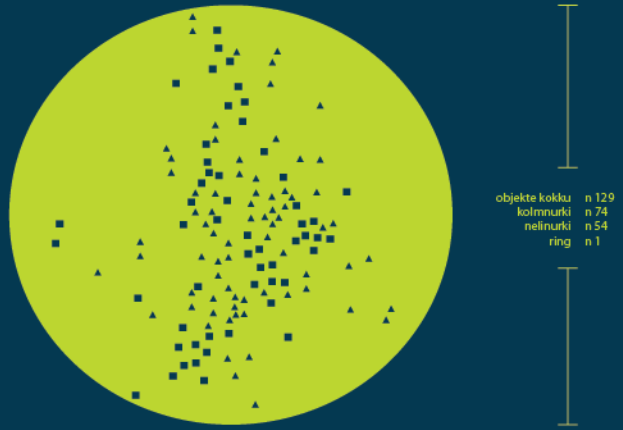


Kaia Oras

LONDON GROUP ON ENVIRONMENTAL ACCOUNTING
25th MEETING, Session C
METHODOLOGICAL WORK SEEA Experimental ecosystem accounting, SUBSESSION 15

eesti statistika

Estonia's effort of building ecosystem extent account and discussing the typology national perspective

7-9 OCTOBER 2019, Central Statistics Office of Australia

PLAN OF THE PRESENTATION

1. Compilation of the ecosystem extent account in Estonia:
Creation of the explicit spatial database on land cover/land use/habitat

2. From spatial database to ecosystems typology

3. Sjoerd Schenau’s questions

ECOSYSTEM EXTENT COMPILATION, WHAT STATISTICS ESTONIA HAS DONE SO FAR IN 2019:

…collected all relevant and up to date spatial data concerning Estonian ecosystems

…compiling spatially explicit base map

… created the link between land owners and „ecosystems“ for example study area

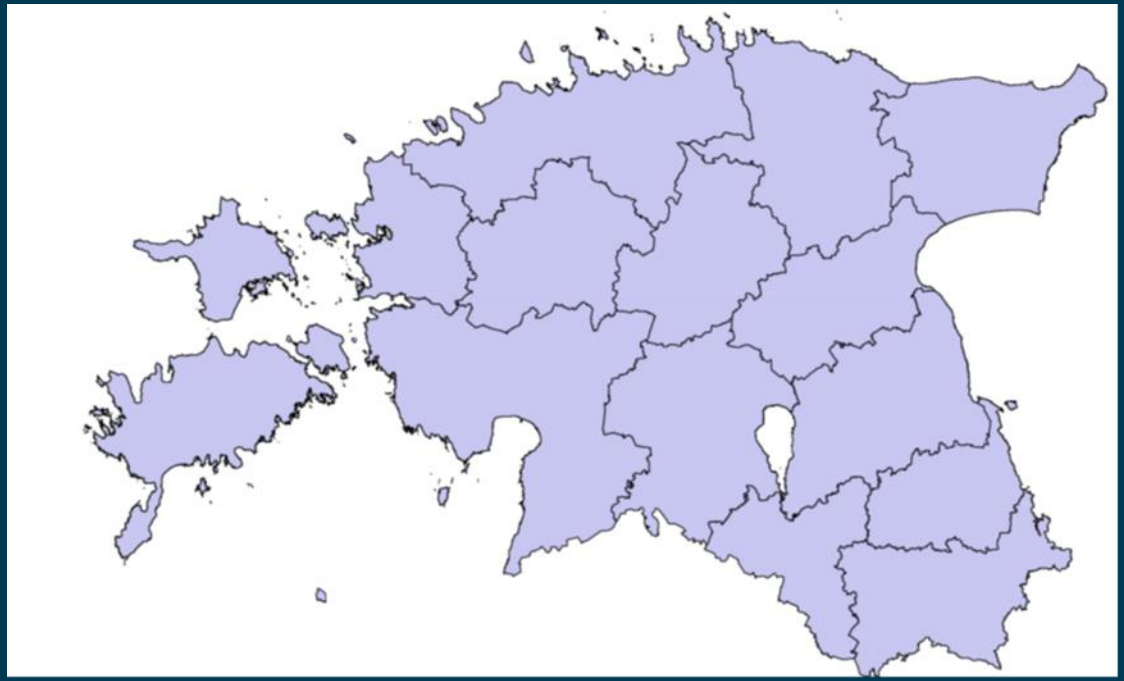
… working on typology and crosswalks

PROCESS FOR THE COMPILATION OF THE FULL LAND COVER/LAND USE/HABITAT DATABASE

MAP LAYERS

1. Agricultural land and semi-natural communities (Support bases!)
2. Forest land
3. Wetlands
4. Semi-natural communities (Eligible for support)
5. Natura 2000 habitats inventory
6. Meadows database
7. Estonian Topographic Database

ECOSYSTEM ACCOUNTING AREA (EAA)



1. AREA UNDER AGRICULTURAL SUPPORT SCHEMES: Estonian Agricultural Registers and Information Board

Base year: 2018

Original classification:
7 different classes for agricultural land including permanent and short-term grasslands.

