National scale prioritization and spatial planning

Finnish case for cost-effective ecosystem restoration and management

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METZO III -project
Metsähallitus, Parks & Wildlife Finland

Siggen seminar 2022: Nature restoration and the role protected areas
31 March 2022
### Finnish Restoration Policy

#### Policy
- Biodiversity strategy
- Current governmental program

#### Expert Work
- **FBER**: Finnish Board for Ecological Restoration and Management (subgroups for different habitat groups)
- Universities and research centres

#### Prioritization and Planning
- Ecosystem improvement expert working group, Zonation – spatial planning, PAF, EU bd-strategy and restoration law

#### Implementation
- Helmi programme, METSO programme, SOTKA programme, Riekko-programme

#### Monitoring
- Ecosystem restoration and management monitoring for different habitat groups (forests, semi-natural grasslands, mires)
Defining and setting priorities in time and space
Why do we need systematic analyses?

Conservation Practice and Policy

Six Common Mistakes in Conservation Priority Setting

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Abscract: A vast number of prioritization schemes about the allocation of limited resources. It
setting priority in conservation frequency includes to be more rigorous and scientific in the way
manipulate and resolve the underlying principles of decision science, we
prioritize for conservation and acknowledge the complex
deficiencies, prioritization actions, and uncertainties of failure. We explain these strategies and offer a path
towards solutions in future prioritizations.

Keywords: Conservation Action Planning, conservation strategies, research, prioritization

Use of Inverse Spatial Conservation Prioritization

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Contributed Papers

Use of Inverse Spatial Conservation Prioritization to Avoid Biological Diversity Loss Outside

Protected Areas
Why do we need systematic analyses?

To avoid harmful opportunism in decision-making

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To find the balance!

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To define and recognize opportunities
Graphical analysis of the performance
COMPARING TRADE-OFFS

Without emphasizing connectivity

The overall representation level of natural habitats on protected N2K sites

Representativeness of habitats at the analysis area

Total area included in the analysis = protected N2K areas in Finland
National scale restoration prioritization in Finland

**Finnish restoration prioritization project**
Resource allocation for how to most cost-efficiently reach the 15% restoration target

**Spatial prioritization of N2000 network in Finland for restoration and management:**
Which areas to restore and manage to cost-effectively improve ecological representativeness of our PA network.
Finnish restoration prioritization project
Resource allocation for how to most cost-efficiently reach the 15% restoration target

100 habitat experts
Working in ecosystem groups
Systematically defining:
• current state of ecosystems
• degraded ecosystem elements
• how to best reverse the degradation (cost-efficient methods) for each ecosystem type

Calculating resource allocation scenarios within ecosystem groups and across all ecosystems

https://julkaisut.valtioneuvosto.fi/handle/100024/74862
Spatial prioritization of Natura 2000 areas for restoration and management potential

Main elements from databases and Finnish Restoration Prioritization -project

| Fine scale geographic information for 67 N-habitat types + threatened species + current state for each habitat patch from the Parks & Wildlife habitat database |

Current methods

Effects of the methods

Costs of the methods

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How good they will be

How much they are improved

Zonation

Ranks areas (pixels to any size planning units) according to their conservation value, based on:

- Aims to maximize ecological value of the solution (set of areas) considering simultaneously data for multiple habitats and species
- Complementarity (identifying what is missing or poorly represented)
- Connectivity, Condition, Cost-effectiveness

Produces data for trade-off evaluation (how the solution changes / area / costs)

Kareksela et al. 2013 Conservation Biology
Comparison of trade-offs
Avoiding opportunism
Finnish restoration prioritization project

- 15% target is beyond our (current) resources
- Fixing habitat group specific targets leads to cost-inefficient solution. Expensive (continuously managed) habitats consume most of the resources
- Relationship of cost-efficiency and cost-effectiveness still a bit unclear in this process!
Spatial prioritization – showing more detailed priorities

- Low potential
- High potential
- Already good condition

20 km
Spatial prioritization – showing more detailed priorities and also priorities between N2K sites
### Most cost effective 20%

