Current prioritization approaches –
how well can we identify different priorities and the related challenges

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METZO II –project (funded by the Finnish Ministry of Environment)
Metsähallitus, Parks & Wildlife Finland

CAFF meeting
Rovaniemi 10th November 2018

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Systematic (spatial) conservation planning?

Operative model to solve wicked problems

To link ecological uniqueness and irreplaceability with possible threats and pressures
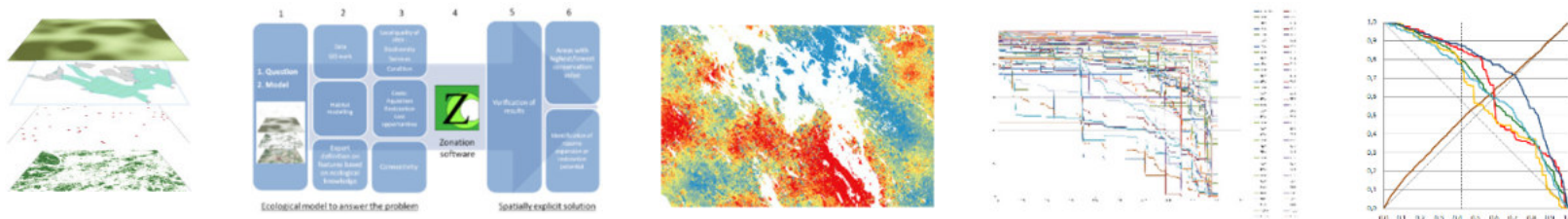
To identify cost-effectiveness and potential for ecosystem improvement

Quantitative evaluation of related social-ecological trade-offs

## Avoiding harmful opportunism in decision-making

Finding the balance!

## Defining and recognizing opportunities

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
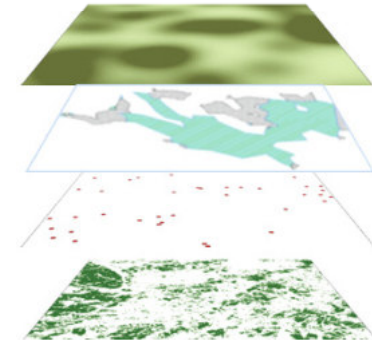
Produces data for trade-off evaluation (how the solution changes / area / costs)
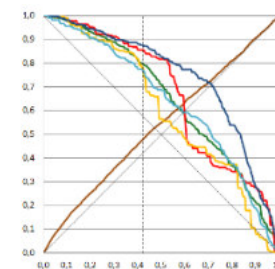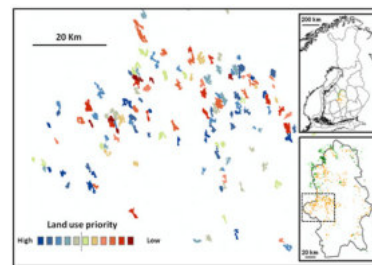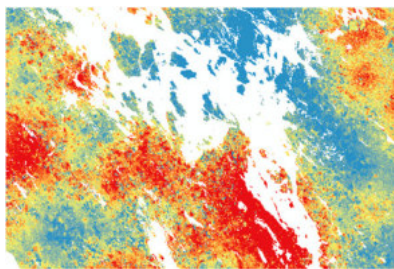
Kareksela et al. 2013 *Conservation Biology*

Irreplaceability

Restoration potential
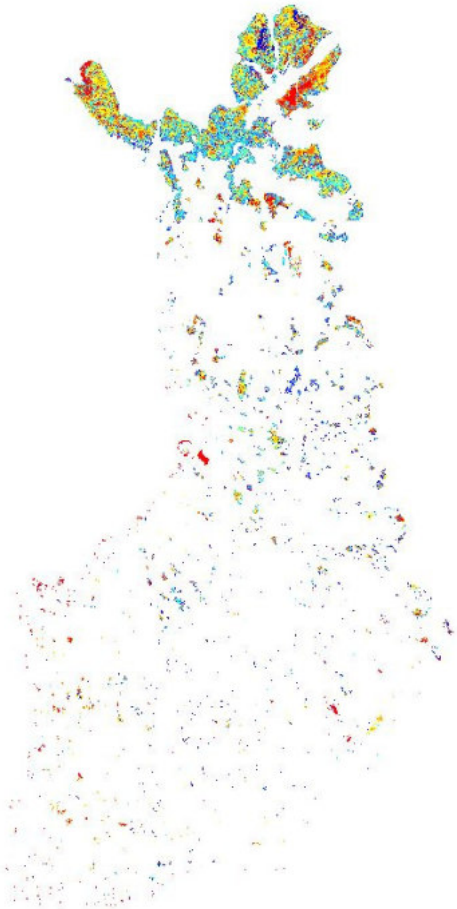
Same areas,
same data,
but different question