Potential problems: Field parcels/areas that recieve support are precisely mapped.

Area under
agricultural support scheems:

Satellite image:

2. FOREST REGISTRY OF ESTONIA

Base data: ten years time frame

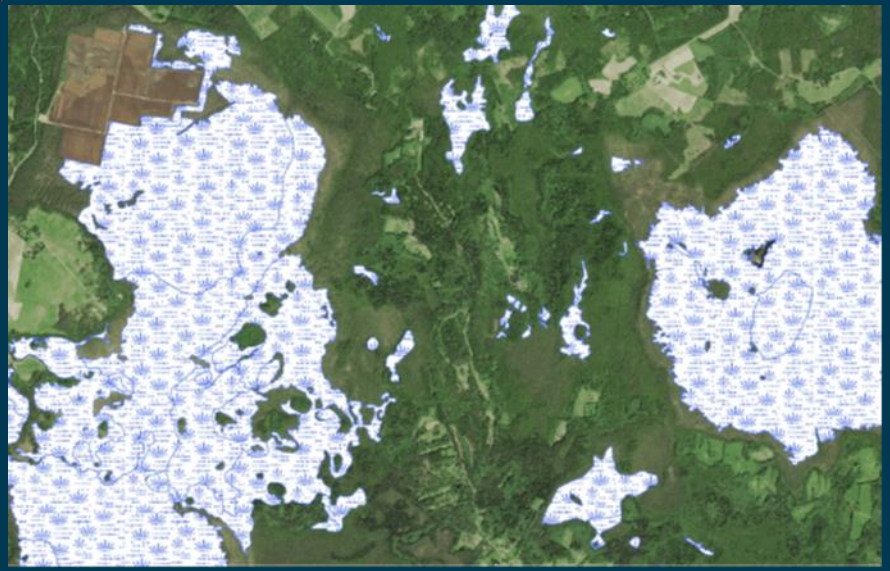
Potential problems:

- **Clearcut areas not recorded (outdated registry)**
- **There are unmapped areas (15%) of forests**
- **Original classification: 28 forest site types (national classification)**

Forest cadastral units:

Satellite image:

3. WETLANDS DATA: ESTONIAN NATURE FOUNDATION



Base data: within ten 10 years of time

Potential problems:

- Could be slightly outdated for some records
- Some areas have multiple classifications „Transition areas“

Original classification: Uses Natura 2000 habitat codes: 7 types (without „Transition areas“)

Wetlands : 

Satellite image: 

4. SEMI-NATURAL COMMUNITIES WHICH ARE ELIGIBLE FOR SUPPORT (Estonian Environment Agency)

Base data: 10 year time frame.

Potential problems:

- Could be slightly outdated
- for some records
- What is the actual state for older records are not known

Original classification: Natura 2000 habitat codes: 15 types.

Seminatural communities:

Satellite image:

5. NATURA 2000 HABITATS (ESTONIAN ENVIRONMENT AGENCY)

Base data: Most of the data is older than 10 years

Potential problems:

- Consisist inaccuracies
- Probably outdated for some records
- What is the actual state for older records is not known

Original classification: Uses Natura 2000 habitat codes: 60 types.

Natura 2000 habitats:

Satellite image:

6. MEADOWS, ESTONIAN SEMINATURAL COMMUNITY CONSERVATION ASSOCIATION DATABASE

Base data: Data is older than 10 years.

Potential problems:

- Consisists inaccuracies
- Probably mostly outdated
- What is the actual state for older
- records is not known

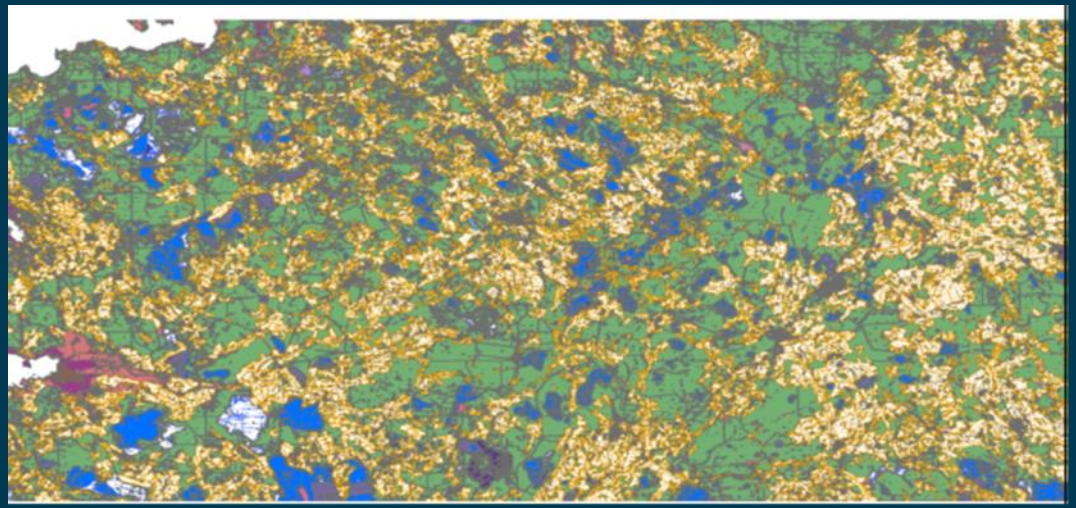
Original classification: Uses Natura 2000 habitat codes:12 types.

