



VivaGrass experience: Mapping and identifying grassland ES

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VivaGrass main objectives

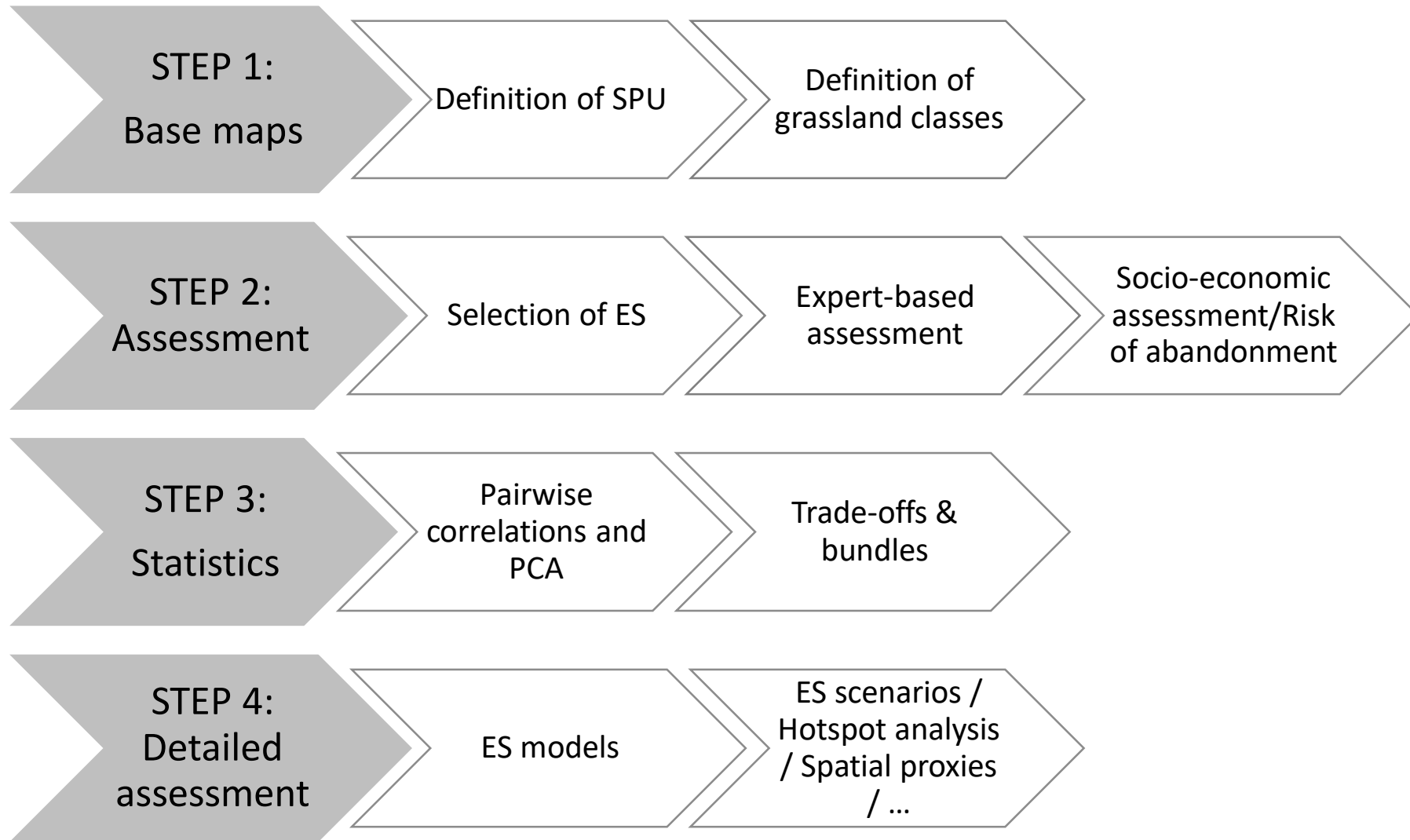
- Analyse **synergy potentials** & shortcomings in **land use & nature conservation** policy and provide proposals for policy improvement
- To offer **integrated, ecosystem based planning solutions** based on economically viable grassland management scenarios
- **Encourage implementation of economically viable grassland management** models within areas of different **natural and socio-economic contexts**

