

Metsä

Tieto

Osaaminen

METLA

Hyvinvointi

Zonation conservation planning software –Spatial prioritization of conservation networks in NATNET Life+ -project

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Concepts of conservation planning

- Systematic conservation planning (SCP)
 - Planning, implementing and monitoring conservation
- (Spatial) conservation prioritization
 - Decision support tool for implementation oriented conservation planning
 - Technical phase inside SCP
 - When, where and how to efficiently achieve conservation goals

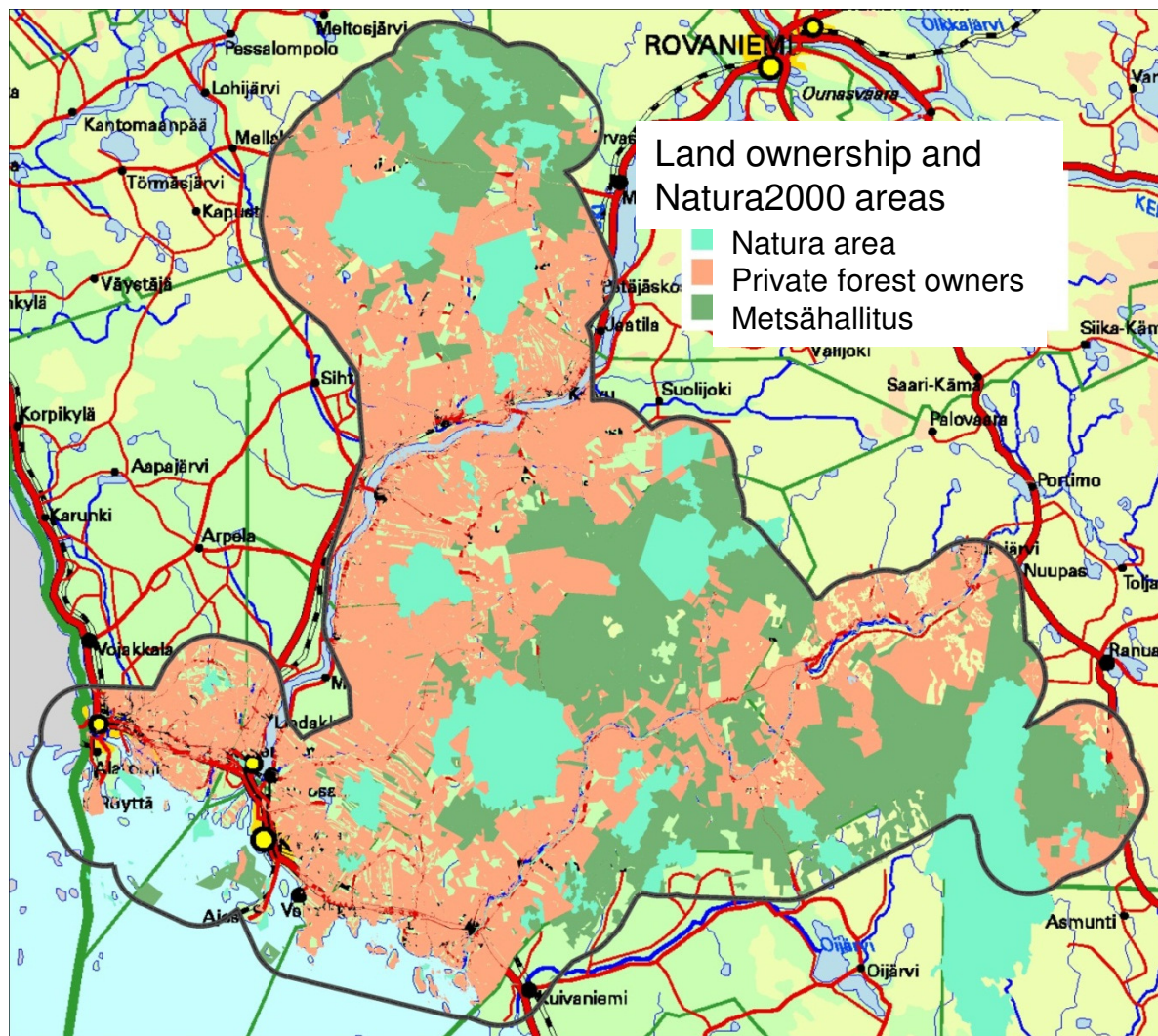
Project area 571000 ha

	Metsähallitus, ha	Metsähallitus, planning units
Forest land	114350.7293	26079
Scrub land	36818.2311	8849
Waste land	56264.4377	6126
Other	9481.0723	2051
TOTAL	216914.4704	43105

	Forest Centre, ha	Forest Centre, planning units
Forest land	169544.3772	109452
Scrub land	27183.6441	18868
Waste land	32856.2303	11241
Other	11057.4038	5936
TOTAL	240641.6554	145497

Protected areas 87800 ha

- Peatlands 83 %
- Forests 17 %



NATNET basic information

- The objective of the project is to increase the ecological connections among the Natura 2000 areas and other existing protection areas in Southwest Lapland
- Part of the Forest Biodiversity Programme of Finland (METSO-programme)
- 35 work packages: acquiring METSO-habitats, restorations, nature inventories, counselling of nature values in forest planning
- Safeguarding ecological connections among Natura2000 areas
- Centre for Economic Development, Transport and the Environment
 - Coordinator
 - Metso-agreements
- Finnish Forest Centre
 - Selection of Metso-areas, Metso-protection agreements, restauration, nature management plans
- Metsähallitus
 - Metsätalous – restaurations
 - Luontopalvelut – species inventories, restaurations, conservation areas
- Forest Research Institute
 - Zonation prioritazion