Seminatural meadows: 

Satellite image: 

DATA SOURCE FOR NON DETERMINED

LAND COVER TYPES:
ESTONIAN TOPOGRAPHIC DATABASE



Classification types:
40-50 major
land cover/use types:

MERGED DATASET

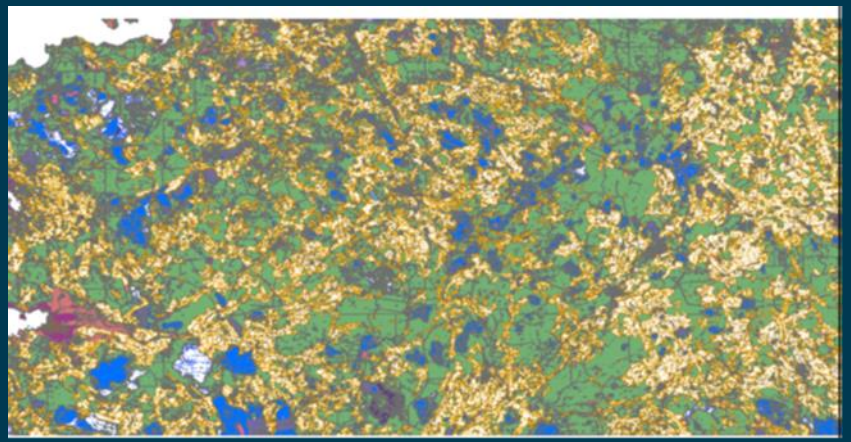
1. Agricultural land and semi-natural communities (support bases!)
2. Forest land
3. Wetlands
4. Semi-natural communities (eligible for support)
5. Natura 2000 habitats inventory
6. Meadows database

MERGED DATA SET (1-6):
Covers 83% territory

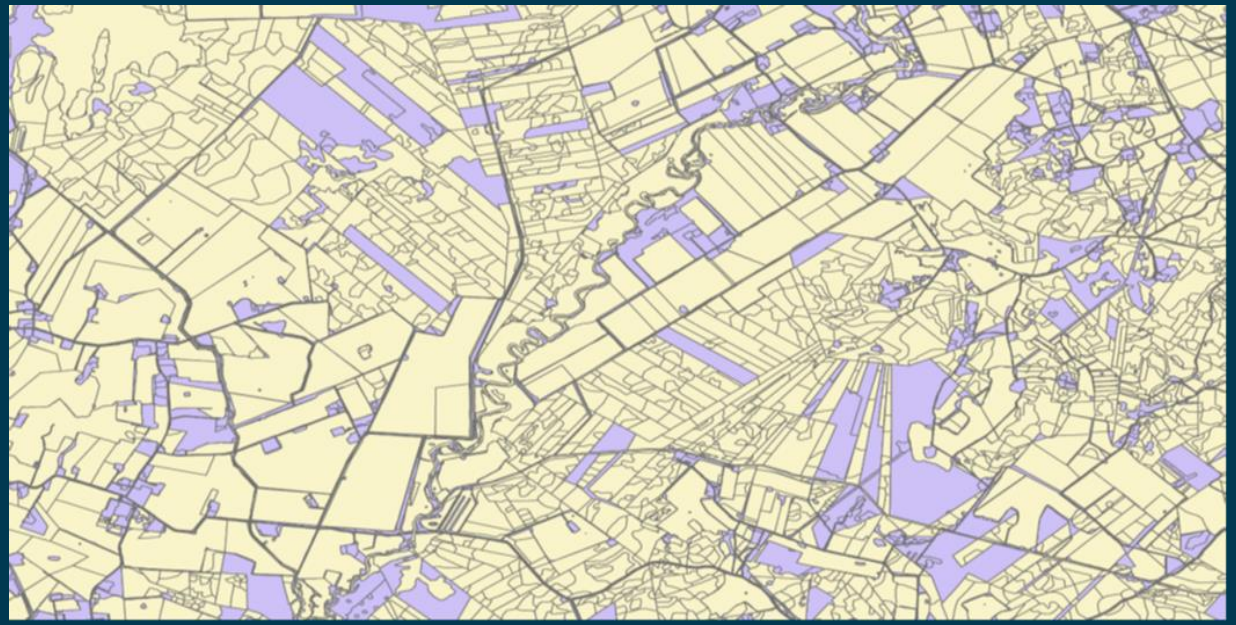
Satellite image:

statistics estonia

MERGED DATASET + ESTONIAN TOPOGRAPHIC DATABASE



Final dataset



Merged data set (around 100 mapping classification units):