INTEGRATED PLANNING TOOL

- Linking spatial data on natural, socio-economic, agricultural & ecosystem services contexts
- Multiple scales
- Multiple stakeholders (user types)

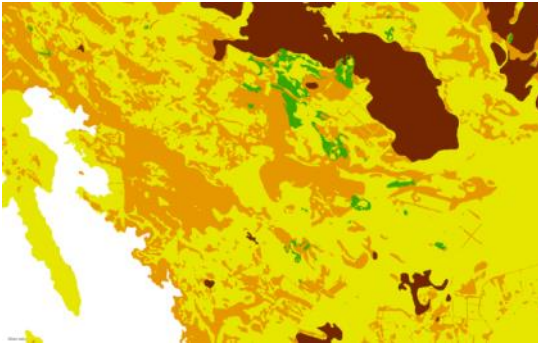


General scheme



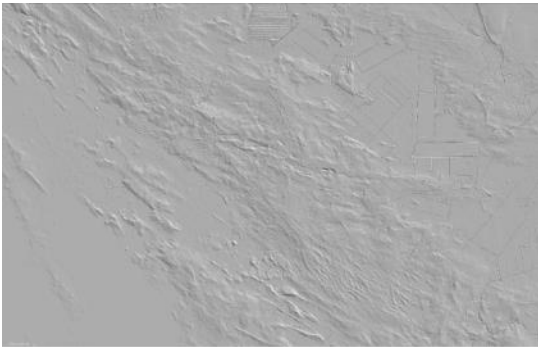
Grassland classes & mapping units

Soil fertility



- > Low soil fertility
- > Medium soil fertility
- > High soil fertility
- > Organic soils

Slope



- > Plain relief
- > Gentle slope
- > Steep slope

Management intensity



- > Cultivated grassland
- > Permanent grassland
- > Semi-natural grassland

- > 36 possible grassland classes
- > Additional 10 arable land classes & 10 abandoned land classes

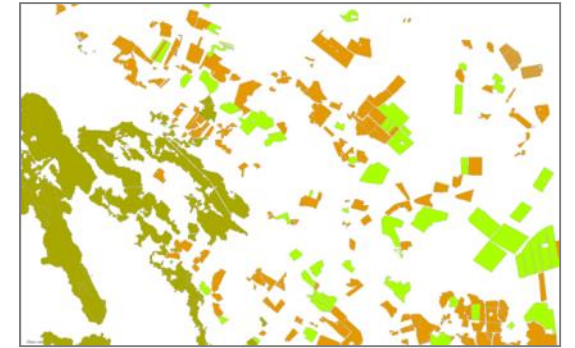


Mapping Unit: Grassland block

Challenges

- › Management intensity is compiled from several databases (5 among the 3 countries)
- › Mismatch of temporal scales
- › Polygons overlap
- › Mismatch of thematic scale
- › Time-consuming processing, topology rules definition, cleaning and „polishing“ shapefiles

Management intensity



Permanent & short term grasslands
Estonian Agricultural Registry

+

Seminal grasslands (eligible for Agri-Env. Payments)
Estonian Agricultural Registry

+

Seminal grasslands
Estonian Nature Information System

Expert – based ES assessment

- › Classification of grassland ecosystem services adopted from CICES
- › Set of **19** ecosystem services (5 provisioning, 8 regulation & maintenance, 6 cultural)
- › Expert-based assessment, 3 + 1 workshops , agreed values

