decision-making in reacting and adapting to climate change in protected areas and beyond.

3.4.2. Objectives of the thematic session

Climate change is usually identified as one of the key pressures to biodiversity, perhaps even more so in the Boreal biogeographical region than elsewhere in the EU. In view of the protected area targets under the EU Biodiversity Strategy for 2030, it is important to exchange views on the question how climate change should be considered in and how to adapt towards climate change.

In addition to habitat level methods for adaptation to a changing environment we urgently need large scale strategic views and prioritization and planning tools to be able to optimize our response to the coming climate changes. Spatial planning at various scales and across sectors is necessary with Protected Area managers having a critical role. Questions therefore to address in this session are:

- Which approaches work best in adapting to climate change: examples on analyses, strategies and projects from Boreal member states.
- Is further action needed for particular ecosystems or species groups (joint initiative – LIFE, network development, common fund etc), and if yes, for which ones?

3.4.3. Common issues, challenges and approaches

Several approaches have been suggested for adapting to Climate Change, ranging from single protected area challenges and planning tools to national level strategic approaches and European level policy recommendations.

EUROPARC ClimateTalks: "Climate Talks is a five-part documentary that aims at better understanding what it takes to adapt to climate change. We'll discover the experience developed by nature conservation professionals in and around Nature Protected Areas across Europe."[29]

Life NATUR'ADAPT Climate Change Adaptation Process: „A methodological guide to developing a vulnerability and opportunities assessment and an adaptation plan for a protected area".[30]

EUROPARC White paper on Climate Change and Protected Areas: "Recommendations for better integration of climate adaptation in policy and practice for Protected Areas in Europe."[31]

IUCN (2016) Adapting to Climate Change – Guidance for protected area managers and planners.[32]

[29] https://www.europarc.org/climate-change/climate-talks/

[30] https://naturadapt.com/groups/communaute/documents/776/get

[31] http://www.europarc.org/wp-content/uploads/2023/05/NaturAdapt_WhitePaper_Protected-Areas-and-Climate-Change_2023.pdf

[32] https://portals.iucn.org/library/sites/library/files/documents/PAG-024.pdf

Resist–accept–direct (RAD) framework by United States National Park Service: "Park managers today face growing challenges. As climate change interacts with other stressors such as land use change, pollution, and nonnative species, ecosystems are changing beyond the bounds of historical variability. These changes are increasingly difficult to resist. Thus, managers are thinking more broadly about how to effectively conserve resources in this rapidly changing world. In this context, the resist–accept–direct (RAD) framework helps decision makers make informed, purposeful, and strategic choices. This tool is simple and flexible, complements other important climate change adaptation approaches, and applies to a wide range of decisions that managers must make as they steward transforming ecosystems". [33]

3.4.4. Ideas on opportunities for cooperative work and follow-up

To resist against these changes and direct them, it will be necessary to create a connected network of high-quality habitats that allows for

1) effective dispersion of species and

2) identification and prioritization of refugia areas (habitats existing on areas of mild changes).

In many cases, the dispersal of species and habitats may require targeted measures for movement[34]. At the same time, there is only very limited scientific knowledge about the possibilities for habitats to shift, let alone about the time needed to restore such habitats[35]. However, the N2000 biogeographic process with its regional level collaboration offers a great possibility for a European scale network level analysis and collaboration to support priority areas and habitats. In many cases, the dispersal of species and habitats may require targeted measures for movement[36]. At the same time, there is only very limited scientific knowledge about the possibilities for habitats to shift, let alone about the time needed to restore such habitats[37].

The habitat working groups within the Boreal region which were established in the past could organise dedicated meetings to address Climate Change challenges and possibilities for adaptation. These could be promoted and facilitated in the form of networking events in the frame of the biogeographic process.

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[33] https://www.nps.gov/subjects/climatechange/resistacceptdirect.htm

[34] Van der Sluis, T. & Jongman, R. (2021). Green Infrastructure and Network Coherence. In: E-BIND Handbook part B: Scientific support for successful implementation of the Natura 2000 network, Van der Sluis& Schmidt (2021). European Commission 2021.

