

Disentangling the complexity of biodiversity using ecoinformatics



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- 1. "Ecoinformatics"**
- 2. Zonation software**
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- 4. Operational principles**
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Ecoinformatics –

Use of ecological information for computational analysis and decision making

- **My angle:** Ecologically based conservation decision analysis
- Protection, maintenance, restoration, offsetting, allocation of different land uses, etc.

Most important components

Experts

Ecology

Analyses

GIS etc. data

Society



**Conservation
value**

**Ecological
model**

**Decision
model**

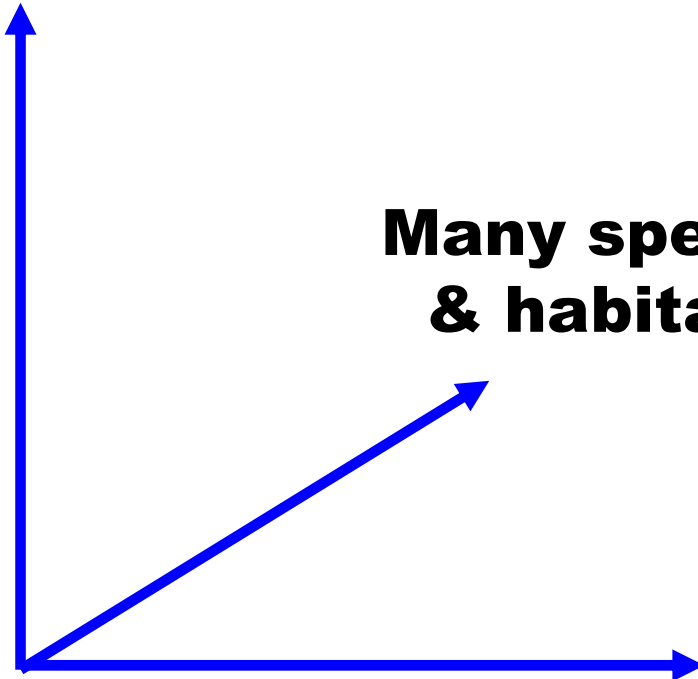
**Computational
analysis**

Actions



Main factors

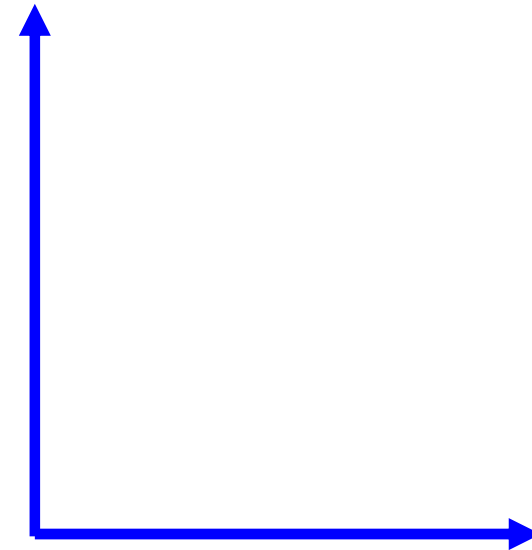
**Local habitat
quality**



Connectivity

**Many species
& habitats**

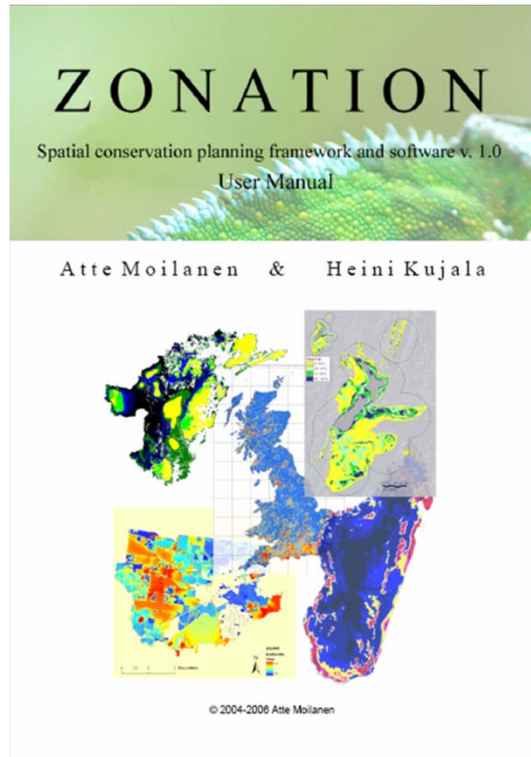
**Costs
€**



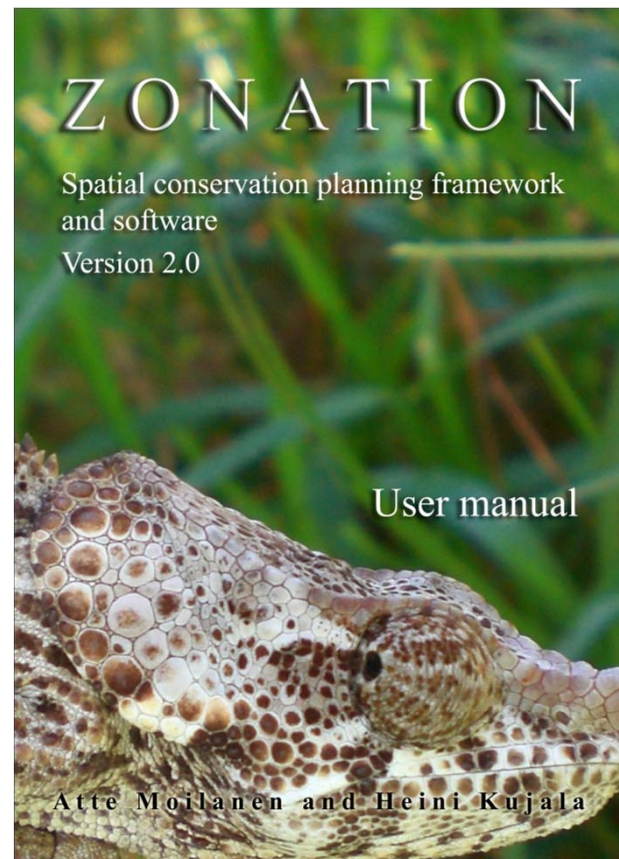
**Ecological
value**

Zonation - Spatial Conservation Prioritization

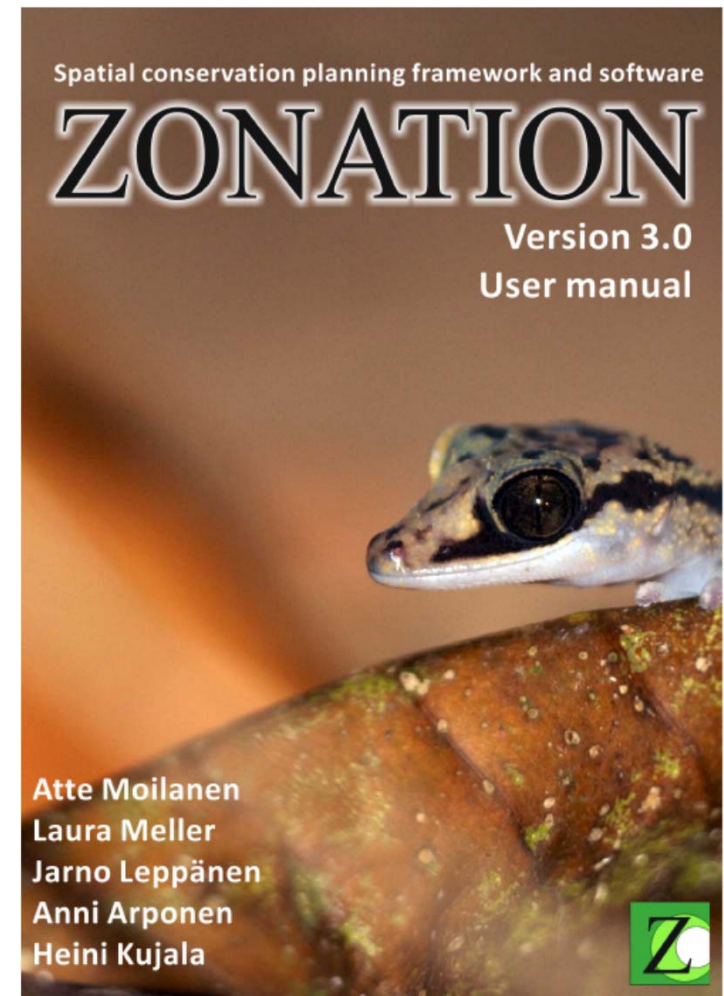
Freely from: www.helsinki.fi/bioscience/consplan