<table>
<thead>
<tr>
<th>Region</th>
<th>Herb rich and broad leaved forests</th>
<th>Cultural biotopes</th>
<th>Bogs, mires, and fens</th>
<th>Coastal biotopes</th>
<th>Sun-lit forests esker</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Restored hectares (ha)</td>
<td>Continuous</td>
<td>Restored (ha)</td>
<td>Continuous</td>
<td>Repeated management (ha)</td>
</tr>
<tr>
<td>Järvi-Suomi</td>
<td>7743,25</td>
<td>838,25</td>
<td>3353,5</td>
<td>0</td>
<td>408,25</td>
</tr>
<tr>
<td>Pohjanmaa-Kainuu</td>
<td>3089,75</td>
<td>1825,25</td>
<td>686,25</td>
<td>840,75</td>
<td>24,75</td>
</tr>
<tr>
<td>Lappi</td>
<td>562,75</td>
<td>281,5</td>
<td>174,25</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Rannikko</td>
<td>7818,25</td>
<td>2797,25</td>
<td>1014,5</td>
<td>2138,5</td>
<td>556,5</td>
</tr>
<tr>
<td>SUM</td>
<td>19214</td>
<td>5742,25</td>
<td>5228,5</td>
<td>2979,25</td>
<td>989,5</td>
</tr>
</tbody>
</table>
Comparing how habitat representations differ with different analysis perspectives

How the solution changes if we change: connectivity? costs? species? habitat rarity/representation in the boreal region or EU27?
Priorities when using national scale abundances of habitats and when each habitat is weighed according to how big proportion of that habitat’s EU27 area is in the analysis area (habitat weight: area in protected areas in Finland / area in EU27).
EU restoration law from the Finnish perspective
30% means 1,2 M ha

If 30% for all N-habitats the cost is c. 5 000 – 12 000 M€

Prioritization according to cost-effectiveness significantly reduces costs and increases effectiveness (e.g. maximizing relative increase to the area in good condition)

Flexibility should be allowed to allocate resources between habitats!

Possible benefits of co-prioritizing and allocation of habitat specific responsibilities between MS should be investigated!
30 % area of not good condition for each N-habitat in Finland – Largest habitats define the needs to meet the restoration target

10 habitats with most to restore compile c. 90% of the huge 30% target, 1,2M ha – 30 % target for the other 55 habitats can be reached with a more realistic target of 120 000 ha/ by 2030
Differences of models and solutions

- Prioritizing according to cost-effectiveness makes a difference

### 30% restoration of degraded area for all N-habitats (with degraded area), no priorities

<table>
<thead>
<tr>
<th>Habitat group</th>
<th>30 % Restoration area / ha</th>
<th>30 % Cost / Milj. €</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal habitats</td>
<td>141 000</td>
<td>2 500–10 000!</td>
</tr>
<tr>
<td>Freswater habitats</td>
<td>192 000</td>
<td>1000</td>
</tr>
<tr>
<td>Grasslands, heath &amp; scrub</td>
<td>2 500</td>
<td>6</td>
</tr>
<tr>
<td>Bogs, mires &amp; fens</td>
<td>532 000</td>
<td>500</td>
</tr>
<tr>
<td>Fells</td>
<td>160 000</td>
<td>160</td>
</tr>
<tr>
<td>Rocky habitats</td>
<td>3 200</td>
<td>5</td>
</tr>
<tr>
<td>Grasslands, heath &amp; scrub</td>
<td>8 300</td>
<td>21 (6)</td>
</tr>
<tr>
<td>Bogs, mires &amp; fens</td>
<td>194 000 (532 200)</td>
<td>192 (500)</td>
</tr>
<tr>
<td>Fells</td>
<td>335 000 (160 000)</td>
<td>335 (160)</td>
</tr>
<tr>
<td>Rocky habitats</td>
<td>600 (3200)</td>
<td>1,1 (5)</td>
</tr>
<tr>
<td>Forests</td>
<td>212 000</td>
<td>600</td>
</tr>
<tr>
<td>Total</td>
<td>1 242 700</td>
<td>4 800–12 300</td>
</tr>
</tbody>
</table>