[35] Van der Sluis, T. & Bouwma, I. (2019). A list of prioritised habitats requiring spatial connectivity and their restoration potential, in the framework of Action 12 of the Nature Action Plan. Techincal Report 2019/1, ETC-BD 2019 Copenhagen.

[36] Van der Sluis, T. & Jongman, R. (2021). Green Infrastructure and Network Coherence. In: E-BIND Handbook part B: Scientific support for successful implementation of the Natura 2000 network, Van der Sluis& Schmidt (2021). European Commission 2021.

[37] Van der Sluis, T. & Bouwma, I. (2019). A list of prioritised habitats requiring spatial connectivity and their restoration potential, in the framework of Action 12 of the Nature Action Plan. Techincal Report 2019/1, ETC-BD 2019 Copenhagen.

3.4.5. Cases and best practices – additional references

There are several good examples of prioritization actions for locating protected areas and corridors in the Boreal region. Prioritization actions have been carried out through LIFE projects in Latvia (LIFE19 IPE/LV/000010), Lithuania (LIFE16 IPE/LT/000016) and Finland (VELMU, LIFE17 NAT/FI/000469) at regional scale.

The Finnish Inventory Programme for the Underwater Marine Environment (VELMU) is a good example of best practices as the results of a survey and modelling of underwater biodiversity along the Finnish coast has been used in prioritization analyses and provide guidance on decision-making on protection and land-use issues (e.g., PA network planning, restoration, windfarm zoning). This work is ongoing with species dispersal modelling, conservation prioritization and zoning for resource-use.

Another other good example is from Lithuania (PAF-NATURALIT, LIFE16 IPE/LT/000016) as prioritization has been used for setting up conservation objectives for the Natura 2000 network at national and local levels and improving the efficiency of management, surveillance, and analysis processes to achieve and maintain favorable conservation status of protected habitats and species.

The experiences made by the Member States of the Boreal region indicate that prioritization tools can be very useful for simultaneous consideration of data for multiple habitats and species in order to select areas with the maximum ecological value, identify missing or poorly represented areas, evaluate connectivity, assess conditions, ensure cost-effectiveness, and set up conservation objectives.

Table 7: Some examples of projects relevant for prioritization issues

Project title	Project code
Finnish Inventory Programme for the Underwater Marine Environment (VELMU), https://maritime-spatial-planning.ec.europa.eu/projects/finnish-inventory-programme-underwater-marine-environment	
LatViaNature - Optimising the Governance and Management of the Natura 2000 Protected Areas Network in Latvia, https://va.lv/en/research/projects/optimising-governance-and-management-natura-2000-protected-areas-network-latvia	(LIFE19 IPE/LV/000010 LIFE-IP)
PAF-NATURALIT - Optimizing the management of Natura 2000 network in Lithuania, https://lifeprojektai.lt/en/life-projects/lithuanian-life-projects/optimizing-the-management-of-natura-2000-network-in-lithuania-life-ip-paf-naturalit/	(LIFE16 IPE/LT/000016)

Useful Literature

Aalto, J., Lehtonen, I., Pirinen, P., Aapala, K., & Heikkinen, R.K. (2023). Adapting to Climate Change: Guidance for protected area managers and planners. Best Practice.

Aalto, J., Lehtonen, I., Pirinen, P., Aapala, K., & Heikkinen, R.K. (2023). Bioclimate change across the protected area network of Finland. Science of The Total Environment, 893, 164782. https://doi.org/10.1016/j.scitotenv.2023.164782

Aggestam, F., Konczal, A., Sotirov, M., Wallin, I., Paillet, Y., Spinelli, R., et al. (2020). Can nature conservation and wood production be reconciled in managed forests? A review of driving factors for integrated forest management in Europe. Journal of Environmental Management, 268, 110670.

Bioclimate change across the protected area network of Finland, Science of The Total Environment, Volume 893, 164782, ISSN 0048-9697, https://doi.org/10.1016/j.scitotenv.2023.164782.