2006

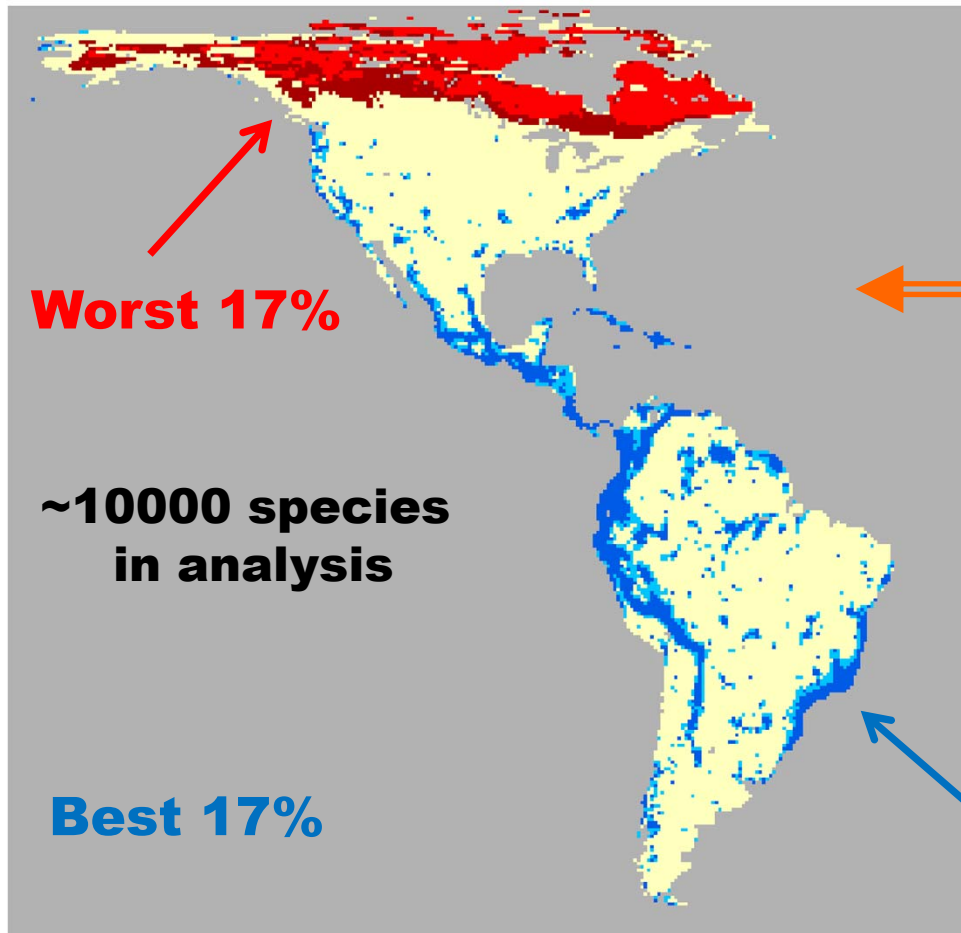


2008

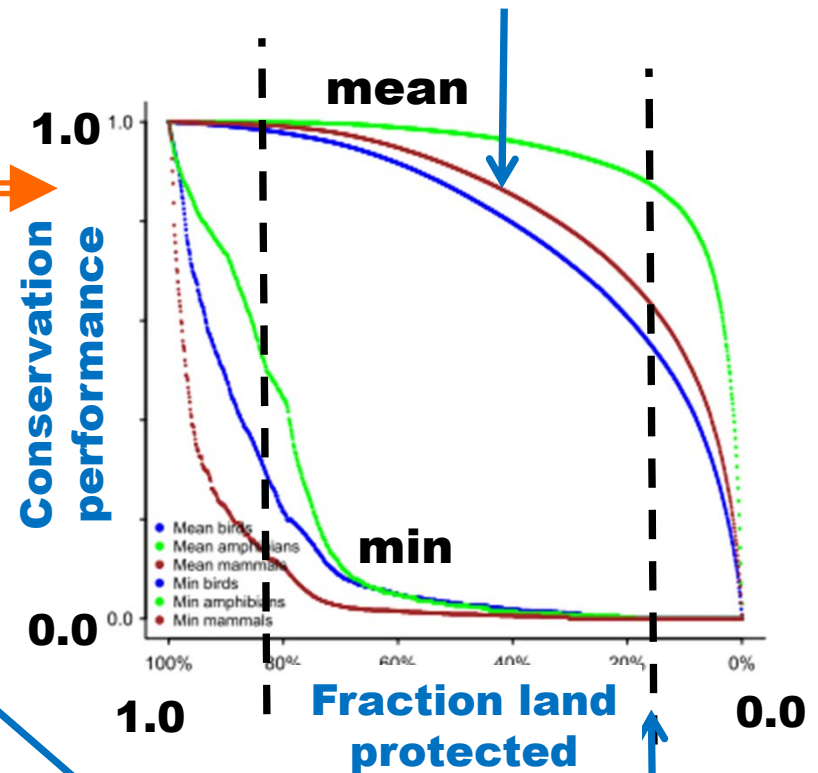


2011

Z on new-world mammals, amphibians, & birds: meaning of the Nagoya 17%...



**Upper 3 curves:
Mean performance for taxa**



26 x difference between top and bottom 17%
GREEN INFRA – WE COULD DO THIS FOR EUROPE!

Best 17% is very good

Zonation

**Produces spatial priority ranking
across the landscape**

Strategy:

**Minimization of loss of weighted
range-size normalized richness**



Minimize extinction rates

Landuse zoning: targeting peat extraction elsewhere













Santtu Kareksela, Janne Kotiaho & Atte Moilanen

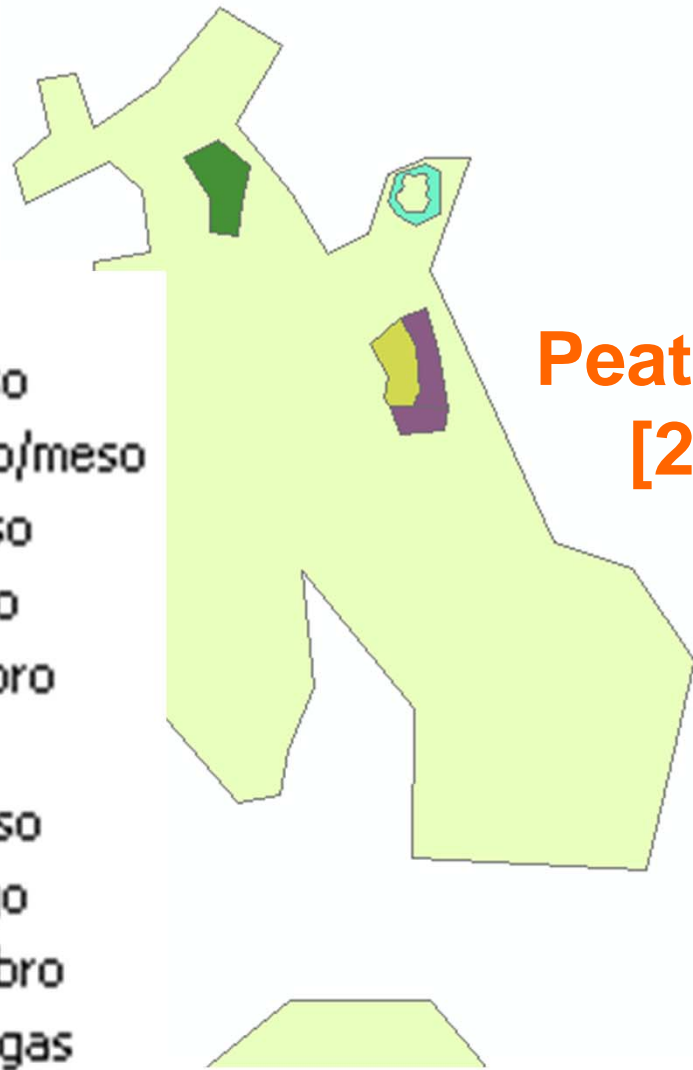


Data

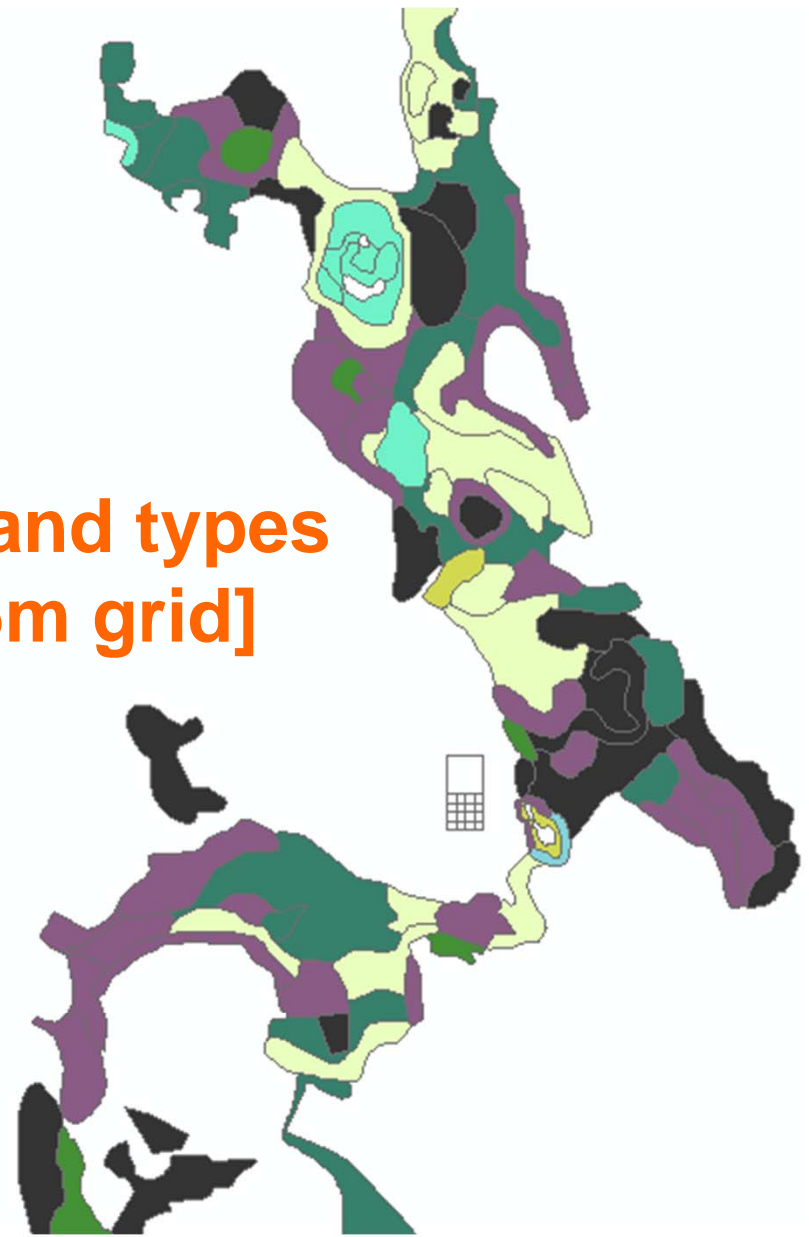
- **Regional Council of Central Finland**
 - Peatland classification & drainage
 - Bird observation data
 - Plant cover data
 - Peat depth data
- **Other**
 - Natural springs
 - Endangered spp observations



-  Korpi eu
-  Korpi meso
-  Korpi oligo/meso
-  Neva meso
-  Neva oligo
-  Neva ombro
-  Räme eu
-  Räme meso
-  Räme oligo
-  Räme ombro
-  Turvekangas
-  Turvetuotanto



**Peatland types
[25m grid]**



What to dig up for energy?

Focus on low ranks =>

avoidance of negative ecological impacts!