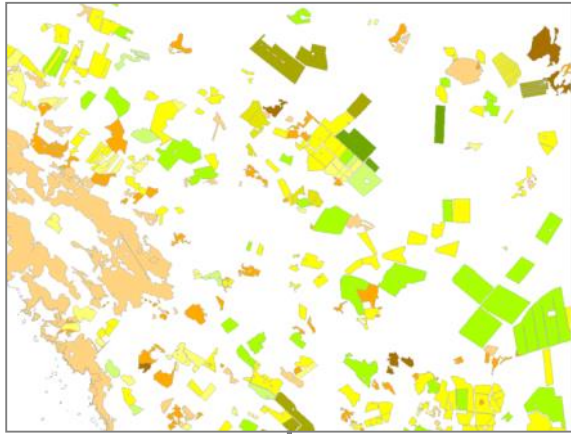
0 – No relevant supply of ES / 5 – very high/maximum supply of ES

- › Indicators provided for each ES: guide and clarify the expert-based assessment process



Expert-based ES assessment

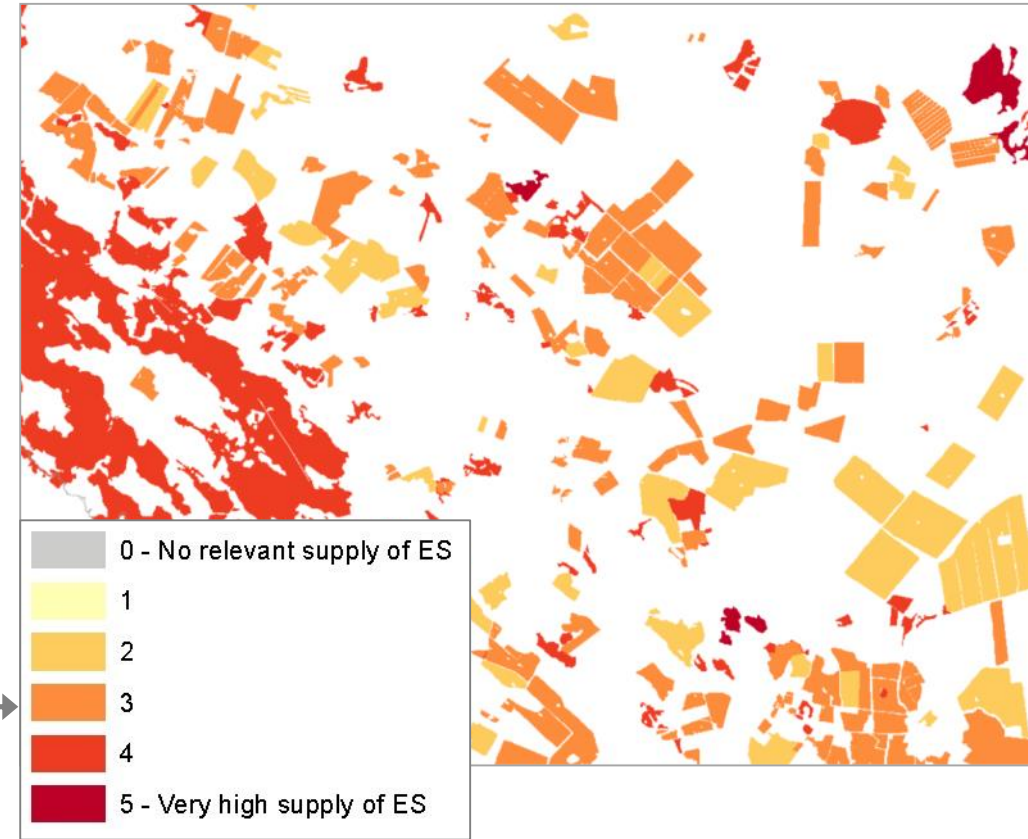
Grasslands types map



Matrix for expert-based assessment

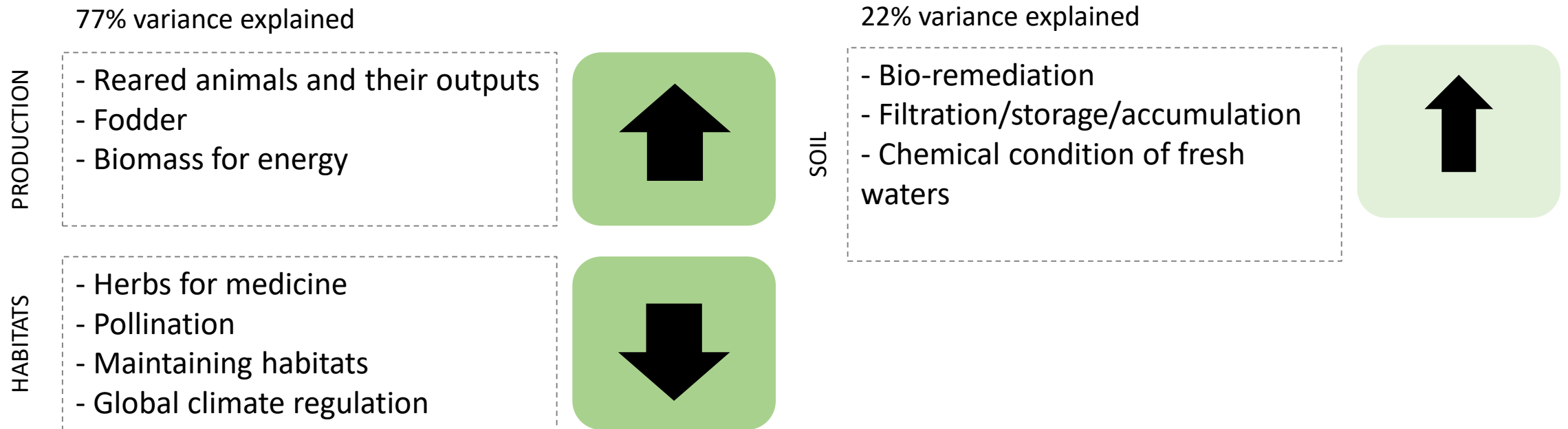
Land category	Provisioning				
	Cultivated crops (t/ha per year)	Reared animals and their outputs Number of animals units (n/ha)	Fodder Standing stock (t/ha per year)	Biomass-based energy sources Standing stock (t/ha per year)	Herbs for medicine (number of species/m ²)
1. Cultivated grassland on plain relief, low soil fertility	0	3	2	2	1
2. Cultivated grassland on plain relief, medium soil fertility	0	4	3	3	1
3. Cultivated grassland on plain relief, high soil fertility	0	5	4	4	1
4. Cultivated grassland on plain relief, organic soils	0	4	3	3	1
5. Cultivated grassland on gentle slope in low soil fertility	0	3	2	2	1
6. Cultivated grassland on gentle slope, medium soil fertility	0	4	3	3	1
7. Cultivated grassland on gentle slope, high soil fertility	0	5	4	4	1
8. Cultivated grassland on gentle slope, organic soil	0	4	3	3	1
9. Cultivated grassland on steep slope low soil fertility	0	3	2	2	1
10. Cultivated grassland on steep slope, medium soil fertility	0	4	3	3	1

ES supply capacity map



Tradeoffs & Bundles

- › Pairwise comparisons (correlations)
- › Principal Components Analysis (PCA)