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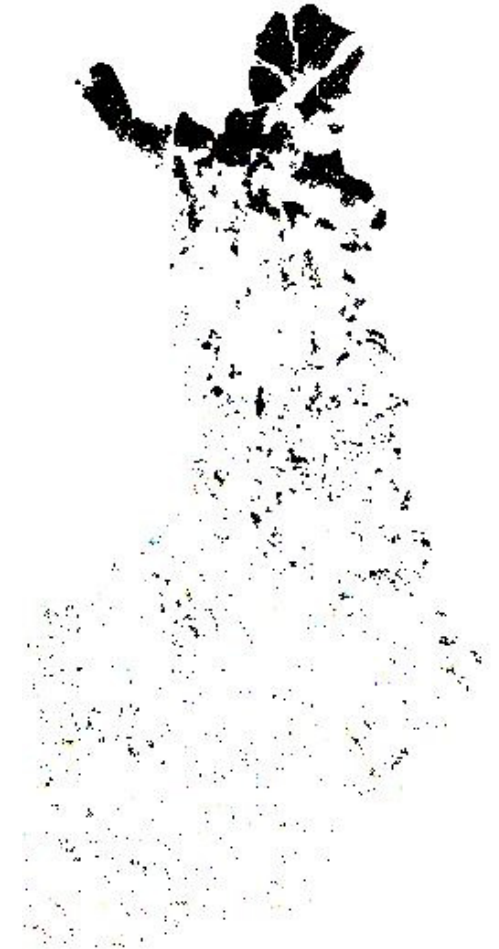
Irreplaceability -
Identifying ecological uniqueness
within the protected N2000 area network

Data: Natura habitats + threatened species

Irreplaceability in prioritization (Zonation):
proportion of habitats' and
species' total abundances occurring
at certain area

Why to do this?
Recreational pressures
Nearby land-use...
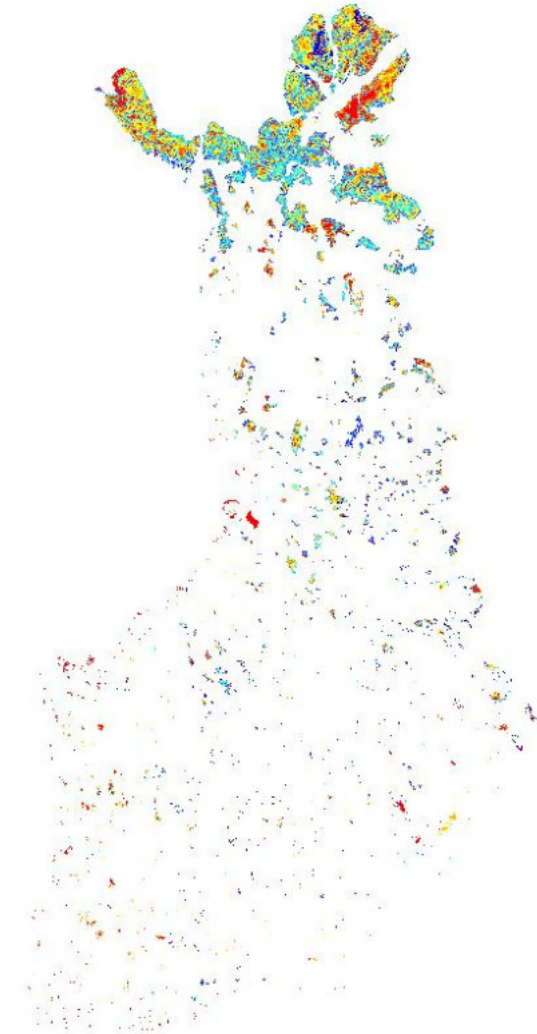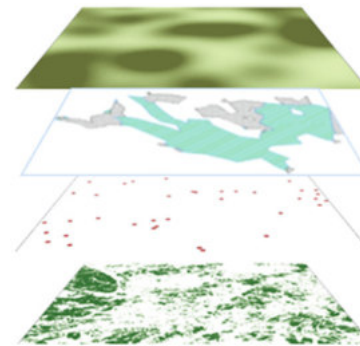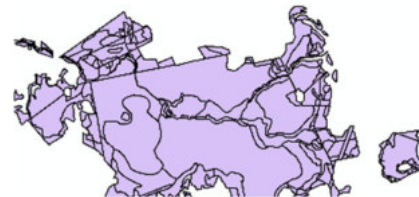
Ecosystem restoration and management analysis:
Comparing how habitat representations differ with different analysis perspectives