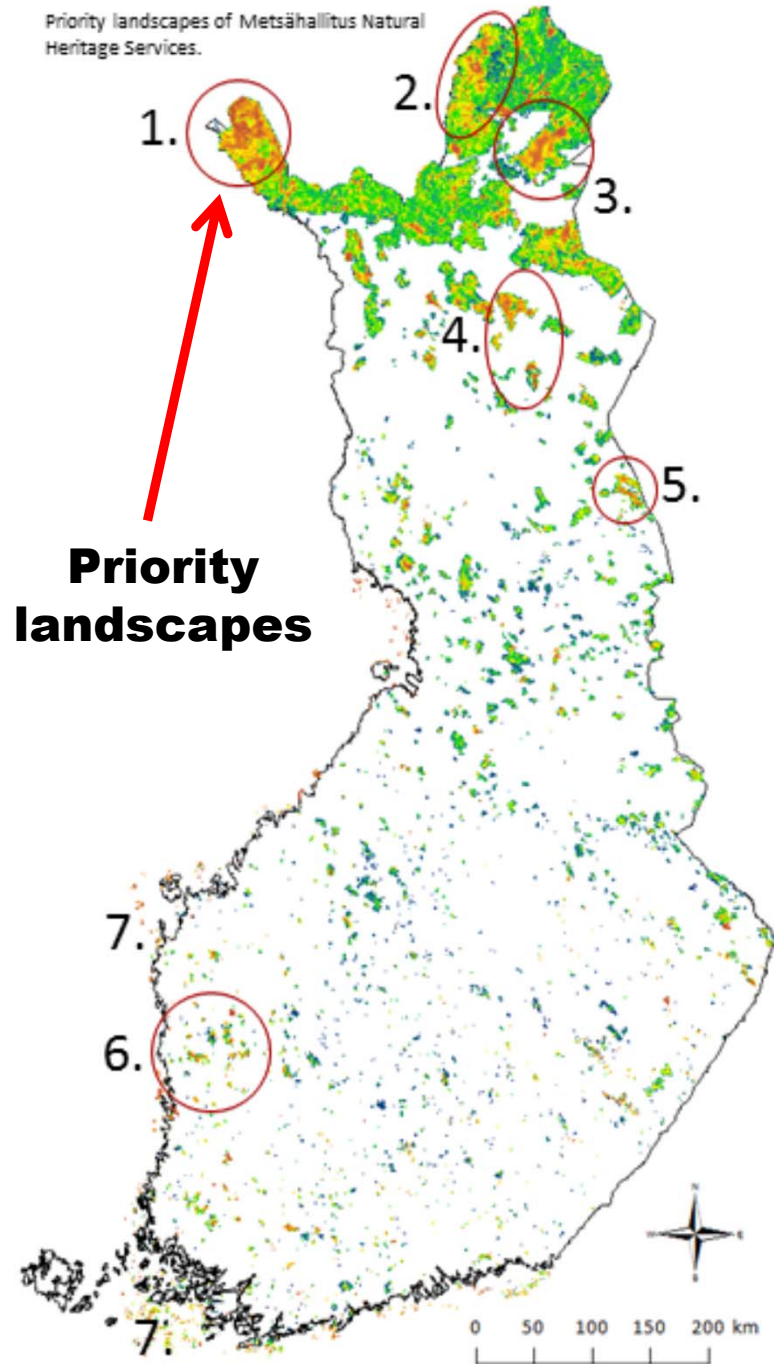


Zonation: fundamental principles

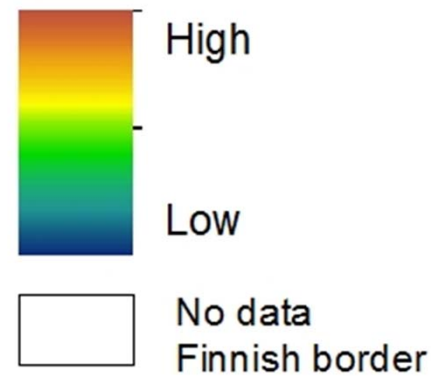
- 1. Best is everything protected**
- 2. Minimize loss = maximize what will remain**
- 3. Habitat quality and connectivity basic variables**
- 4. Range-size normalization emphasizes features with small or shrinking ranges**
- 5. Priority ranking identifies both best and worst parts of the landscape in one go**

Prioritization in and around the
Nature 2000 network
Anniina Mikkonen and Atte Moilanen





Conservation priority according to Zonation Priority rank



Variables:

- **68 Natura 2000 habitat types (HT)**
- **Natural state & HTs**
- **Pair-wise similarity of HTs**
- **Species richness of HTs**
- **Condition of HTs (assessment for EU 2007)**
- **Connectivity, area**
- **EU priority**
- **Rarity**

Zonation: major features

- **Many biodiversity features (species, habitats)**
- **Weighting of features**
- **Connectivity, 7 methods**
- **3 conceptual models for conservation value**
- **Species & community level analysis**
- **Uncertainty analysis**
- **Costs & opportunity costs**
- **Needs of alternative land uses**
- **Different priorities in different administrative regions**
- **Large-scale high-resolution analysis on a PC**