NATNET – resources and goals

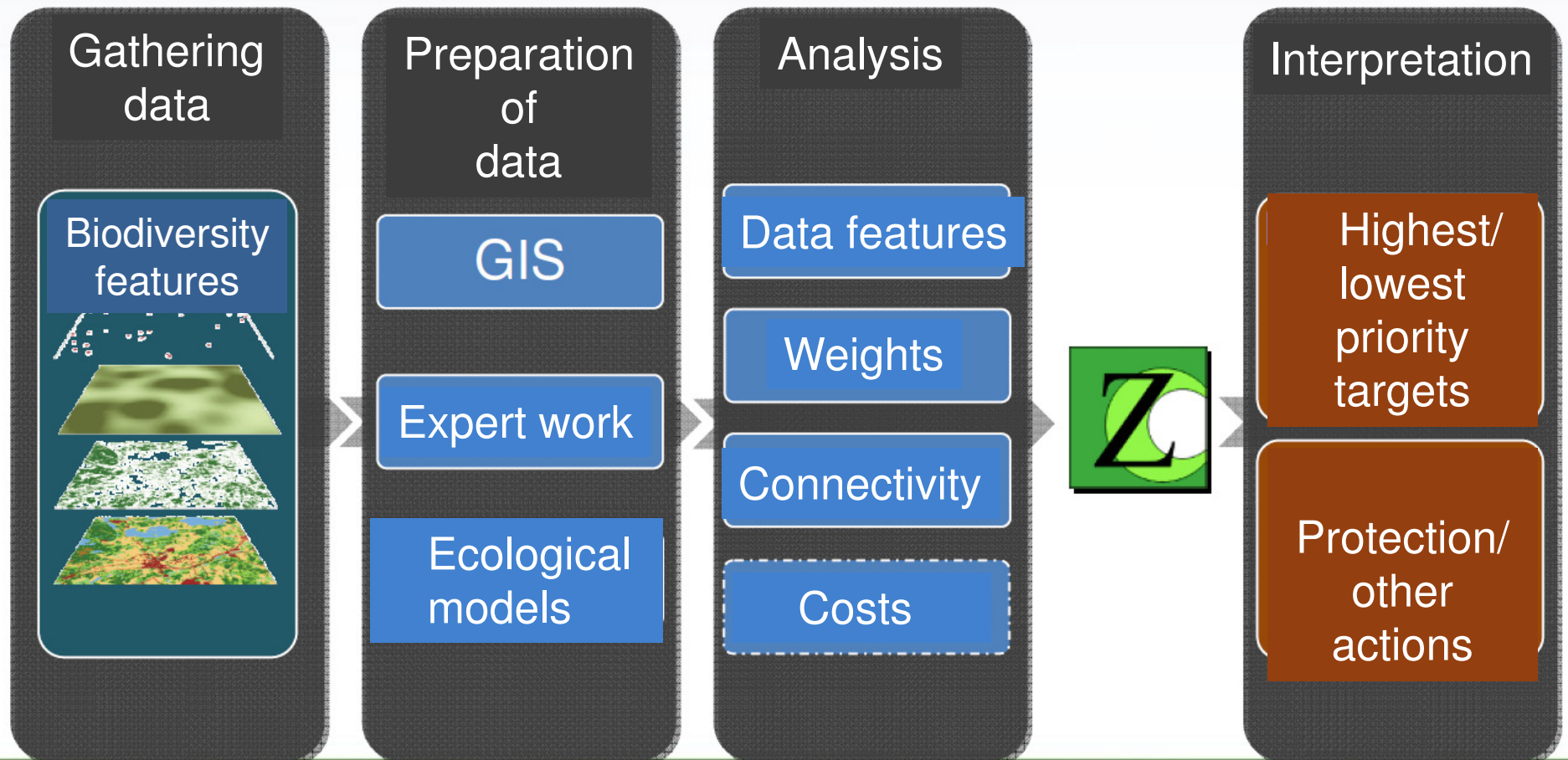
- About 2 mill. € for compensating about 2800 ha voluntarily protected Metso-habitats
 - Taiga forests 450 ha
 - Rich soil type forests 100 ha
 - Land uplift successional series 100 ha
 - Aapafens 1000 ha
 - Forested bogs 400 ha
 - Calcareous peatlands 500 ha
 - Other habitats 250 ha
- The best composition of protected areas in relation to
 - Habitat quality
 - Location

ZONATION

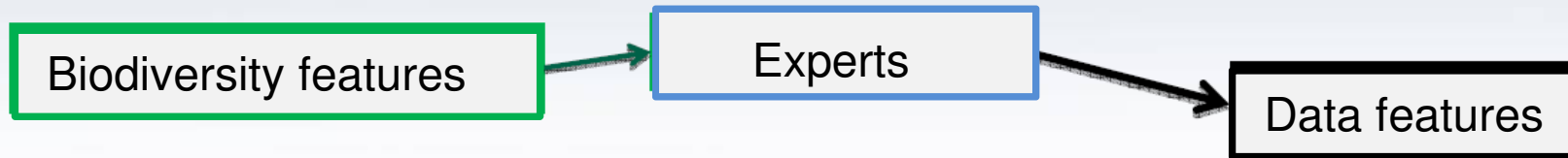


- Decision support tool for spatial conservation planning
- Produces hierarchical prioritisation of the landscape based on the conservation value of sites
- Grid based, can process areas with up to ~50 mill. cells and tens of feature layers
- Developed by prof. Atte Moilanen and his team at Helsinki University
- Freely available at
- <http://www.helsinki.fi/bioscience/consplan/software/Zonation/downloads.html>