1. Agricultural land and semi-natural communities ()
2. Forest land (41)
3. Wetlands (7)

4. Semi-natural communities (13)

5. Natura 2000 habitats ()

6. Meadows database ()

…other

Estonian Topographic Database (50 categories): forest, grasslands, agricultural land …

ESTONIAN TOPOGRAPHIC DATABASE:

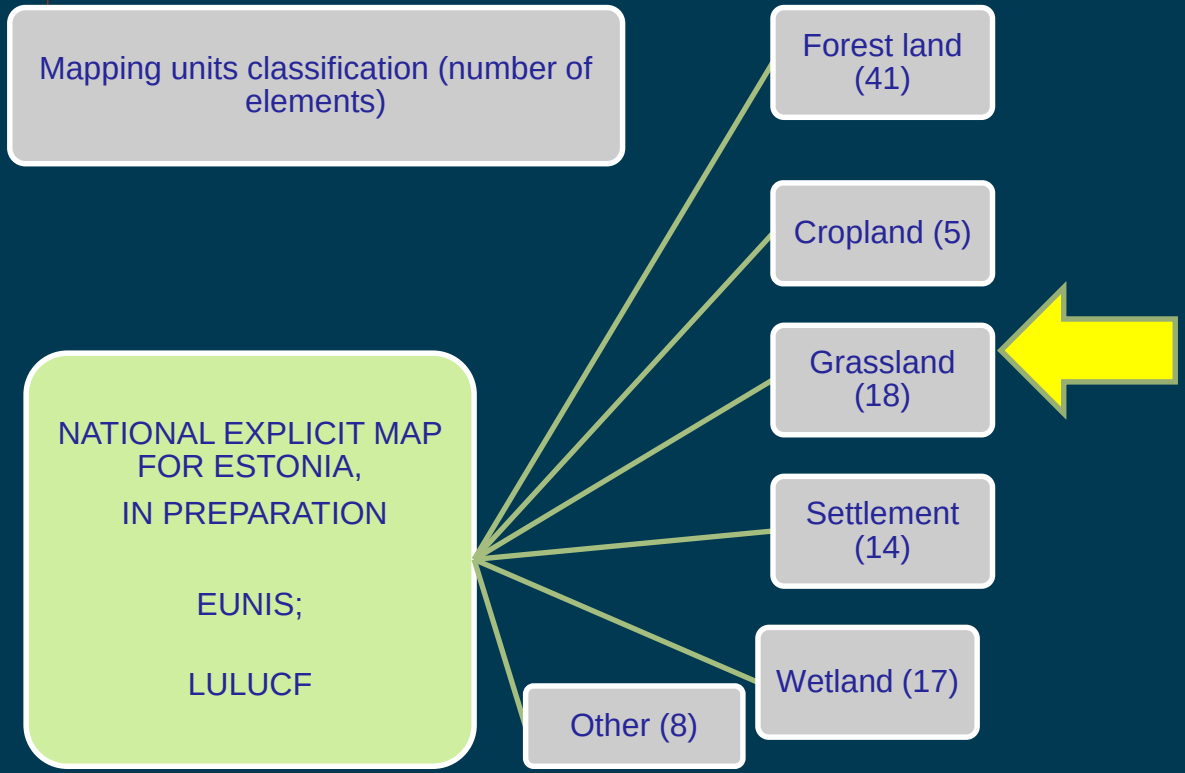
MERGED DATASET IS FURTHER LINKED TO THE CADASTRAL DATA
THE DIMENSION OF THE OWNERS OF ESTONIA'S „ECOSYSTEMS"* IS DERIVED

Land Cover and Land use / Institutional sector (thousand ha)	Forest land	Cropland	Cultivated grassland	Semi-natural grassland	Wetlands	Shrubs and bushies	Inland waterbodies	Quarries	Settlements	Roads and Routes	Other land	TOTAL
Households	51,802	34,170	14,496	6,304	1,413	202	668	58	6,151	2,221	58	117,544
Corporations	33,701	17,096	3,763	1,734	761	71	253	50	840	1,046	24	59,341
General government	5,491	4,881	2,311	1,373	530	65	161	1,359	690	1,873	6	18,740
State Forest Management Centre	63,403	286	69	854	29,748	38	489	62	70	928	58	96,005
Rest of the world	685	372	99	106	18	3	5		167	39	0	1,493
TOTAL	155,082	56,805	20,738	10,371	32,470	379	1,576	1,530	7,918	6,108	147	293,123

***- actually by the mix of land cover/use, habitat / ecosystem classes**

Land accounts data relevant for ecosystem services accounts is the basis for the compilation of an accounting basic matrix in the sense of ecosystem extent account with an additional data layer by economic and institutional units.