■ Good condition or not realistic

■ Potential and will be improved (best 20% solution)

■ Potential but not treated if "only" best 20% is done

Species rich meadows (6270) | Raised bogs (7110) | Southern rich fens (7230) | Broad-leaved deciduous forests (9020) | Old oak woods (9190) | Herb rich forests (9050)
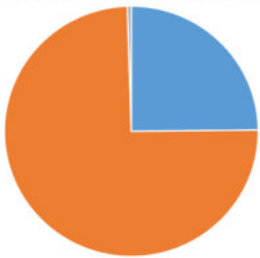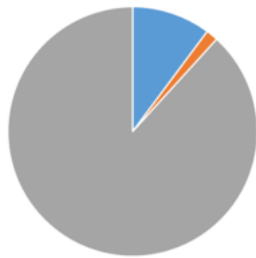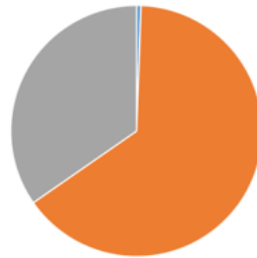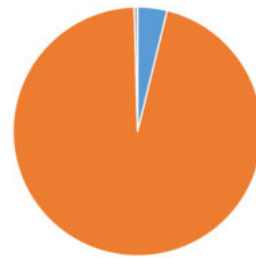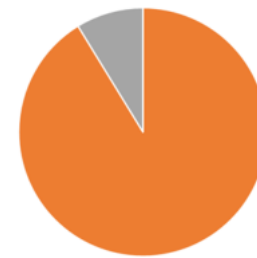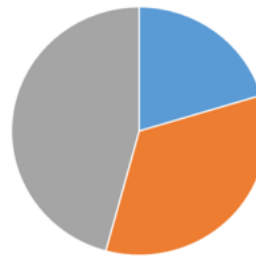
How the solution changes if we change:
connectivity? costs? species? habitat rarity/representation in the boreal region or EU27?

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Challenges

Data issues
Interpreting the maps and stuff
Implementation

Solutions

Systematic analyses with operational models help to implement the results and to investigate trade-offs and knowledge gaps

Systematic analyses with operational models help to implement the results and to investigate trade-offs and knowledge gaps

Proportional changes for the Natura habitats when N2000 areas are improved following the prioritization