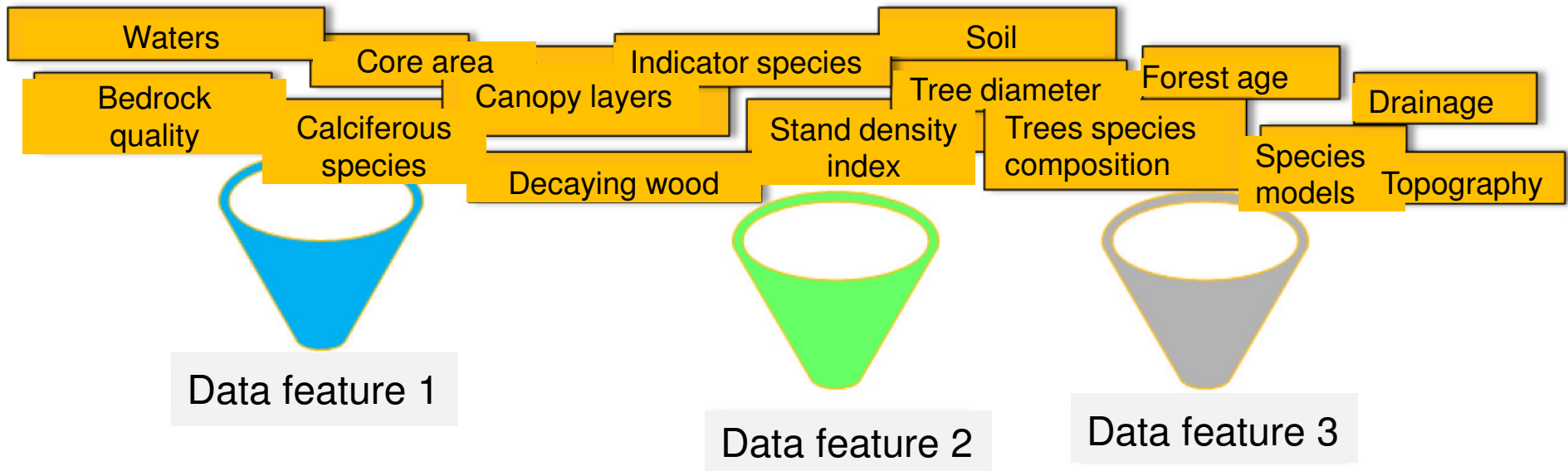
Workflow of the Zonation analysis



Selection of the features to be used in analysis



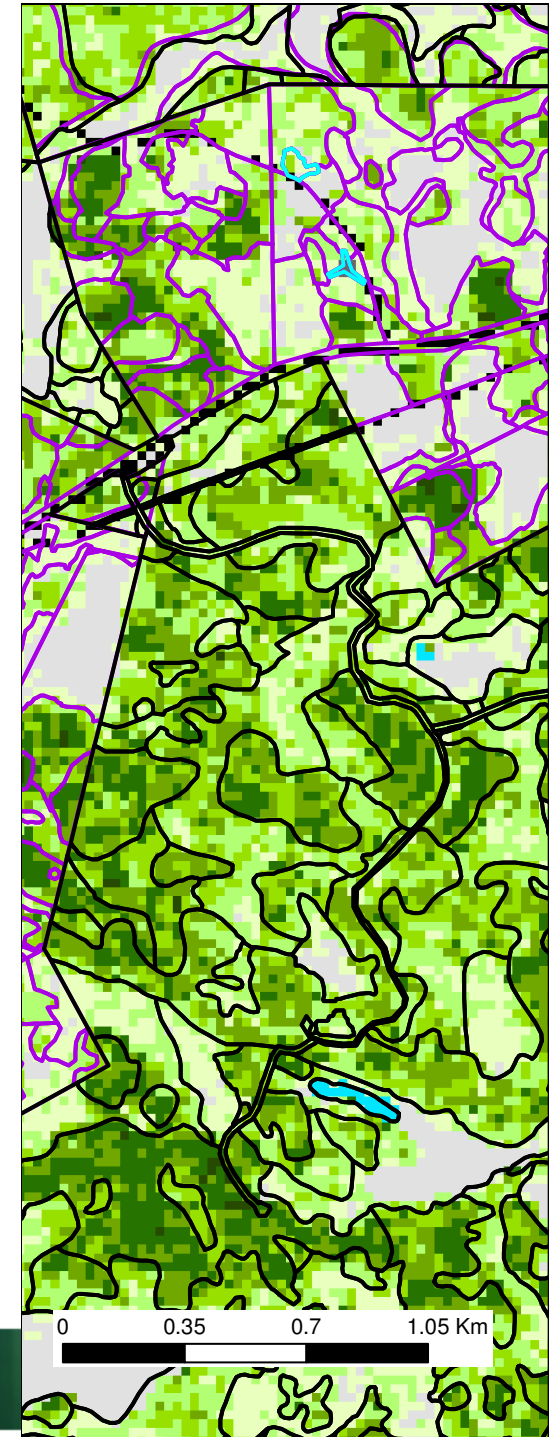
- Biodiversity feature = Qualitative and quantitative characteristics of biodiversity, conservation goals



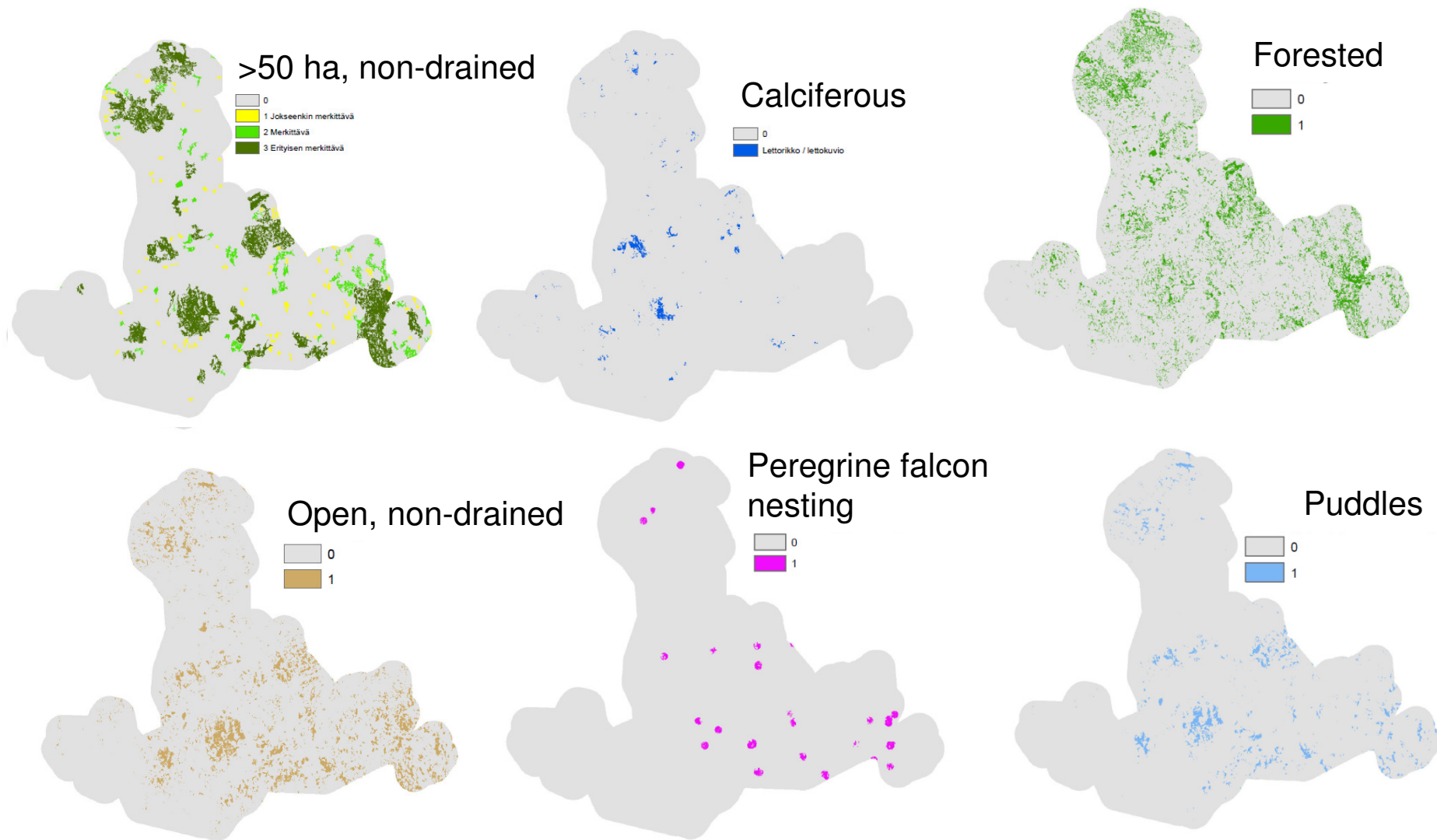
- Data feature = Qualitative and quantitative attributes in GIS data that can be used to describe biodiversity features (often surrogates)