103 landcover/use/habitat types In order to create a specially explicite map of Estonia's landcover we need



MAP LAYERS

1. Agricultural land and semi-natural communities (Support bases)
2. Forest land
3. Wetlands
4. Semi-natural communities (e for support)
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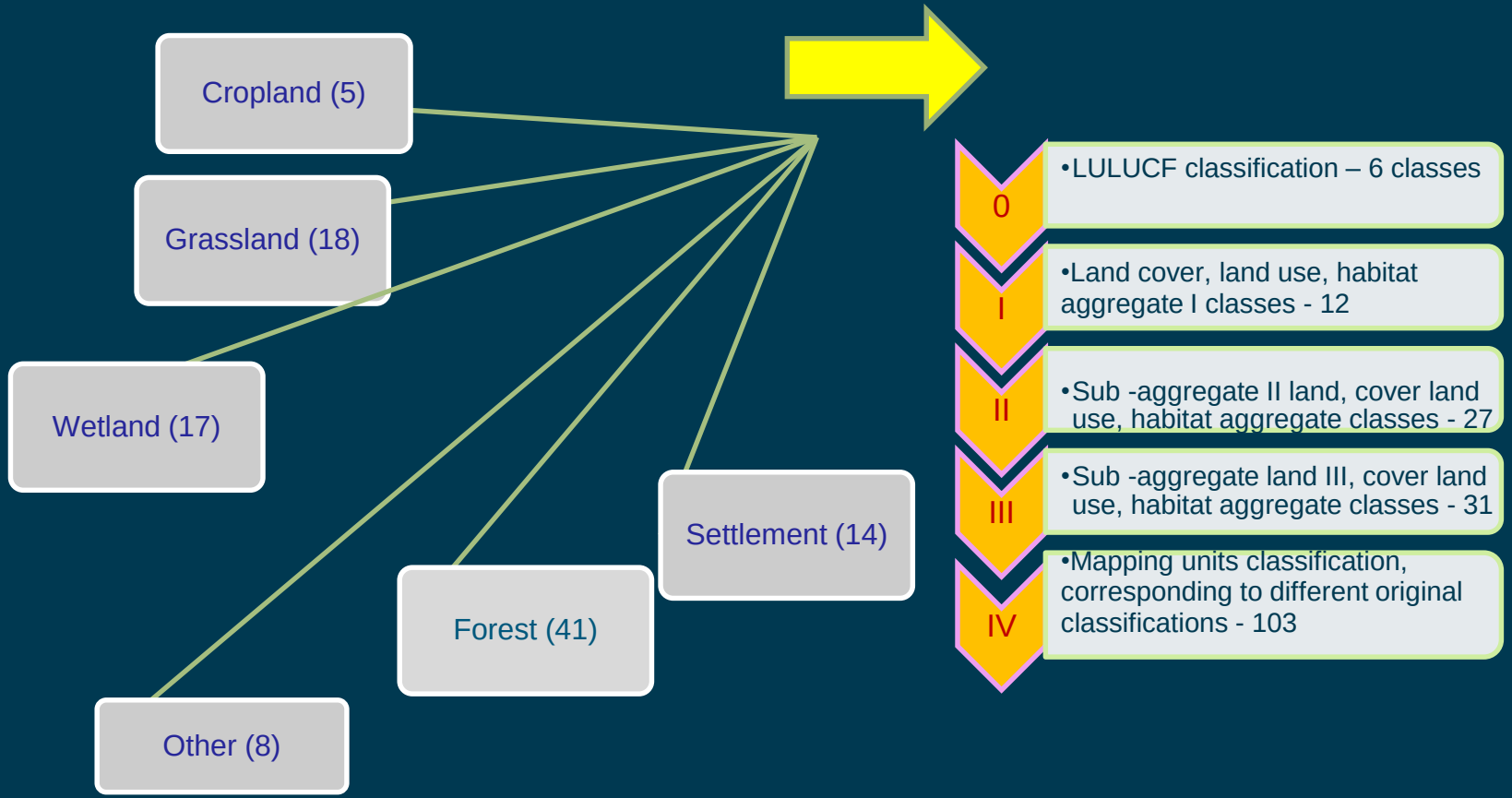
6. Meadows database
7. Estonian Topographic Database

World Ecosystems data (UDGS/ESRI) is a 250 m global dataset of biophysically distinct (GDBBS) areas

How to get from 103 land cover/use/habitat types to national ecosystems typology? Work in progress.