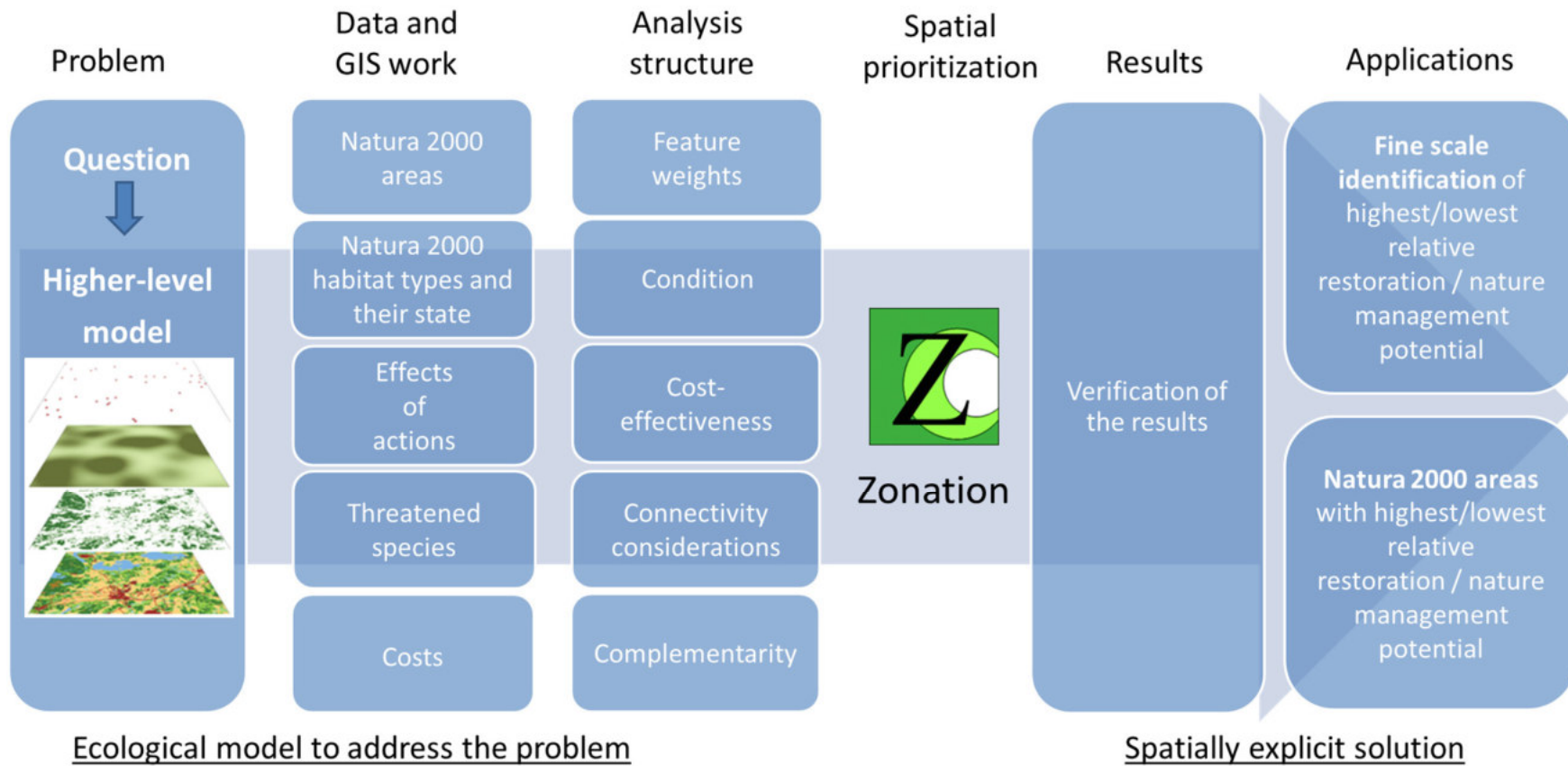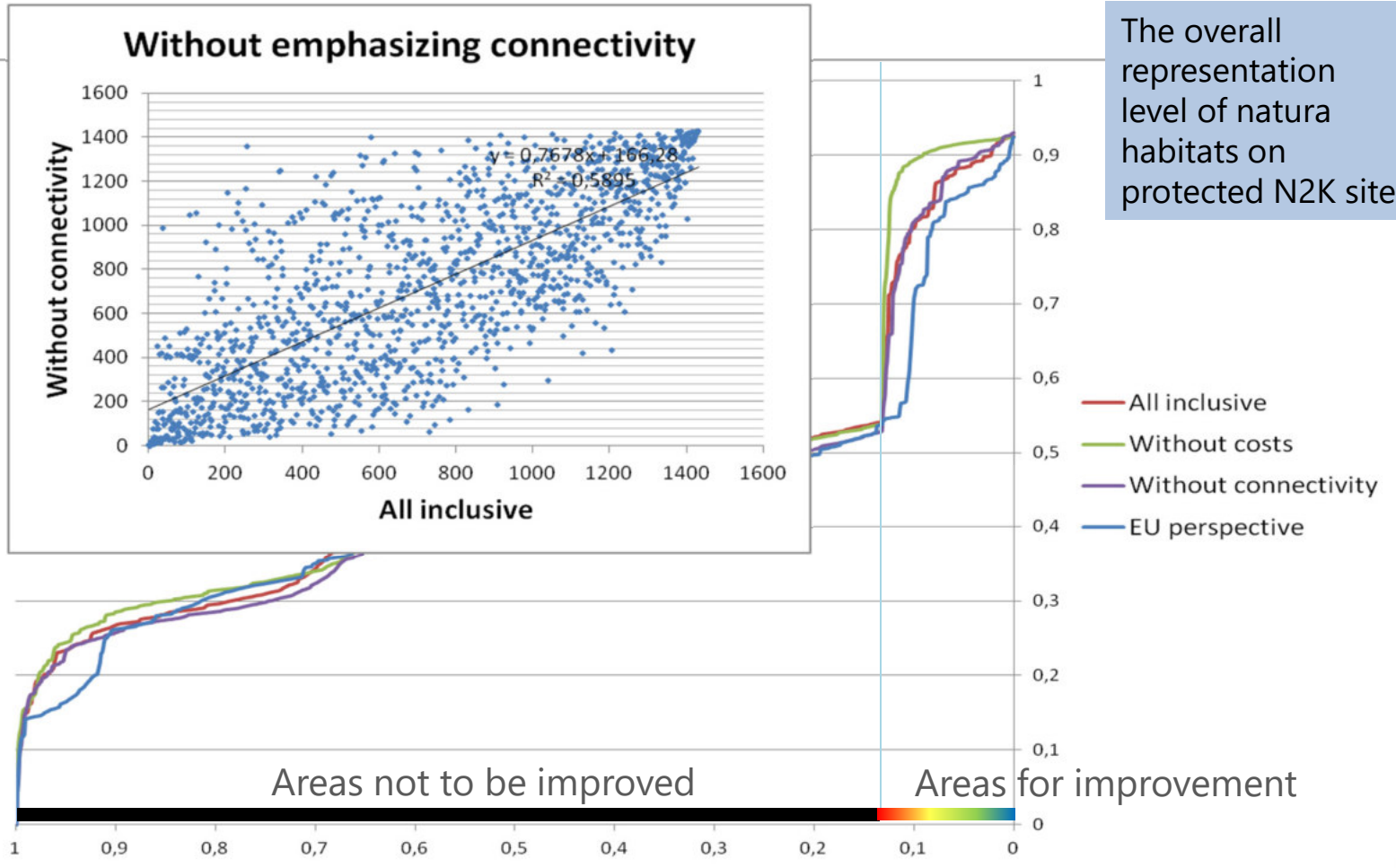		Change in area	Total improvement	6230	6270	6280	7240	7110	7140	7160	7210	7220	7230e	7230p	7310	7320	8210	8220	8230	9010	9030	9050	9020
Osuus valittavana olevasta alasta		0,688	0,874	0,750	0,981	0,000	0,133	0,111	0,681	0,000	0,088	0,991	0,100	0,083	0,000	0,411	0,333	0,349	1,000	0,057	0,625	0,962
Erotus: nykytila - paras 20%		0,213	0,450	0,454	0,755	0,000	0,013	0,001	0,047	0,000	0,003	0,566	0,001	0,001	0,000	0,023	0,003	0,096	0,001	0,009	0,293	0,901
	0	0,844492	0,515	0,608	0,77	0,875	0,834	0,991	0,933	0,95	0,938	0,874	0,959	0,957	0,995	0,965	0,995	0,928	0,963	0,702	0,865	0,941
	0,001	0,844033	0,515	0,608	0,77	0,875	0,834	0,988	0,933	0,95	0,938	0,874	0,958	0,957	0,995	0,965	0,994	0,928	0,963	0,702	0,864	0,941
	0,002	0,843705	0,515	0,608	0,77	0,875	0,834	0,987	0,933	0,95	0,938	0,874	0,958	0,956	0,995	0,965	0,994	0,927	0,963	0,701	0,862	0,941
	0,003	0,842377	0,515	0,608	0,77	0,875	0,834	0,987	0,931	0,95	0,938	0,874	0,957	0,955	0,994	0,965	0,994	0,927	0,963	0,699	0,862	0,941
	0,004	0,841377	0,515	0,608	0,77	0,875	0,833	0,987	0,931	0,95	0,938	0,874	0,957	0,954	0,994	0,965	0,994	0,927	0,963	0,696	0,859	0,941
	0,005	0,83877	0,515	0,601	0,77	0,875	0,83	0,987	0,931	0,95	0,938	0,874	0,957	0,954	0,994	0,965	0,993	0,926	0,963	0,696	0,858	0,941
	0,006	0,836443	0,515	0,599	0,77	0,875	0,829	0,986	0,929	0,95	0,938	0,874	0,957	0,952	0,994	0,965	0,991	0,926	0,963	0,695	0,856	0,941
	0,007	0,835623	0,515	0,599	0,77	0,875	0,829	0,986	0,929	0,95	0,938	0,874	0,957	0,952	0,994	0,965	0,991	0,911	0,963	0,694	0,855	0,941