Forest data

- Metsähallitus forest planning data
 - State owned forests
 - 216914 ha, 43105 planning units
- Forest Centre forest planning data
 - Private owned forests
 - 240641 ha, 145497 planning units
- Diameter of trees × site type
- Open rocks
- Small waters

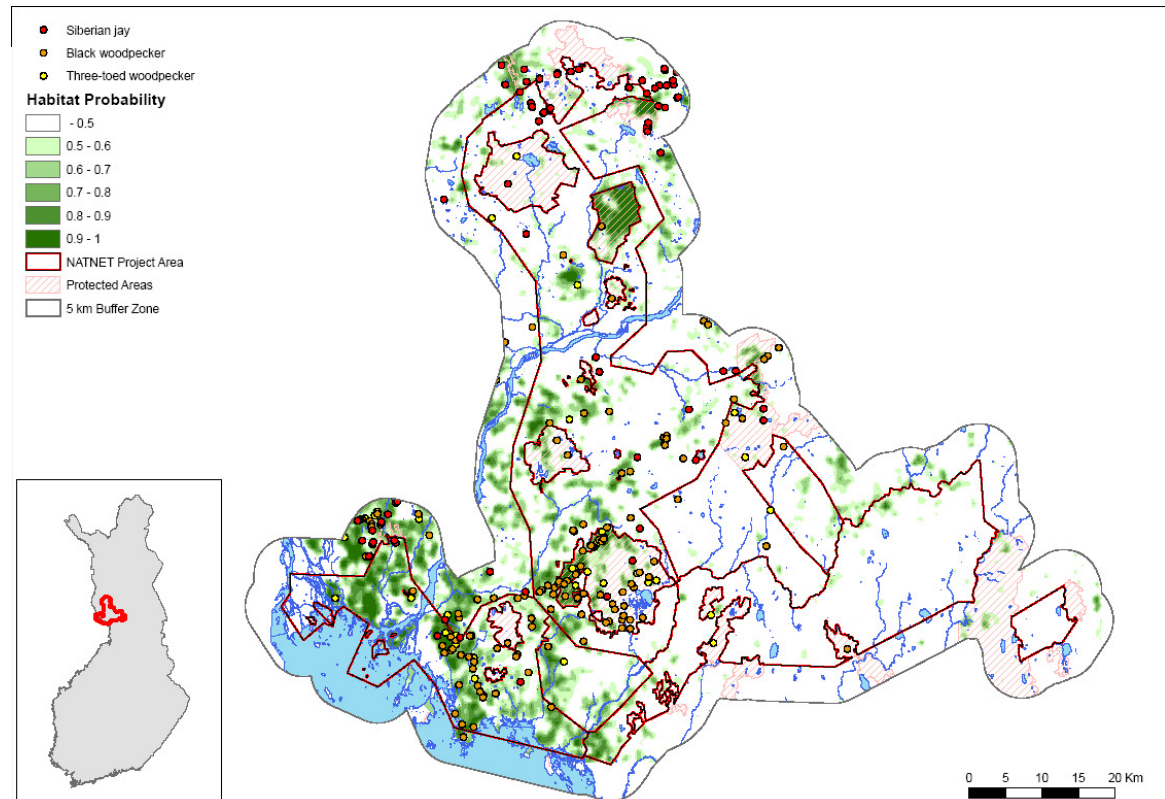


Peatland data



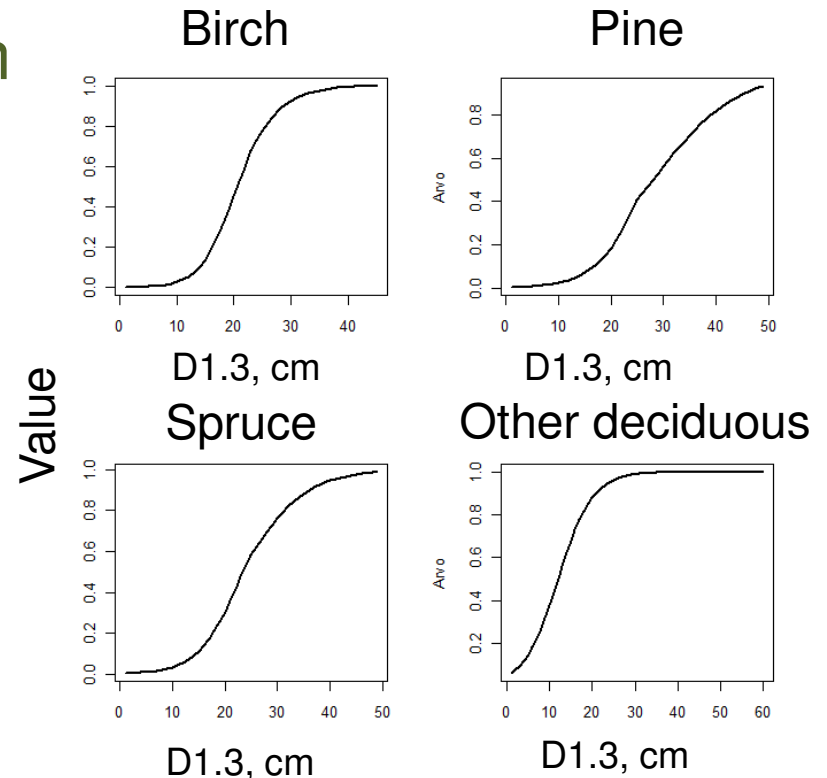
Habitat models

- Old-growth forest birds
 - Black woodpecker
 - Three-toed woodpecker
 - Siberian jay
- Fairy slipper and Lady's slipper
- Multi-Source Forest Inventory
- Logistic regression
- Probability of habitat



Zonation-parameterization

- Scaling tree diameter between 1 – 0
- PINE:
 - mean = 13,60 cm, med = 13 cm, max. = 49,32 cm
- SPRUCE:
 - mean = 14,60 cm, med. = 15 cm, max. = 42,06 cm
- BIRCH:
 - mean = 12,29 cm, med. = 13 cm, max. = 40,85 cm
- OTHER DECIDUOUS:
 - mean = 14,22 cm, med. = 14 cm, max. = 67,45 cm



Weights, similarity and connectivity

■ Weights for site types

	Fertile		--	--	--	Poor
Birch	4.0	2.5	1.0	1.5	2.0	1.0
Spruce	2.5	1.5	1.0	1.0	1.0	1.5
Other dec.	6.0	4.0	2.5	1.5	2.0	2.0
Pine	2.5	1.0	1.0	1.0	1.0	1.0

■ Similarity matrices

– Tree species

	Birch	Spruce	Other dec.	Pine
Birch	1.0	0.6	0.8	0.3
Spruce	0.6	1.0	0.4	0.7
Other dec.	1.0	0.5	1.0	0.5
Pine	0.4	0.7	0.2	1.0