### Prioritization according to cost-effectiveness: 43 habitats restored ->100 %, 14 habitats no restoration

<table>
<thead>
<tr>
<th>Habitat group</th>
<th>Restoration area (ha) following habitat specific cost-effectiveness</th>
<th>Cost / Milj €</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coastal habitats</td>
<td>136 000 (141 000)</td>
<td>180 (2 500–10 000)</td>
</tr>
<tr>
<td>Freswater habitats</td>
<td>43 000 (192 000)</td>
<td>215 (1000)</td>
</tr>
<tr>
<td>Grasslands, heath &amp; scrub</td>
<td>8 300 (2500)</td>
<td>21 (6)</td>
</tr>
<tr>
<td>Bogs, mires &amp; fens</td>
<td>194 000 (532 200)</td>
<td>192 (500)</td>
</tr>
<tr>
<td>Fells</td>
<td>335 000 (160 000)</td>
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</tr>
<tr>
<td>Rocky habitats</td>
<td>600 (3200)</td>
<td>1,1 (5)</td>
</tr>
<tr>
<td>Forests</td>
<td>485 000 (212 000)</td>
<td>731 (600)</td>
</tr>
<tr>
<td>Total</td>
<td>1 202 000 (1 242 700)</td>
<td>1 770 (4 800–12 300)</td>
</tr>
</tbody>
</table>

(almost) Same total restoration area with 1/3 costs!!

3-times average increase to N-habitats!!

43 -> 100% and 14 -> 0% against 57 -> 30%
How is this prioritization working (in addition to data problems..)?

**National level priorities and cooperation enabling cost-effectiveness**

Finnish restoration prioritization showing efficiency pitfalls

Spatial analysis providing a complementary solution at national scale by cost-effectively filling in biodiversity gaps (through restoration and management in this case)

Ensuring connectedness in the landscape

Effective allocation of resources to meet the mutually agreed targets

**“Strict” implementation is still a challenge while ad hoc opportunities arise**

Regional planning in Parks & Wildlife Finland

Priority Action Framework (PAF), national pledge for EU BD-strategy, EU restoration law

**Even more holistic solutions?**

Our ability to achieve larger scale effects like mitigating climate change or e.g. regional ESS consideration like flood control still needs more careful analyses.
Thank you!

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Zonation analysis:

Finnish Restoration Prioritization –project:
https://julkaisut.valtioneuvosto.fi/handle/10024/74862
The Finnish Board on Ecological restoration and management (FBER) – a key instrument for successful and long-term (since 2004) development of restoration in Finland

- **National cooperation body**: Steering group with three habitat expert groups (forests, peatlands, semi-natural grasslands)

- **Key national restoration experts** from main research and operative institutes and authorities, including MoE and MoAF, are involved

- **Adaptive management and the evaluation of the impacts** of restoration require both experimental scientific research and long-term monitoring on a scale of decades. FBER has actively produced and planned:
  - Handbooks for the ecological restoration of forests and drained peatlands
  - Monitoring guidebooks
  - A national network of long-term monitoring of restored peatlands and forests

FBER’s expertise is used in a broad range of research and development projects as well as policy processes concerning restoration, and it collaborates with large range of national and international stakeholders (including SERE and ReNO)
METSO - The Forest Biodiversity Programme for southern Finland
2008 –2025
A success story of nature conservation and management in Finland

• **Voluntary-based** conservation and management programme based on a
government resolution

• **Engage all participants** - active collaboration between forest and
environmental authorities (MoAF, MoE) and organizations, private forest
owners, forest companies, NGOs and other stakeholders

• **Ambitious targets** - 96 000 ha permanently protected forests and 82 000 ha
of fixed-term (10 years) environmental forestry subsidy agreements and
nature management by 2025
  - So far appr. 5 000 ha nature management
  - Compensation for permanent protection is tax-free

• **Criteria** - voluntary-based programme but site selection according to jointly
approved ecological criteria

• **Active communication** - scientific research + nature management and
restoration development projects + regional partnerships → mainstreaming
forest biodiversity, engaging all participants

• **Resources** - government funding, appr. 30 million euros per year

Helmi-programme, 2020 ->

National scale program for improving ecosystems and species in and outside protected areas

Connecting administration, experts, planners, land-owners...

Targets for 2020-2023:

• Protect 20 000 ha of mires
• Restore 12 000 ha of mires
• Restore and manage 15 000 ha of seminatural grasslands
• Restore and manage 80 sites of SPA-bird wetlands
• Manage 600 wooded sites
• Restore 200 freshwater and coastal habitat sites

ALSO: Riekko-programme and SOTKA-programme

• Restoring and managing wetlands and mires and whole watersheds to improve declined bird and fish populations and sustain related ecosystem services