	0,008	0,834836	0,515	0,598	0,77	0,875	0,827	0,986	0,929	0,95	0,938	0,874	0,957	0,951	0,994	0,965	0,991	0,91	0,963	0,693	0,852	0,941
	0,009	0,833787	0,515	0,596	0,77	0,875	0,826	0,986	0,928	0,95	0,938	0,874	0,957	0,949	0,994	0,965	0,991	0,91	0,963	0,692	0,847	0,941
	0,01	0,833033	0,515	0,595	0,77	0,875	0,823	0,986	0,928	0,95	0,938	0,874	0,956	0,948	0,994	0,965	0,991	0,91	0,963	0,692	0,843	0,941
	0,011	0,827787	0,515	0,584	0,77	0,792	0,821	0,986	0,925	0,95	0,917	0,873	0,956	0,948	0,994	0,961	0,991	0,886	0,963	0,69	0,832	0,941
	0,012	0,823541	0,515	0,579	0,77	0,792	0,818	0,985	0,924	0,95	0,917	0,873	0,956	0,948	0,994	0,961	0,991	0,882	0,963	0,682	0,826	0,941
	0,013	0,815475	0,515	0,575	0,766	0,792	0,815	0,985	0,924	0,95	0,917	0,873	0,955	0,948	0,994	0,961	0,991	0,868	0,963	0,682	0,823	0,94
	0,014	0,810328	0,515	0,56	0,766	0,792	0,809	0,985	0,922	0,95	0,917	0,873	0,954	0,947	0,994	0,961	0,991	0,867	0,963	0,681	0,812	0,94
	0,015	0,804459	0,515	0,556	0,766	0,792	0,807	0,984	0,917	0,95	0,917	0,873	0,954	0,947	0,994	0,961	0,99	0,867	0,963	0,646	0,798	0,94
	0,016	0,777656	0,45	0,548	0,766	0,792	0,806	0,984	0,917	0,95	0,917	0,873	0,954	0,947	0,994	0,96	0,99	0,867	0,963	0,564	0,787	0,915
	0,017	0,773082	0,45	0,542	0,766	0,792	0,795	0,984	0,915	0,95	0,917	0,872	0,954	0,946	0,994	0,96	0,99	0,867	0,963	0,563	0,778	0,912
	0,018	0,767836	0,45	0,53	0,766	0,792	0,785	0,983	0,915	0,95	0,917	0,872	0,952	0,946	0,994	0,959	0,99	0,867	0,963	0,556	0,772	0,908