Bundle 1 - Production

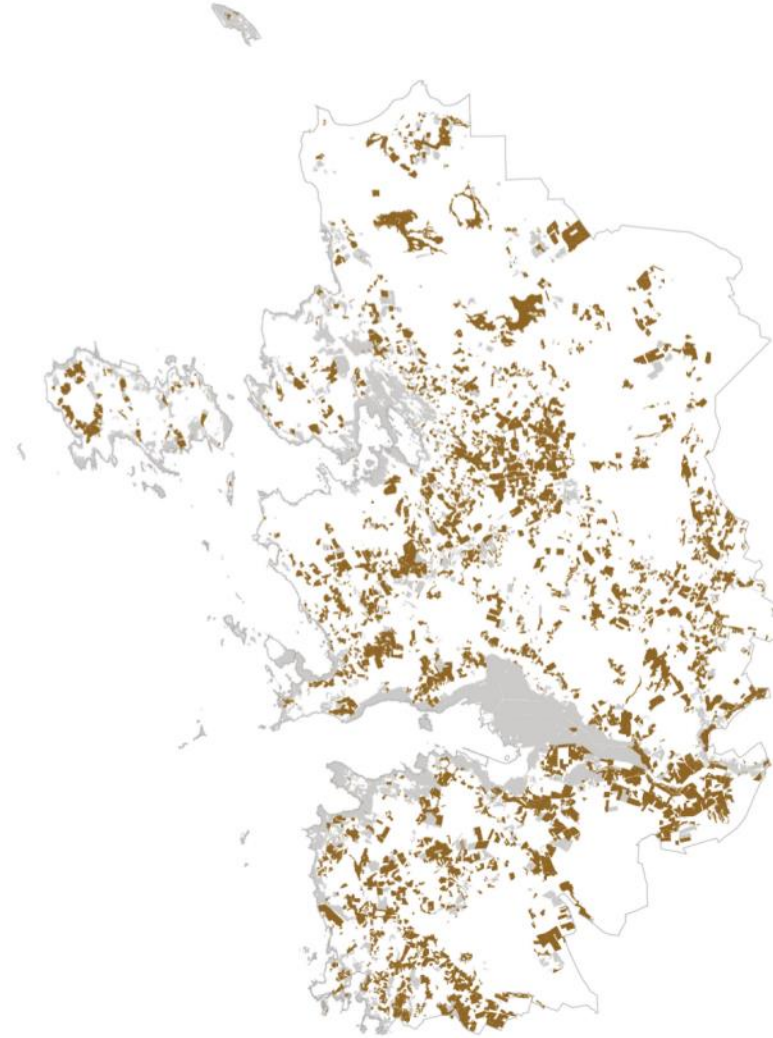
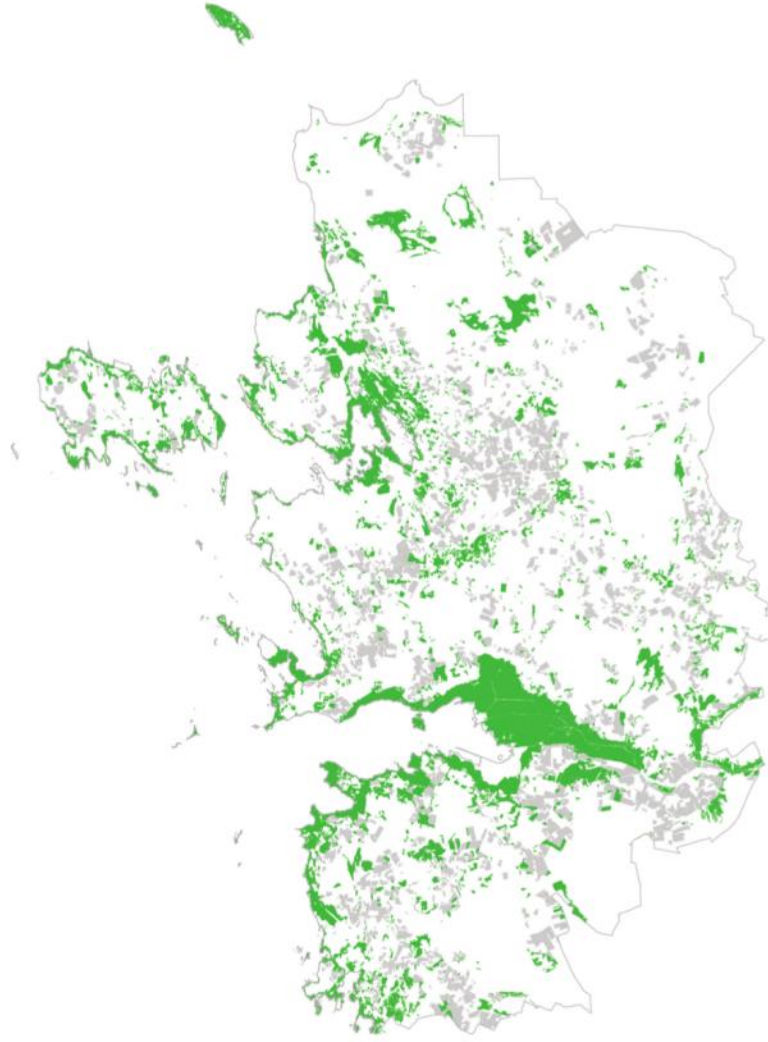