The Capercaillie and connectivity

- Population down 60%+
- Umbrella species
- Lecks > 300 ha

Saija Sirkiä, Joonas Lehtomäki,
Harto Lindén & Atte Moilanen

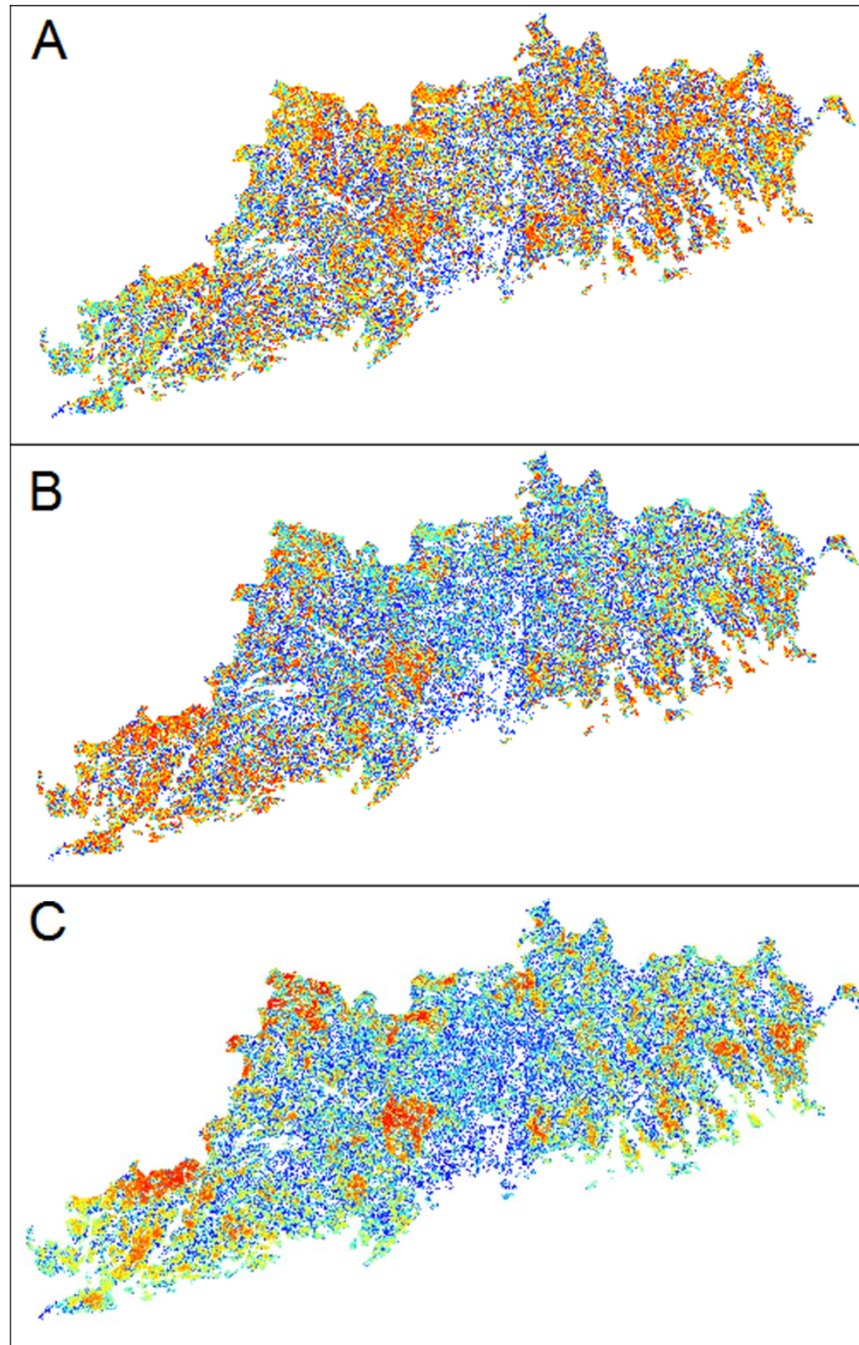


Forest quality

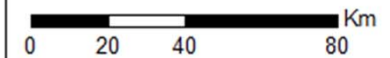
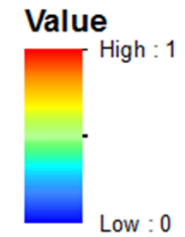
+