	0,019	0,764016	0,45	0,519	0,766	0,792	0,775	0,983	0,912	0,95	0,912	0,869	0,951	0,946	0,994	0,938	0,989	0,826	0,963	0,556	0,728	0,906
	0,02	0,753213	0,45	0,488	0,766	0,792	0,77	0,983	0,911	0,95	0,912	0,869	0,95	0,946	0,994	0,938	0,989	0,749	0,963	0,556	0,705	0,906
Most cost-effective 20% addition to the existing if degraded areas are restored/managed	0,021	0,748148	0,45	0,457	0,755	0,792	0,749	0,983	0,911	0,95	0,907	0,869	0,95	0,946	0,994	0,932	0,989	0,749	0,963	0,554	0,689	0,905
	0,022	0,739508	0,45	0,371	0,755	0,792	0,737	0,983	0,909	0,95	0,906	0,869	0,95	0,945	0,994	0,93	0,988	0,749	0,963	0,549	0,658	0,905
	0,023	0,721197	0,45	0,338	0,653	0,792	0,737	0,983	0,904	0,95	0,906	0,868	0,95	0,945	0,994	0,921	0,988	0,682	0,962	0,549	0,586	0,901
	0,024	0,694869	0,376	0,212	0,596	0,792	0,737	0,983	0,891	0,95	0,905	0,867	0,95	0,945	0,994	0,92	0,986	0,654	0,962	0,549	0,551	0,871
	0,025	0,631738	0,376	0,111	0,244	0,792	0,736	0,983	0,889	0,95	0,904	0,318	0,95	0,945	0,994	0,915	0,986	0,654	0,962	0,548	0,491	0,83
Representation on areas already in good condition	0,026	0,535279	0	0,003	0	0,792	0,736	0,982	0,864	0,95	0,904	0,303	0,949	0,945	0,994	0,909	0,986	0,653	0,962	0,545	0,396	0,004
	0,027	0,535148	0	0,003	0	0,792	0,736	0,982	0,864	0,95	0,904	0,303	0,949	0,945	0,994	0,909	0,986	0,653	0,961	0,545	0,396	0,004
	0,028	0,53482	0	0,003	0	0,792	0,736	0,982	0,864	0,95	0,904	0,303	0,949	0,945	0,994	0,909	0,986	0,653	0,961	0,545	0,396	0,004
	0,029	0,534557	0	0,003	0	0,792	0,736	0,982	0,864	0,95	0,904	0,303	0,949	0,945	0,994	0,909	0,986	0,653	0,961	0,545	0,396	0,004