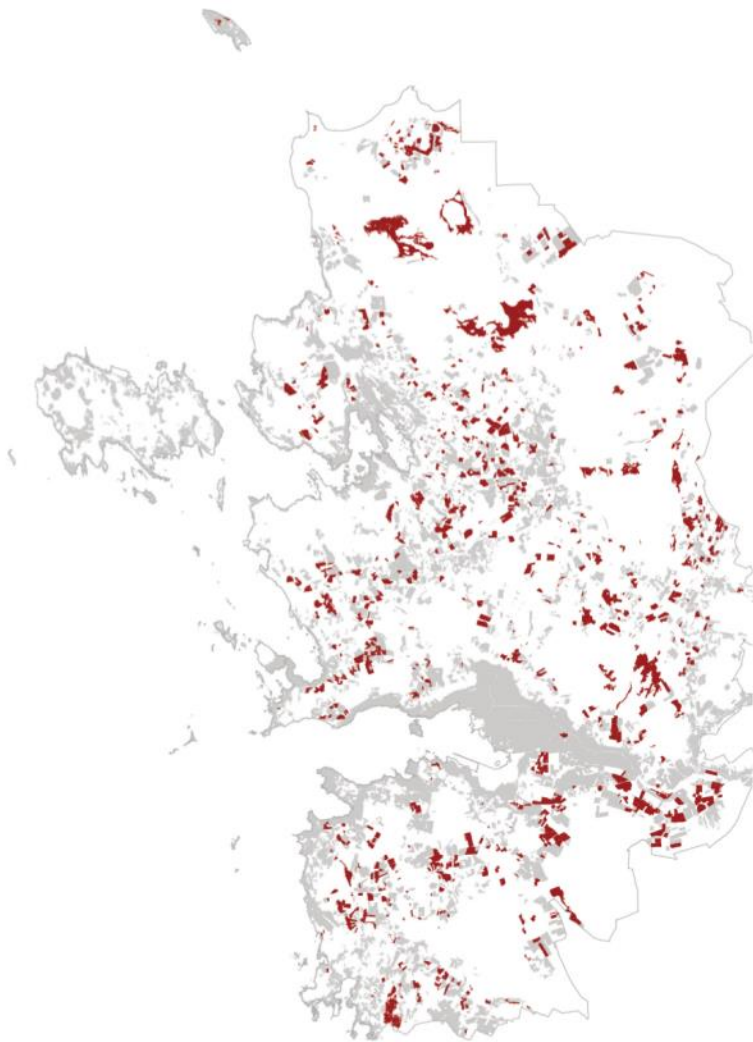
- grasslands in the bundle
- grasslands outside the bundle