– Site types

	Fertile	--	--	--	--	Poor
Fertile	1.0	1.0	0.7	0.7	0.4	0.1
--	0.9	1.0	1.0	0.9	0.7	0.1
--	0.7	0.9	1.0	1.0	0.9	0.2
--	0.4	0.7	0.9	1.0	1.0	0.5
--	0.2	0.4	0.7	0.9	1.0	0.6
--	0.1	0.1	0.2	0.5	0.6	1.0
Poor	0.1	0.1	0.2	0.5	0.6	0.8

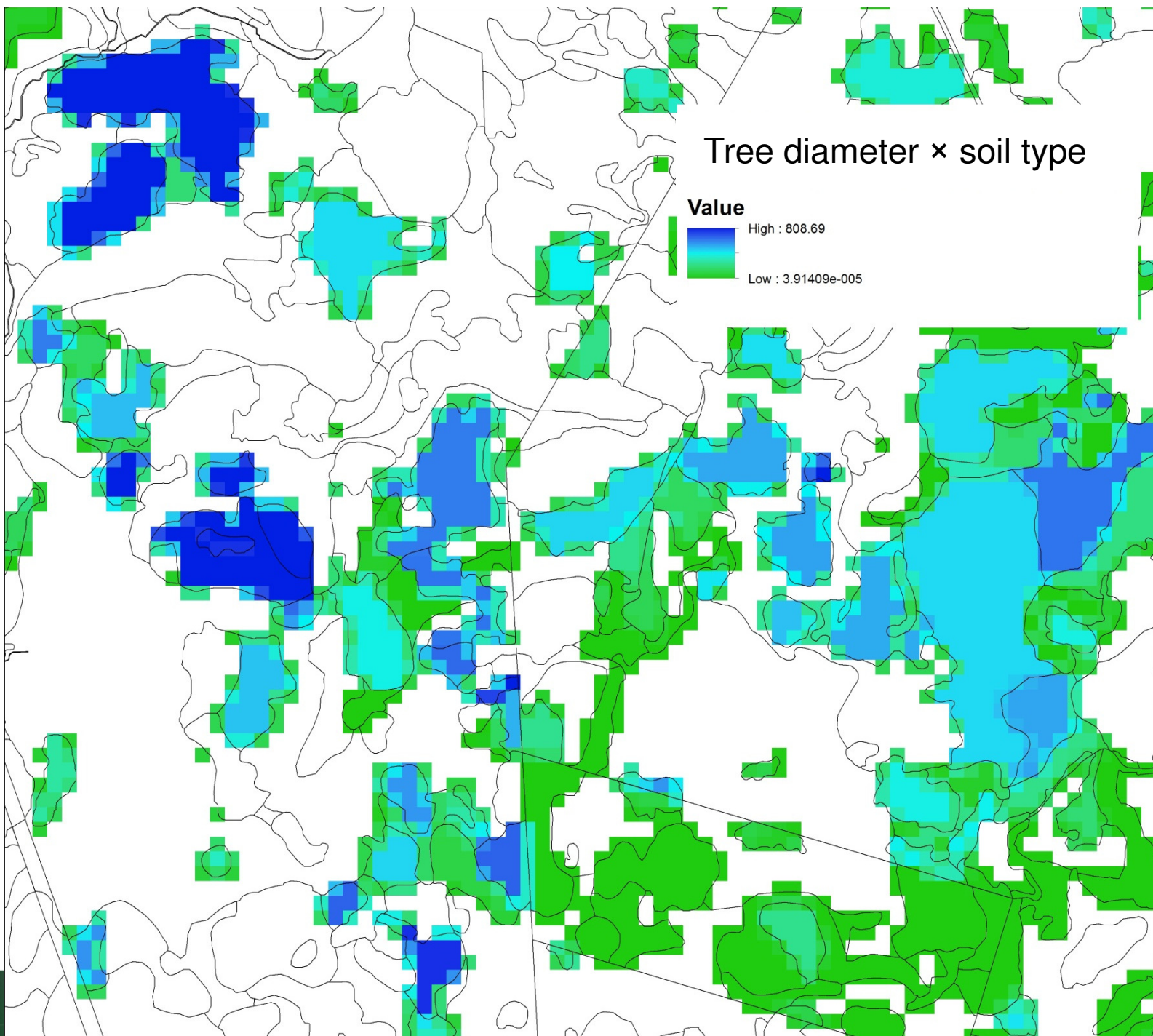
■ Connectivity

- Similar habitats
- Conservation areas
- Protected by law

500 m

2000 m

100 m



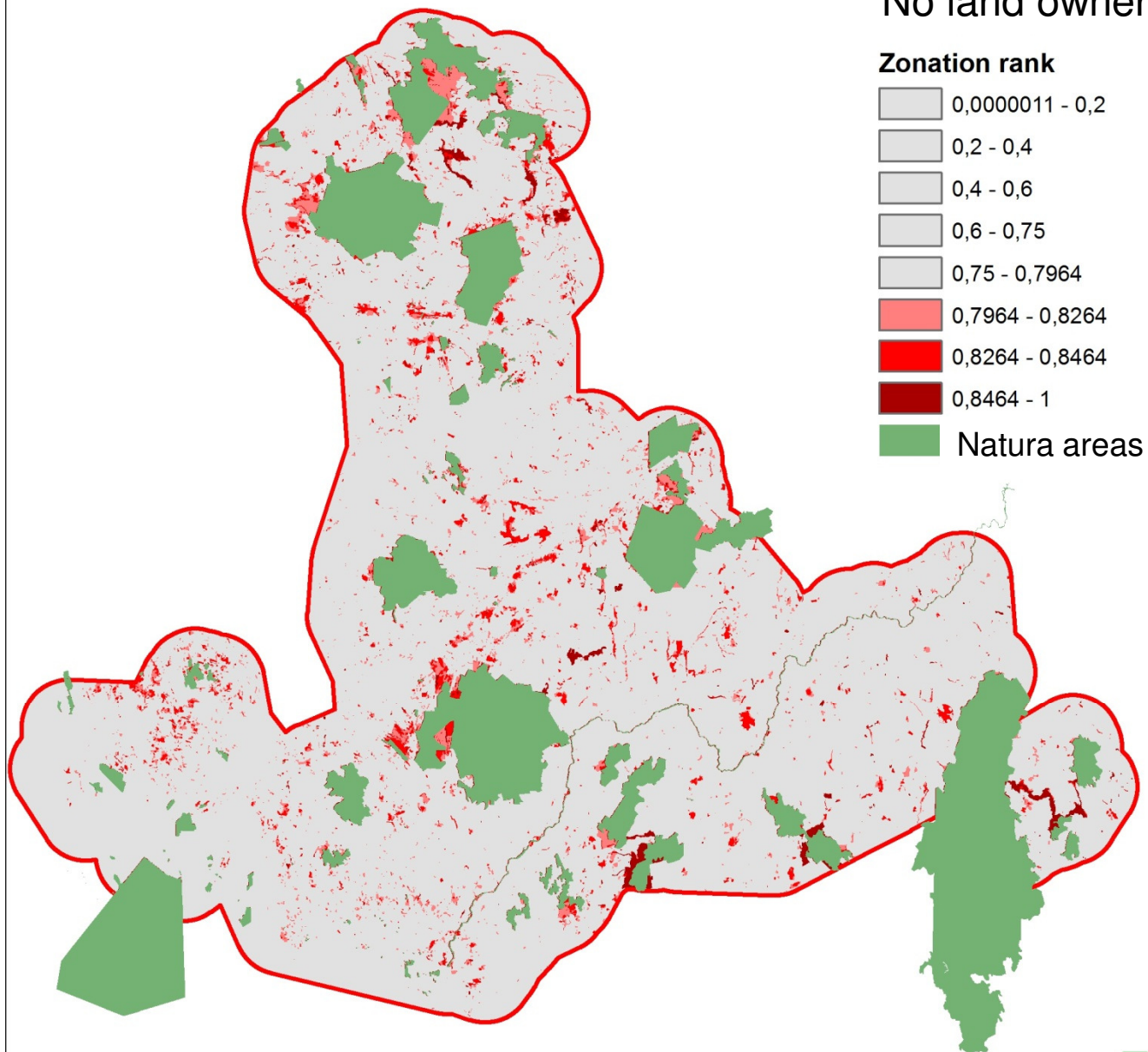
Corridor tool

- *Pouzouls, F.M., Moilanen, A. 2014. A method for building corridors in spatial conservation prioritization. Landscape Ecology 29:789-801.*
- Corridors via good habitats