M E T Z O

Graphical analysis of the performance
COMPARING TRADE-OFFS

Representativenes of habitats at the analysis area

Without emphasizing connectivity

The overall representation level of natura habitats on protected N2K sites

- All inclusive
- Without costs
- Without connectivity
- EU perspective

Areas not to be improved   Areas for improvement

Total area included in the analysis = protected N2K areas in Finland

Monitoring perspective
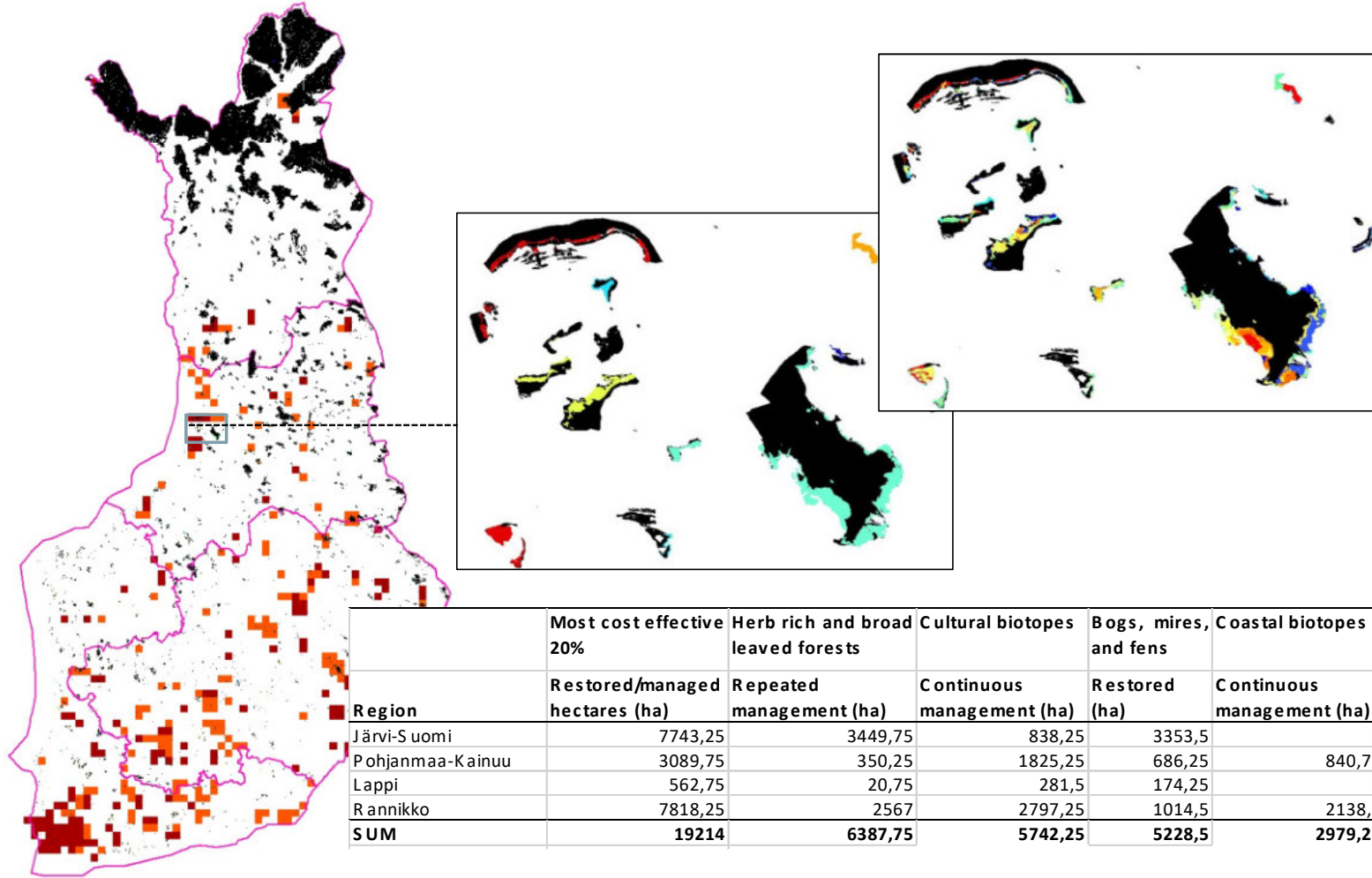Starting from identifying ecological irreplaceability