Bundle 2 - Habitats

- grasslands in the bundle
- grasslands outside the bundle

Bundle 3 - Soil

- grasslands in the bundle
- grasslands outside the bundle



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2016

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System functionalities and structure

System functionalities

VivaGrass **VIEWER**

- ES consulting and summarizing capabilities
- Selection capabilities
- Trade-offs & bundles visualization capabilities

VivaGrass **PLANNER**

PRIORITIZATION

SCENARIO
EVALUATOR

HOT-SPOTS
ANALYSIS

RECOMMENDATION
OF MEASURES

Tiered approach

TIER 1

- Expert-based valuation
- Scenarios
- Trade-offs & Bundles analysis

TIER 2

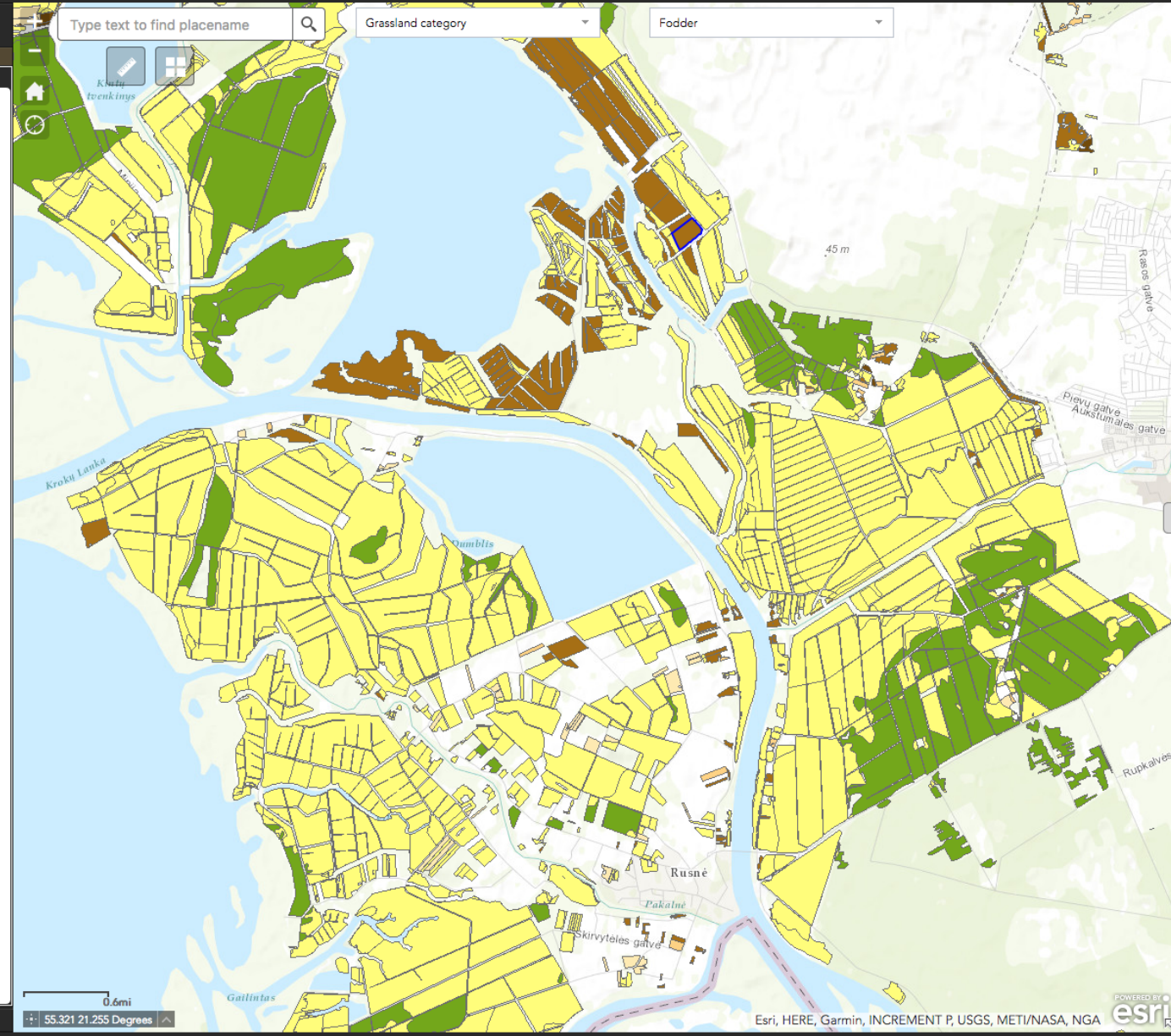
- ES models (provision & demand)
- Biophysical data
- Proxies