AT THE MOMENT, WHAT WE HAVE:

Original Classification: 103 different types

Types are: the mix of different habitats, land-use and land cover classes.

These classes cover 100% of Estonia's terrestrial area (incl inland waters).

We still miss common aggregate ecosystem classes, these have to be agreed

- CROSSWALK is feasible to the high level:

- UNFCCC/IPCC land use classes (LULUCF) classes
- EUNIS habitat classification (mostly, to variety of levels but to the broad classes for sure)…

Grasslands: crosswalk from national categories used for mapping to EUNIS categories	n/o	A : Marine habitats	B : Coastal habitats	C : Inland surface waters	D : Mires, bogs and fens	E : Grasslands and lands dominated by forbs, mosses or lichens	F : Heathland, scrub and tundra	G : Woodland, forest and other wooded land	H : Inland unvegetated or sparsely vegetated habitats	I : Regularly or recently cultivated agricultural, horticultural and domestic habitats	J : Constructed, industrial and other artificial habitats	X : Habitat complexes
Grasslands and lands dominated by forbs, mosses or lichens	o					E						
Perennial calcareous grassland and basic steppes	6210					E1.2						
Perennial calcareous grassland and basic steppes	6280					E1.2						
Low and medium altitude hay meadows; Boreal and sub-boreal meadows	6270					E2.24						
Low and medium altitude hay meadows; Boreal and sub-boreal meadows	6510					E2.24						
Moist or wet eutrophic and mesotrophic grassland						E3.4						
Moist or wet eutrophic and mesotrophic grassland; Northern boreal alluvial meadows	6450					E3.47						
Moist or wet oligotrophic grassland	6410					E3.5						
Moist or wet tall-herb and fern fringes and meadows; Boreal river bank tall-herb communities dominated by [Filipendula]	6430					E5.4						
Temperate thickets and scrub; [Juniperus communis] scrub	5130						F3.16					
Dry heaths	4030						F4					
Intensive unmixed crops	o									I1.1		
Arable land with unmixed crops grown by low-intensity agricultural methods	o									I1.3		
Pasture woods (with a tree layer overlying pasture)	6530											X09
Pasture woods (with a tree layer overlying pasture)	o											X09
Large parks	o											X11