Burrascano, S., Chianucci, F., Trentanovi, G., Kepfer-Rojas, S., Sitzia, T., Tinya, F., et al. (2023). Where are we now with European forest multi-taxon biodiversity and where can we head to? Biological Conservation, Vol. 284, Pages 110176. DOI: https://doi.org/10.1016/j.biocon.2023.110176

De Lamo, X. et al. (2020). Strengthening synergies: how action to achieve post-2020 global biodiversity conservation targets can contribute to mitigating climate change. UNEP-WCMC, Cambridge, UK.

Decleer, K. & Bijlsma, R-J. (2021). Guidance and tools for effective restoration measures for species and habitats. In: Van der Sluis & Schmidt, E-BIND Handbook (Part B): Scientific support for successful implementation of the Natura 2000 network, Chapter 4, p.4-23.

Duchenne, F., Thébault, E., Michez, D., Elias, M., Drake, M., Persson, M., et al. (2019). Phenological shifts alter the seasonal structure of pollinator assemblages in Europe. Nature Ecology & Evolution, 4(1), 115-121. https://doi.org/10.1038/s41559-019-1062-4

EEA (2020). State of nature in the EU. Results from reporting under the nature directives 2013-2018.

EUROPARC, White Paper: Climate Change & Nature Protected Areas (2023). CC-BY-SA LIFE Natur''Adapt, EUROPARC Federation.

European Commission (2013). Guidelines on Wilderness in Natura 2000. Management of terrestrial wilderness and wild areas within the Natura 2000 Network. Alterra, PAN Parks Foundation and Eurosite.

European Commission (2020). EU Biodiversity Strategy for 2030. Bringing nature back into our lives.

European Commission (2021). Guidance document on the strict protection of animal species of Community interest under the Habitats Directive. Brussels.

European Commission (2023). Guidelines on Closer-to-Nature Forest Management.

Gann, G.D., McDonald, T., Walder, B., Aronson, J., Nelson, C.R., Jonson, J., et al. (2019). International principles and standards for the practice of ecological restoration. Second edition. Ecological Restoration 27(S1): S1–S46. www.ser.org/page/SERStandards.

Ganuza, C., Redlich, S., Uhler, J., Tobisch, C., Rojas-Botero, S., Peters, M.K., et al. (2022). Interactive effects of climate and land use on pollinator diversity differ among taxa and scales. Science Advances. https://doi.org/abm9359

Gross, J. E., Woodley, S., Welling, L.A., & Watson, J.E.M. (eds.) (2016). Adapting to Climate Change: Guidance for Protected Area Managers and Planners. Best Practice Protected Area Guidelines Series No. 24, Gland, Switzerland: IUCN. XVIII + 129 pp.

Häfner, K., & Piorr, A. (2021). Farmers' perception of co-ordinating institutions in agri-environmental measures–The example of peatland management for the provision of public goods on a landscape scale. Land use policy, 107, 104947.

Jarašius, L., Etzold, J., Truus, L., Purre, A. H., Sendžikaitė, J., Strazdiņa, L., & Jurema, L. (2022). Handbook for assessment of greenhouse gas emissions from peatlands. Lithuanian Fund for Nature (Lithuania).

Kettunen, M. et al. (2017). Summary report - Integration approach to EU biodiversity financing: evaluation of results and analysis of options for the future. Final report for the European Commission (DG ENV) (Project ENV.B.3/ETU/2015/0014), Institute for European Policy (IEEP), Brussels / London.

Kujala, H., Moilanen, A., Araújo, M.B., & Cabeza, M. (2013). Conservation Planning with Uncertain Climate Change Projections. PLoS ONE 8(2): e53315. https://doi.org/10.1371/journal.pone.0053315

Pakalne M. et al. (2021). Best Practice Book for Peatland Restoration and Climate Change Mitigation. Experiences from LIFE Peat Restore Project. University of Latvia, Riga.

Rawlins, A., & Morris, J. (2010). Social and economic aspects of peatland management in Northern Europe, with particular reference to the English case. Geoderma, 154(3-4), 242-251.