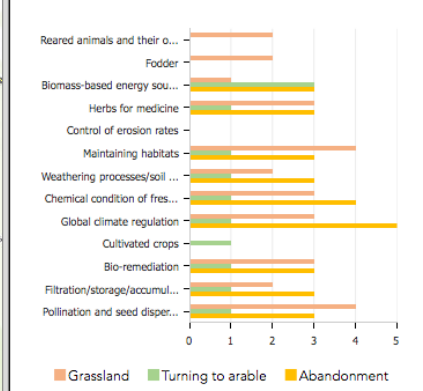
Layer List

- Grassland category
 - Cultivated grassland on gentle slope in low soil fertility
 - Cultivated grassland on gentle slope, high soil fertility
 - Cultivated grassland on gentle slope, medium soil fertility
 - Cultivated grassland on gentle slope, organic soil
 - Cultivated grassland on plain relief in, high soil fertility
 - Cultivated grassland on plain relief, low soil fertility
 - Cultivated grassland on plain relief, medium soil fertility
 - Cultivated grassland on plain relief, organic soils
 - Cultivated grassland on steep slope low soil fertility
 - Cultivated grassland on steep slope, high soil fertility
 - Cultivated grassland on steep slope, medium soil fertility
 - Permanent grassland on gentle slope, high soil fertility
 - Permanent grassland on gentle slope, low soil fertility
 - Permanent grassland on gentle slope, medium soil fertility
 - Permanent grassland on gentle slope, organic soils
 - Permanent grassland on plain relief in, low soil fertility
 - Permanent grassland on plain relief, high soil fertility
 - Permanent grassland on plain relief, medium soil fertility
 - Permanent grassland on plain relief, organic soils
 - Permanent grassland on steep slope, high soil fertility
 - Permanent grassland on steep slope, low soil fertility
 - Permanent grassland on steep slope, medium soil fertility
 - Semi-natural grassland on gentle slope, high soil fertility
 - Semi-natural grassland on gentle slope, low soil fertility
 - Semi-natural grassland on gentle slope, medium soil fertility
 - Semi-natural grassland on gentle slope, organic soils
 - Semi-natural grassland on plain relief, high soil fertility
 - Semi-natural grassland on plain relief, low soil fertility
 - Semi-natural grassland on plain relief, medium soil fertility
 - Semi-natural grassland on plain relief, organic soils
 - Semi-natural grassland on steep slope, high soil fertility
 - Semi-natural grassland on steep slope, low soil fertility
 - Semi-natural grassland on steep slope, medium soil fertility



Country: Lithuania
 Municipality: Šilutės r. sav.
 Grassland type: 11. Permanent grassland on plain relief in, low soil fertility
 Block id: 2368
 Area, ha:

ES Service	Gras...	Turni...	Aba...
Reared animals and their outputs	2	0	0
Fodder	2	0	0
Biomass-based energy sources	1	3	3
Herbs for medicine	3	1	3
Control of erosion rates	0	0	0
Maintaining habitats	4	1	3
Weathering processes/soil fertility	2	1	3
Chemical condition of freshwaters	3	1	4
Global climate regulation	3	1	5
Cultivated crops	0	1	0
Bio-remediation	3	1	3
Filtration/storage/accumulation by ecosystems	2	1	3
Pollination and seed dispersal	4	1	3



Conclusions and next steps

- › Successfully completed the first component of the tool: **VivaGrass Viewer**
- › **VivaGrass Planner** modules will be further developed in terms of GIS models and data inputs
- › Re-check the tool functionalities with stakeholders and define new modules/functions if needed
- › Define the way data, modules and functionalities integrate into an attractive, easy to use GUI