USGS/ESRI World Ecosystems data granularity for Estonia

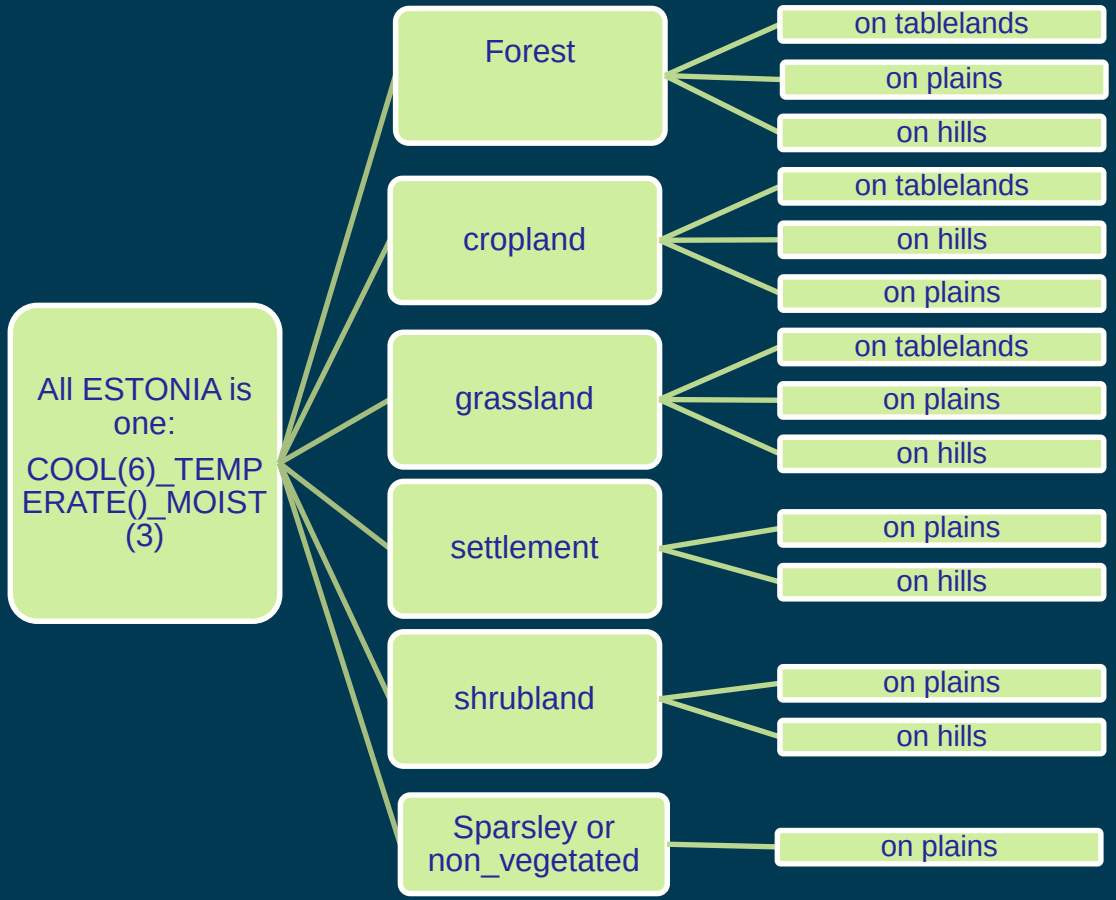
Good: it is all mapped

Is there enough granularity in the World Ecosystems to capture what we have mapped already in terms of ecosystems?

14 distinguished broad classes for Estonia. Distinguishing flat Estonia on the basis of altitude does not seem relevant to us.

How well these types match to our own map is too early to say.

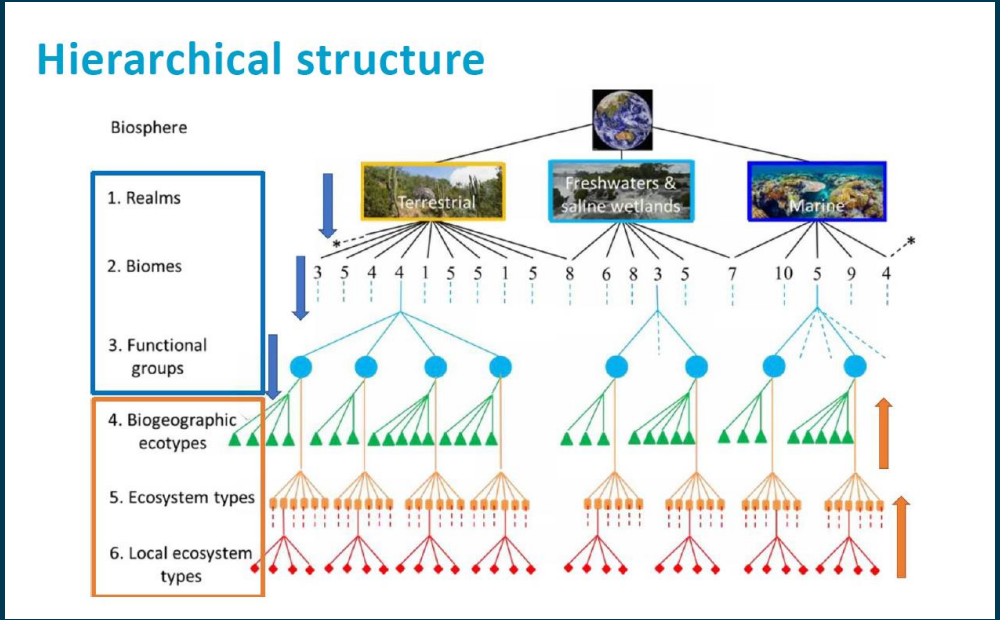
Idea to have IUCN classes incorporated sounds promising.



World Ecosystems data (UDGS/ESRI) is a 250 m global dataset of biophysically distinct (GDBBS) areas

INTERNATIONAL CLASSIFICATION FOR ECOSYSTEM TYPOLOGY?

- Desired features of IUCN RLE types classification:
- represents ecosystems, spatially delineated, geographically and conceptually exhaustive, mutually exclusive both conceptually and geographically, practicable, linkable to other established classifications
- Criteria are good but IUCN RLE typology has not been used yet
- -crosswalk from national level lowest level probably feasible to level 3 but does this level contain enough relevant detail?



Crosswalk from national level lowest level probably feasible to level 3 but does this level contain enough relevant detail?