- Working principle is the use of a penalty structure in an iterative algorithm used for producing a spatial priority ranking
 - aims to prevent loss or degradation of structural connections required to keep networks connected
- Included in next Zonation release

Zonation-analysis in NATNET project

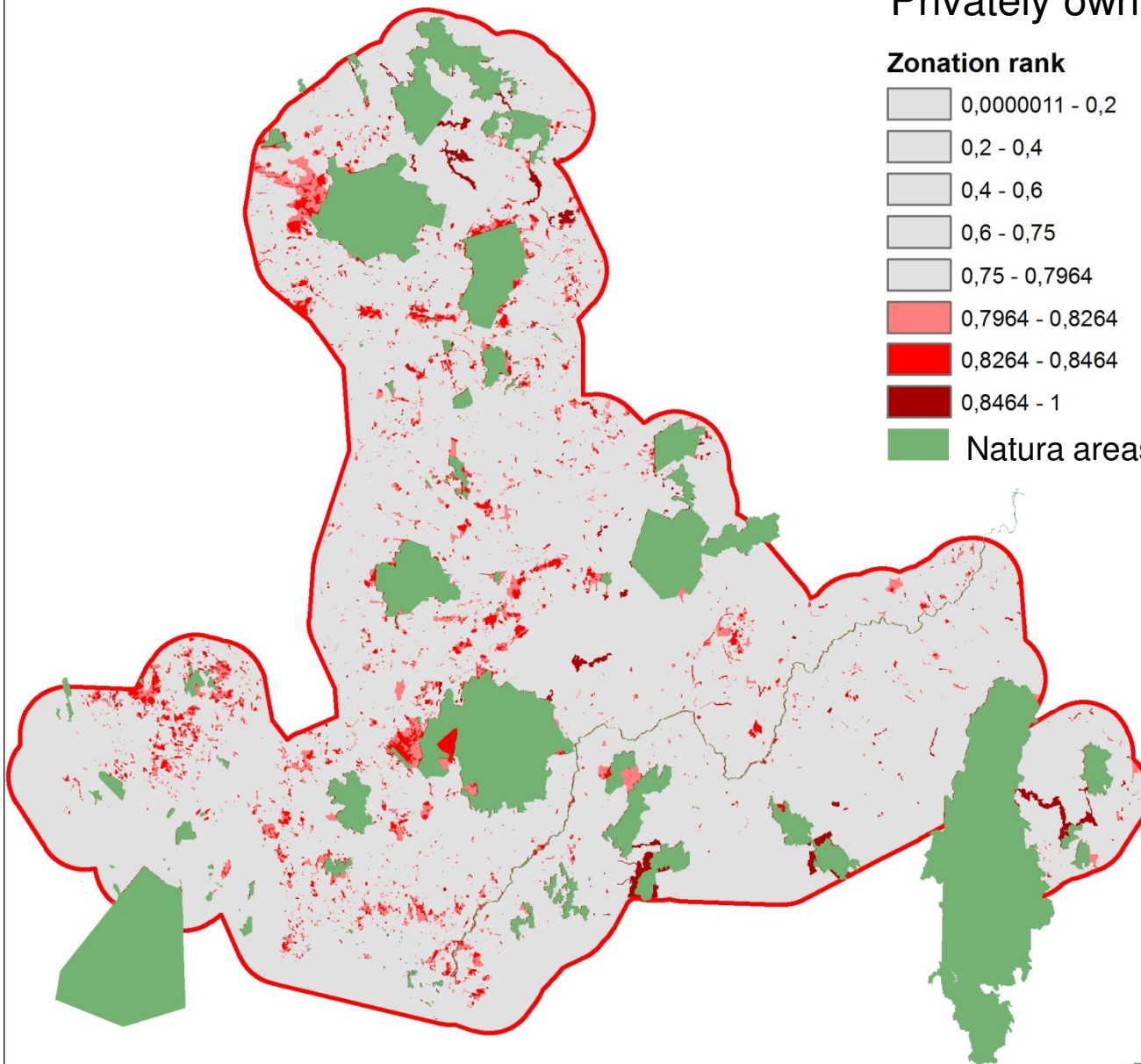
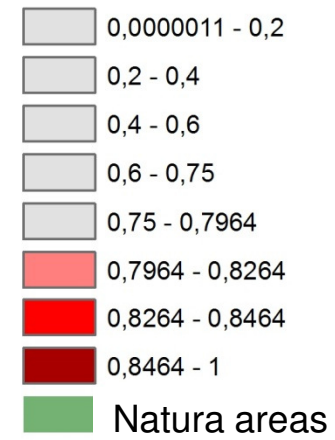
- 50 m x 50 m grid cells (2,3 mill. cells)
- Feature layers for
 - Tree species × site type (24 layers)
 - Peatlands (8)
 - Small waters (1)
 - Open rock (1)
 - Occurrence of species (3)
 - Conservation areas (1)
 - Areas protected by forest law (1)
 - Land ownership (1)