Rodríguez, A., & Kouki, J. (2017). Disturbance-mediated heterogeneity drives pollinator diversity in boreal managed forest ecosystems. Ecological Applications, 27(2), 589-602. https://doi.org/10.1002/eap.1468

Rodríguez, A., Pohjoismäki, J.L., & Kouki, J. (2019). Diversity of forest management promotes parasitoid functional diversity in boreal forests. Biological Conservation, 238, 108205. https://doi.org/10.1016/j.biocon.2019.108205

Rubene, D., Schroeder, M., & Ranius, T. (2015). Diversity patterns of wild bees and wasps in managed boreal forests: Effects of spatial structure, local habitat and surrounding landscape. Biological Conservation, 184, 201-208. https://doi.org/10.1016/j.biocon.2015.01.029

Triviño, M., Kujala, H., Araújo, M.B., et al. (2018). Planning for the future: identifying conservation priority areas for Iberian birds under climate change. Landscape Ecology, 33, 659-673. https://doi.org/10.1007/s10980-018-0626-z

Van der Sluis, T. & Schmidt, A.M. (2021). E-BIND Handbook (Part B): Scientific support for successful implementation of the Natura 2000 network. Wageningen Environmental Research/ Ecologic Institute /Milieu Ltd. Wageningen, The Netherlands.

Vasiliev, D., & Greenwood, S. (2021). The role of climate change in pollinator decline across the Northern Hemisphere is underestimated. Science of The Total Environment, 775, 145788. https://doi.org/10.1016/j.scitotenv.2021.145788

ANNEXES

Annex 1 – Link to the Boreal Biogeographical Roadmap

For the road map: see the online pdf:
https://ec.europa.eu/environment/nature/natura2000/platform/call_for_2021_networking_events/documents/Roadmap_Boreal.pdf

Annex 2 – Follow-up and networking events since the previous Boreal seminar

NETWORKING EVENTS Boreal Region / Since 2019

Restoring Degraded Landscapes through Green Infrastructure; University of Lisbon & Leaf

Date: March/April 2023

Location: Portugal

Natural river processes as a base for river-related protected areas and river restoration

Date: 20-22 April 2023

Location: Drawa National Park, Poland

Europe's freshwater fishes in the context of the Biodiversity Strategy targets for protected areas and conservation status improvement of habitats and species

Date: 24-25 November 2022

Location: The premises of the Committee of the Regions, Brussels

LIFE in Common Land Congress

Date: 08-09 November 2022

Location: Lugo, Spain

Natura 2000 site management

Date: 15 November 2021 and 23-25 May 2022

Location: Zagreb, Croatia

Assessment of current and future Invasive Alien plant Species (IAS) in European coastal dune ecosystems

Date: 19-21 May 2022

Location: De Panne, Belgium

Workshop on butterflies and EU biodiversity strategy targets

Date: 29-30 March 2022

Location: Online

Introductory biogeographical seminars; terrestrial and marine

9-10 December and 14-15 December 2021

Location: Online

Baltic N2000 Sites as Migration Hotspots

Date: 19-20 November 2020

Location: Online

Protection of Meadow Birds in the EU

Date: 17-18 November 2020

Location: Utrecht, The Netherlands

Assessment and Management of Natura Freshwater Habitats

Date: 9-11 November 2020

Location: Online

Uncertainty and Multifunctionality: Legal Challenges and Opportunities for Green Infrastructure (GI) Policy

Date: 28th April 2020

Location: Online

Exchanging experience on the management of invasive alien species in Europe

Date: 18 December 2019

Location: Brussels, Belgium

European Workshop on Measures to Benefit Pollinators

Date: 13 November 2019

Location: Brussels, Belgium

International seminar on Sustainable forest management in Natura 2000

Date: 11-12 November 2019

Location: Palermo, Italy

LIFE Platform meeting on Natura 2000 Governance

Date: 14-16 October 2019

Location: Brussels, Belgium

The third Boreal biogeographical seminar

Date: 14-16 October 2019

Location: Tallinn, Estonia