1. Quick and dirty: irreplaceable areas should have a monitoring priority

2. Iteration of the irreplaceability analysis with emphasis for monitoring need

   Weighing biodiversity elements according to their need for monitoring

   Should combine **monitoring need** and **possibilities to make a difference**
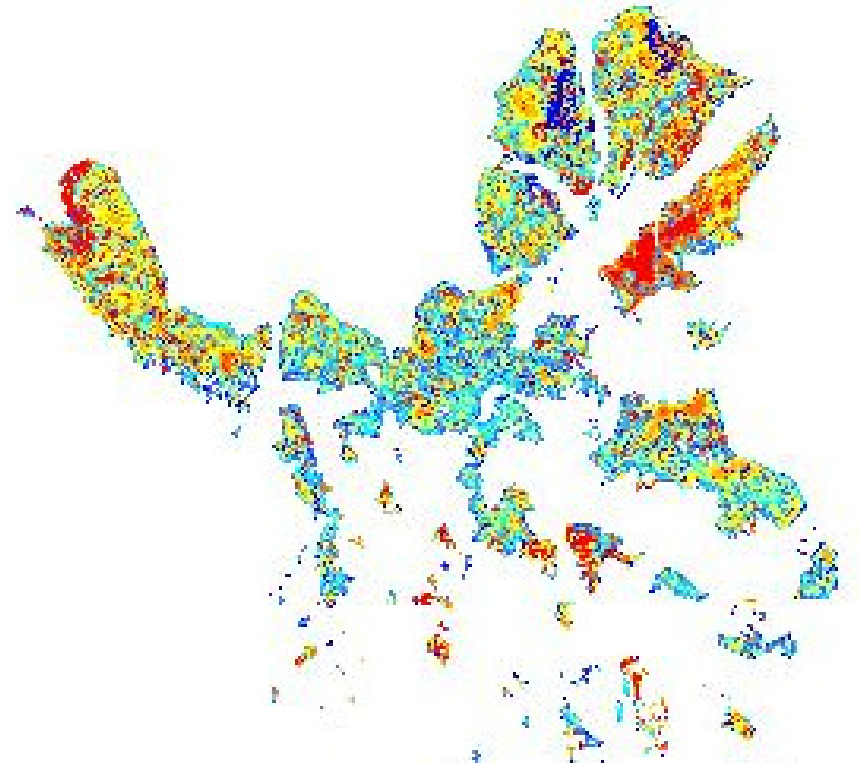
Spatial identification of responsibilities? (spatial allocation of most cost-effective restoration and management between Parks & Wildlife Finland regions)

	Most cost effective 20%	Herb rich and broad leaved forests	Cultural biotopes	Bogs, mires, and fens	Coastal biotopes	Sun-lit esker forests
Region	Restored/managed hectares (ha)	Repeated management (ha)	Continuous management (ha)	Restored (ha)	Continuous management (ha)	Repeated management (ha)
Järvi-Suomi	7743,25	3449,75	838,25	3353,5	0	408,25
Pohjanmaa-Kainuu	3089,75	350,25	1825,25	686,25	840,75	24,75
Lappi	562,75	20,75	281,5	174,25	0	0
Rannikko	7818,25	2567	2797,25	1014,5	2138,5	556,5
SUM	19214	6387,75	5742,25	5228,5	2979,25	989,5

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Some conclusions

Current methods allow ecologically sophisticated and meaningful analysis of different kinds of conservation needs that can be applied to wide range of decision-making

Proper analyses also enable proper investigation of the trade-offs, which helps to compare different solutions and to implement the results!

Getting good DATA for AND the IMPLEMENTATION of complex analyses is however still a CHALLENGE...

Offers tools also to build a prioritization model for cost-effective monitoring and use of data

**Possibilities to identify cost-effective social ecological decisions**

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Thank you!

Ari Lahtinen, Marja Hokkanen, Jussi Päivinen, Tuula Kurikka, Tuomas Haapalehto, Katja Raatikainen, Janne Kotiaho, Atte Moilanen, Ninni Mikkonen, Niko Leikola

More information
Presented analyses and Zonation: me, santtu.kareksela@metsa.fi
Zonation method: Atte Moilanen, atte.moilanen@helsinki.fi
Our prioritization project, (http://www.metsa.fi/web/en/zonation)
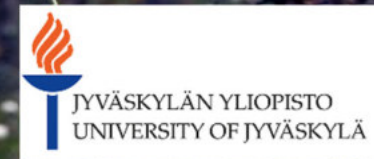
Research-implementation gap?

Exposing ecological and economic costs of the research-implementation gap and compromises in decision making

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[2]Metsähallitus, Parks & Wildlife Finland, Kalevankatu 8, FI-40100 Jyväskylä, Finland
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Abstract: *The frequently discussed gap between conservation science and practice is manifest in the gap between spatial conservation prioritization plans and their implementation. We analyzed the research-implementation gap of one zoning case by comparing results of a spatial prioritization analysis aimed*

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