No land owner restrictions

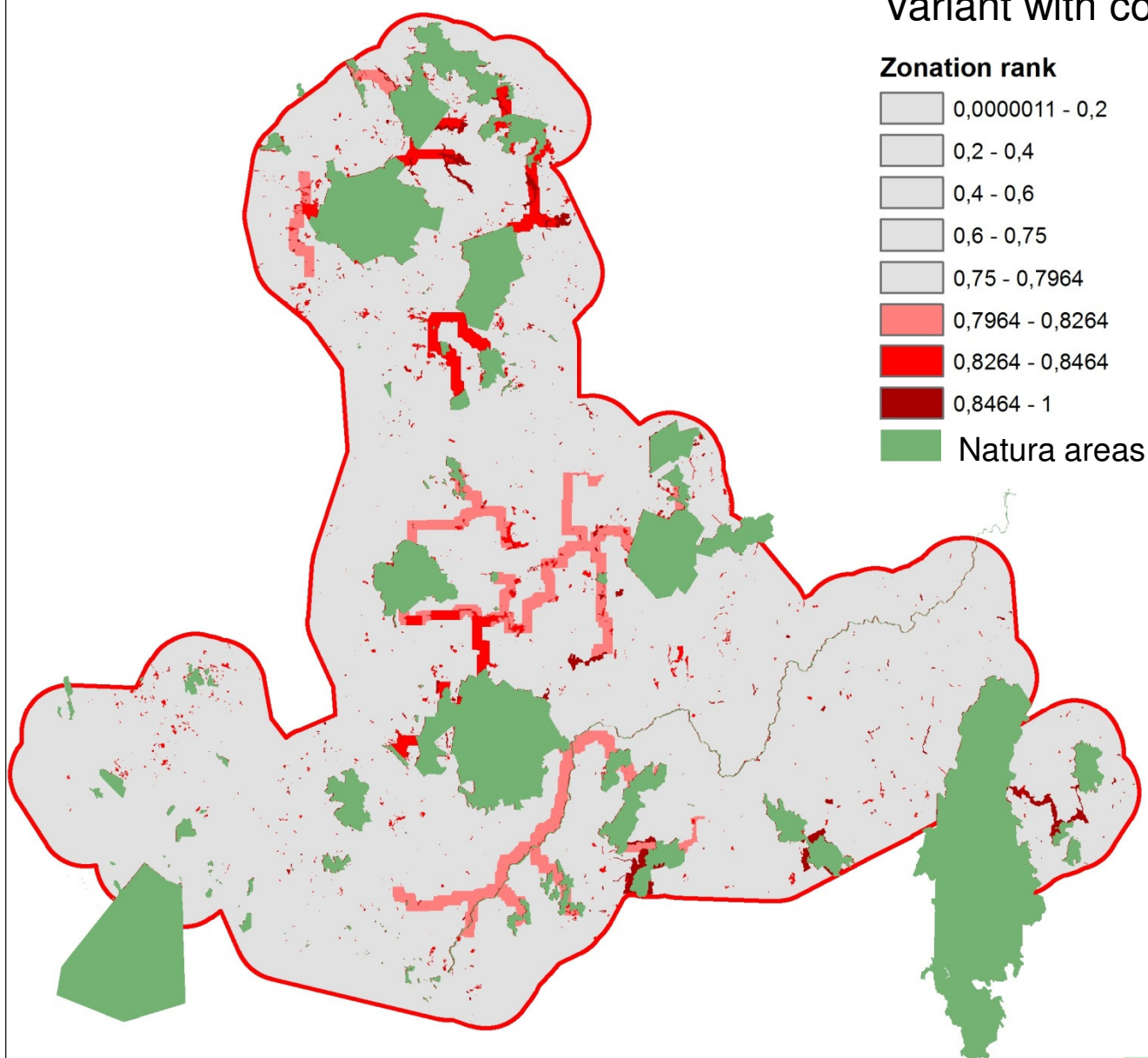


Privately owned land

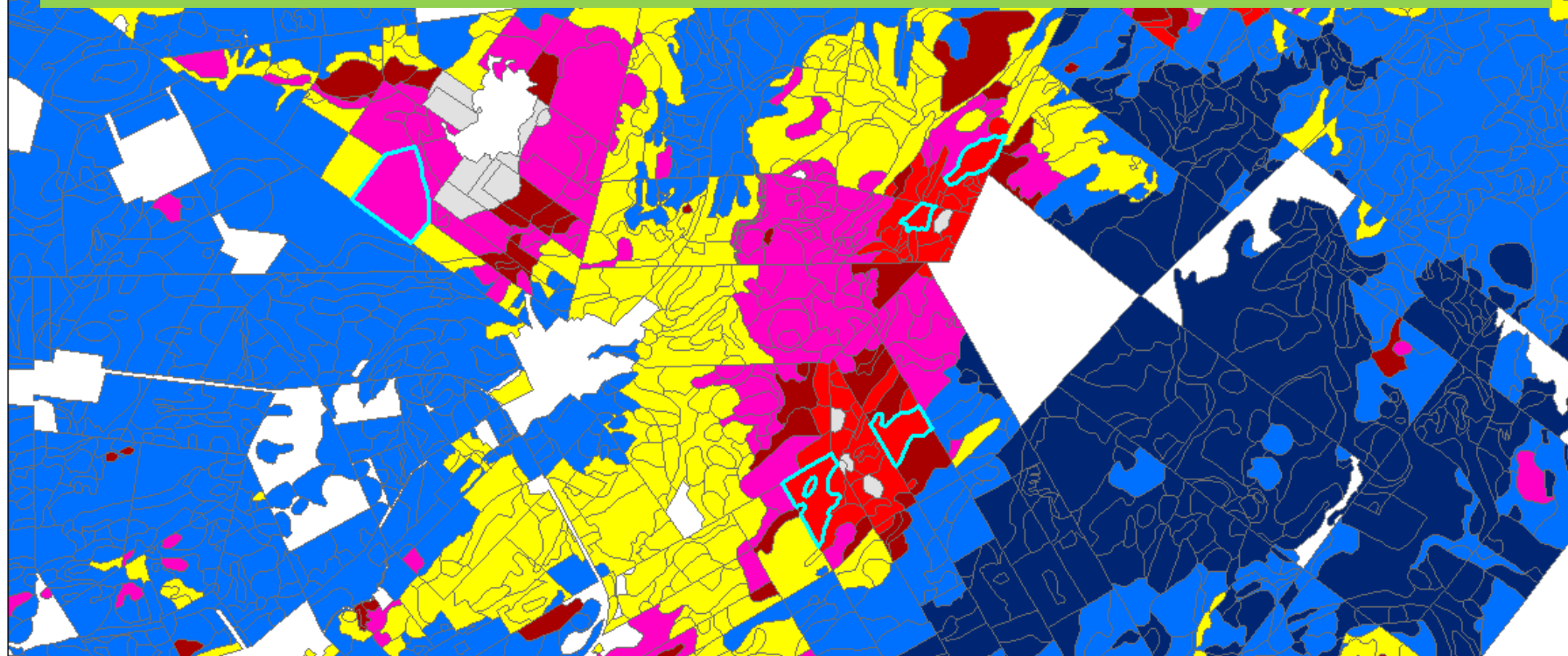
Zonation rank



Variant with corridors



ForestCentrePlanningData_Ranks.shp

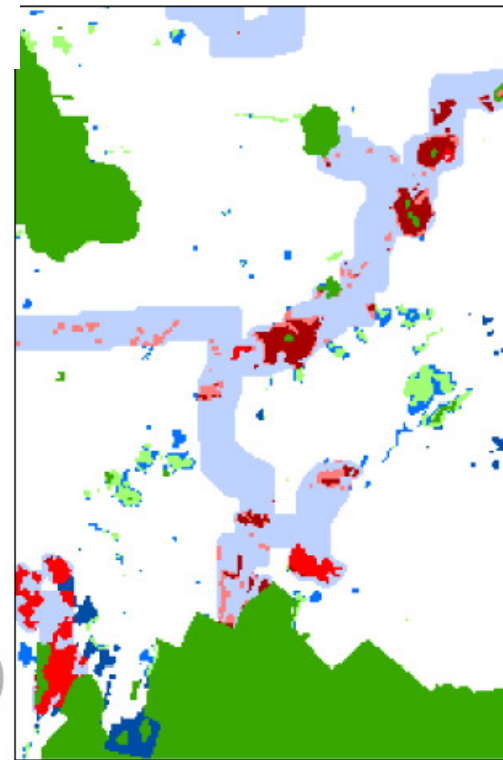
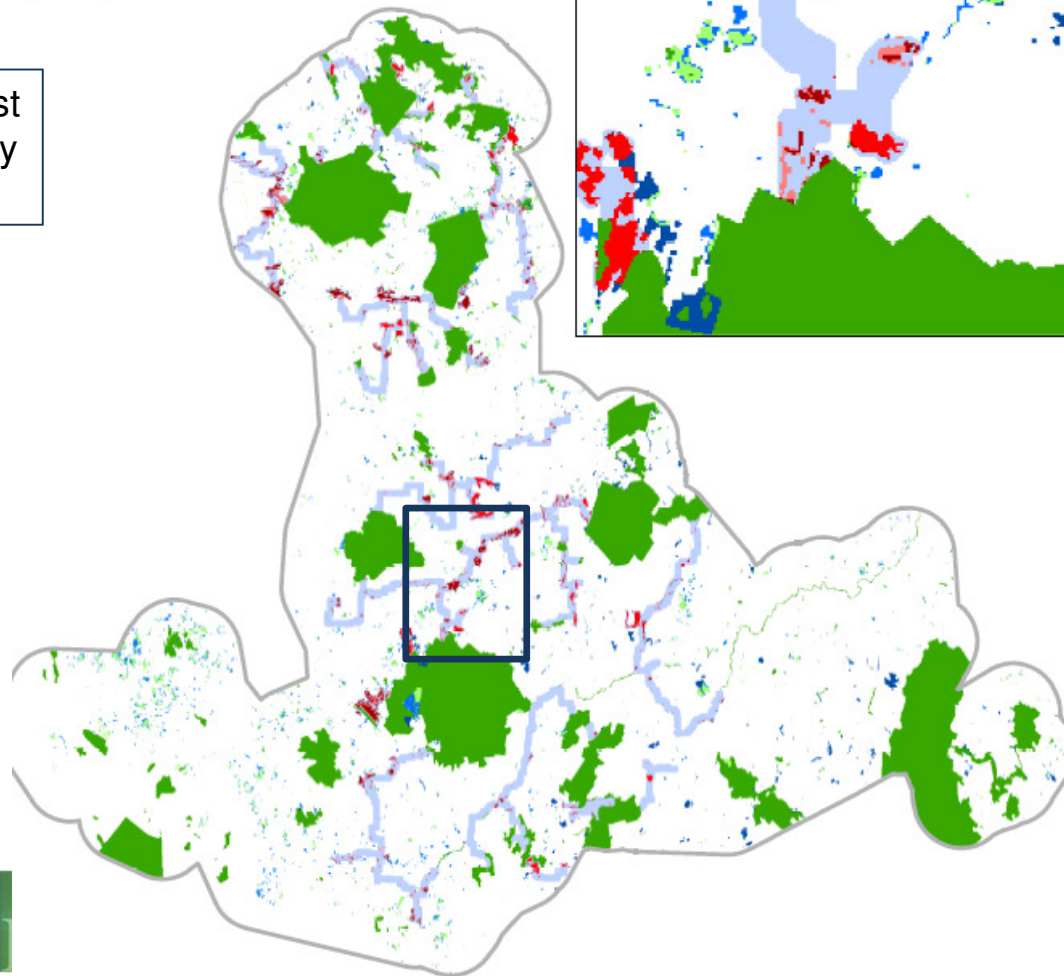


Et_K1_kayt	P1max	P1mean	P1paras2os	P3max	P3mean	P3paras	EnnVmax	EnnVmean	EnnVp2os	PintaAla	Ruutuj_kp	P1P3K1_os
0	99,9901	99,9551	99,333333	99,988	99,9637	99,3333	53,43908	53,300089	0	1,4994	150	99,333333
0	99,9816	98,0138	59,195402	99,979	98,7679	77,2988	0	0	0	6,987813	696	59,195402
279	94,7187	90,5640	0	96,886	94,2732	0	0	0	0	13,03222	1302	0
0	99,9331	98,3521	63,013699	99,951	99,0332	96,1643	0	0	0	3,660307	365	63,013699
0	99,9807	99,3828	92,87169	99,984	99,6045	99,5926	0	0	0	4,898793	491	92,87169

Priority of variant combinations



P1 = Ecologically best
P3 = Private land only
K1 = Corridors



Workshop - questions

1. Do you have experience about conservation planning methods (CPM)?
2. How about the need in present or future projects?
3. Possibilities to use CPM in terms of
 - 3.1 Data availability (public and private sources, possible restrictions in use)
 - 3.2 Data contents in relation to objectives
 - 3.3 GIS methods
4. Other points of view?

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Kiitos



Actions A1 & A8 – Milestones and deliverables

- Action A1: Collecting, analysing and modelling the existing data for use of further planning and Zonation
 - Data collected and analysed for further planning and use of Zonation by **31.12.2012**
- Action A8:
 - Connectivity features of Zonation developed and tested by **31.12.2013**
 - Conservation prioritization maps (created with Zonation) by **31.3.2014**
 - New publicly available release of Zonation by **31.12.2014.**