Table 3.2: Ecosystem extent account (hectares)

	Ecosystem type														
	Artificial surfaces	Herbaceous crops	Woody crops	Multiple or layered crops	Grassland	Tree-covered areas	Mangroves	Shrub-covered areas	Regularly flooded areas	Sparse natural vegetated areas	Terrestrial barren land	Permanent snow and glaciers	Inland water bodies	Coastal water and inter-tidal areas	Sea and marine areas	TOTAL
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Opening extent																
Additions to extent																
Managed expansion																
Natural expansion																
Upward reappraisals																
Reductions in extent																
Managed regression																
Natural regression																
Downward reappraisals																
Net change in extent																
Closing extent																

Table 5.1: Ecosystem services supply and use table*

ECOSYSTEM SERVICES SUPPLY TABLE

	Measurement Units	Type of economic unit						Ecosystem type													TOTAL SUPPLY
		Agriculture, forestry and fisheries	Electricity, gas supply	Water collection, treatment and supply	Other industries	Households	Accumulation	Rest of the world - Imports	Artificial surfaces	Herbaceous crops	Woody crops	Multiple or layered crops	Grassland	Tree-covered areas	Mangroves	Shrub-covered areas	Regularly flooded areas	Sparse natural vegetated areas	Terrestrial barren land	Permanent snow and glaciers	Inland water bodies	Coastal water and inter-tidal areas	Sea and marine areas	
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Ecosystem services																								
Provisioning services																								
Biomass accumulation																								
- Timber																								
- Crops																								
- Grass / fodder																								
- Fish																								
Water abstraction																								
Regulating services																								
Carbon sequestration																								
Water regulation																								
Water purification																								
Air filtration																								
Nutrient/waste remediation																								
Pest & disease control																								
Soil retention																								
Cultural services																								
Enabling tourism and recreation																								
Enabling nature based education and research																								
Enabling nature based religious and spiritual experiences																								
Products																								

A B C D

Ecosystem services (detail correpsonding to supply table)			
Provisioning services		E	F
Regulating services			
Cultural services			
Products		G	H

* The types of ecosystem services shown are indicative only.

What is relevant from the extent account (changes) and ecosystem service flow accounting perspective?

Sjoerd Schenau's questions:
1. Do you agree with the next steps for testing ?

CROSSWALKING THE 'GLOBAL' EFGs WITH SELECTED 'LOCAL' NATIONAL ECOLOGICAL CLASSIFICATIONS

- test the unambiguous mapping of local classes to the EFGs

- Identify possible gaps in the EFGs

- Identify other issues, e.g. related to gradients and ecotone

2. ASSESSING THE USABILITY OF THE USGS/ ESRI WES PRODUCT.

- Assess the correspondence between WES mapping units to locally (country scale) known ecosystems.

- For cases where this correspondence is insufficient for adequate SEEA EEA accounting purposes, identify if, and which, additional global data sets underlying the WES product, may be helpful to increase this correspondence

3. CROSSWALKING EFGs WITH OTHER INTERNATIONAL CLASSIFICATION SCHEMES I.E. IUCN HABITAT CLASSIFICATION, RAMSAR, EUNIS, MAES ETC. Some of this work is in progress within IUCN.

2. What is needed in addition to test and implement a reference classification for ecosystem types ?

Question is relevant as most of the countries are lucky with their own systems and classifications. So, how to get countries to test the crosswalks?

- Provide the examples to the users (testers) how their data would be managed and which kind of benefits would be generated?
  - -summing up to comparable classes
  - -spatially explicit maps
- Make the testing easy and enjoyable…in a style…do you want to compare…
- Try to figure out if the data/comparisons still make sense if you make them on EFG level 3.
- For some countries international databases could help/assist in building ecosystem type classification, tell them.
- Which are important parameters to consider (soil, climate, water regime, habitats)?
- While IUCN is now mapping the IUCN RLE for providing global maps of the EFGs, they should inform focal points in countries in order to facilitate the testing.
- Provide funding for testing

2. WHAT IS NEEDED IN ADDITION TO TEST AND IMPLEMENT A REFERENCE CLASSIFICATION FOR ECOSYSTEM TYPES ?
3. WOULD YOU WANT TO VOLUNTEER AND HELP IN THE TESTING ?

- The RLE is based on ecosystem assembly theory and focuses on ecosystem function. In addition, levels 1 and 2 are on a strictly ecological basis (i.e. organization in biomes).

- For SEEA-EEA purposes additional socio-economical organization is appropriate as it helps to build the links and to integrate with other statistics. Ownership and land use are first ones to consider

- We could test:
  - the crosswalk to international IUCN-RLE Classification of ecosystems
  - the match of the USGS WES classification to our own map

Some thoughts

- In general ecosystem accounting needs full coverage, common infrastructure and language ☺
- Most of the land use and land cover classifications refer for the plant communities, IUCN RLE includes other dimensions of ecosystems ☺
- Most of the relevant information (in sense of the services and ccondition) lies on lowest levels but the countries practices and ecosystems differ.
- We hope that IUCN RLE types classification helps to reflect the condition of ecosystems and the ability to provide the services? ☺

Thank you!

Kaia Oras (Statistics Estonia), Üllas Ehrlich *(Tallinn Technical University),* Kätlin Aun (*Statistics E*stonia), Argo Ronk*(Statistics Estonia*), Veiko Adermann (*Statistics Estonia)*

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