**weight on
conifers**

**+ connectivity
& avoidance of
people**

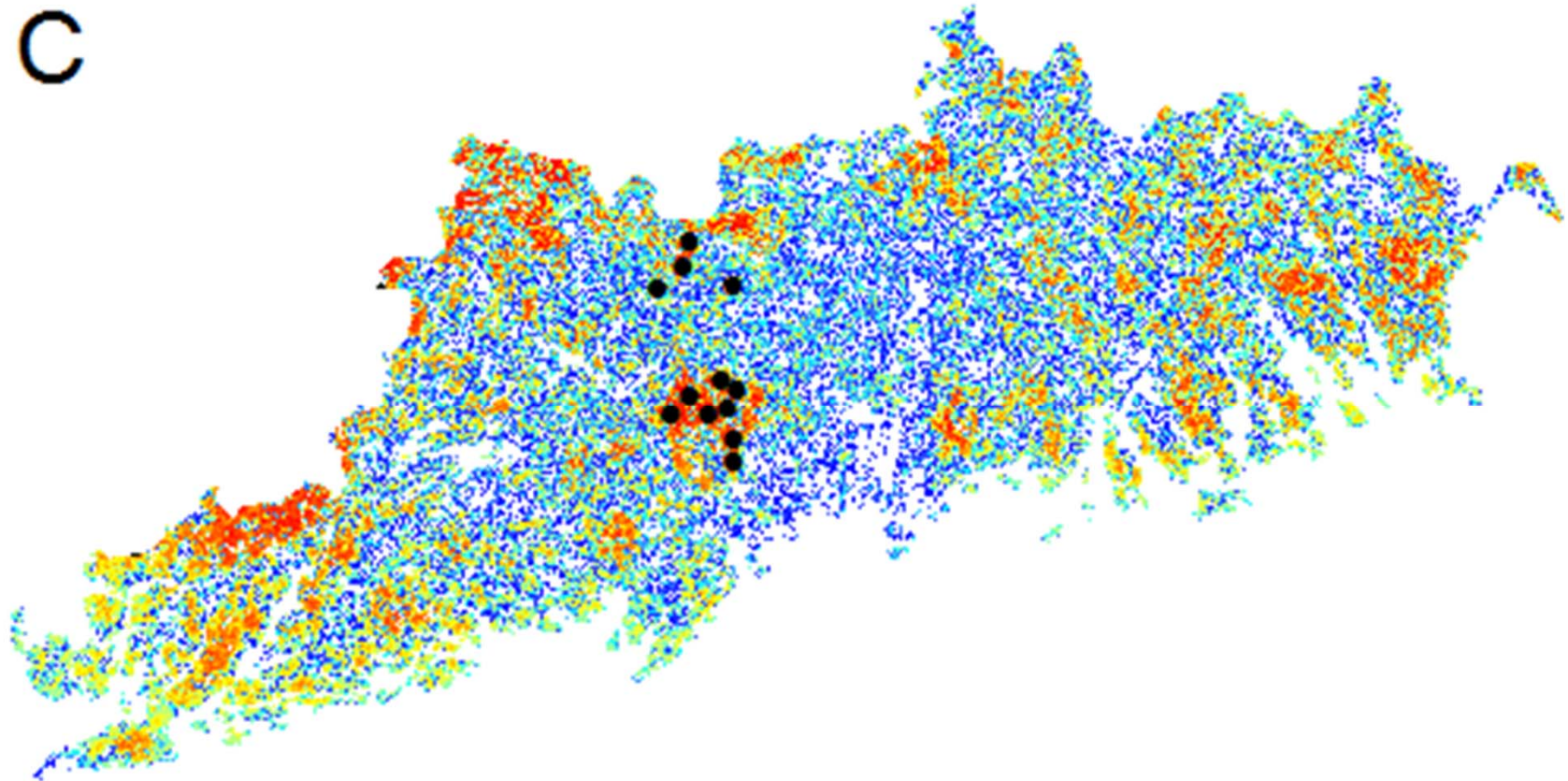


Priority rank value



+ known leck locations

C



Guiding survey efforts 2011->

Benefits and disadvantages



Disadvantages

- **Slow, when (formatted) data is missing**
=> expensive, initially
- **Data quality / availability problems**
- **Stakeholders hesitant about new methods**

Benefits

- **Large quantities of data can be processed + difficult factors, such as connectivity**
- **Transparency, limits subjectivity**
- **Efficient, when data exists**
- **Adds focus into data collection**

Thank you!



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