# Advancing EU ecosystem extent accounts based on Copernicus and in situ data sets

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# EU ecosystem extent accounts - overview

- EEA has developed ecosystem extent accounts at EU and country level based on Corine Land Cover (CLC) for the years 2000 – 2018 in 3 tiers of increasing detail: ( https://doi.org/10.1016/j.ecoser.2022.101457 )
- These achieve an ecosystem type sub-division of 23 ecosystem categories in Tier II and 30 sub- categories in Tier III, respectively.
- New EU-level technical guidance on SEEA EA extent accounts proposes a much finer ecological sub-division at level 2 (46 sub-types) and level 3 (137 sub-types).
- Such ecologically detailed ecosystem divisions cannot be developed by available land cover or field survey data alone -> we thus need to develop & combine both.
- EEA has sponsored work to explore methodological options in that context (see Mucher et al., id 150); this presentation reviews policy context and further plans.

# Information needs of EU Green New Deal on ecosystems

- The EU Biodiversity strategy to 2030 and the proposal for an EU Nature Restoration Law set *inter alia* policy objectives at the level of habitats (e.g. beech forest, medit. oak forest, mountain fir forest) in- & outside protected areas
- Extent accounts at the level of broad ecosystem types (e.g. 'Forest' or 'Grassland') do not support such requirements, hence EU guidance proposes a much higher ecological sub-division via voluntary ecosystem type levels 2 and 3
- This guidance is linked to the EU implementation of SEEA EA and combines the IUCN Global Ecosystem Typology and the European habitat classification system EUNIS in a pragmatic manner. It is currently undergoing testing.
- Developing ecosystem extent accounts at a high level of ecosystem sub-division & in a geo-spatial data system would allow direct input from ecosystem accounts to the tracking of EU policy targets (at EU and national level).

# From ecosystem accounts towards habitat mapping

From ecosystem accounts

to

geo-spatial data on ecosystem distribution in accounts + maps

| Area in km² | MAES ECOSYSTEM TYPES | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1 Urban | 2 Cropland | 3 Grassland | 4 Forest | 5 Heathland and shrub | 6 Sparsely vegetated land | 7 Inland wetlands | 8 Rivers and lakes | 9 Marine inlets and transitional waters | Total |
| Ecosystem extent 2000 | 233,996 | 2,026,581 | 648,231 | 2,011,666 | 284,383 | 350,307 | 129,568 | 140,596 | 29,458 | 5,854,788 |
| Reductions to initial ecosystem extent | 1,961 | 11,134 | 3,635 | 48,536 | 1,812 | 2,462 | 642 | 317 | 63 | 70,565 |
| Additions to initial ecosystem extent | 8,475 | 6,712 | 1,755 | 49,579 | 828 | 1,985 | 147 | 985 | 99 | 70,565 |
| Net changes to ecosystem extent (additions - reductions) | +6,514 | -4,423 | -1,880 | +1,043 | -984 | -477 | -495 | +668 | +36 | |
| Net change as % of initial extent | 2.8% | -0.2% | -0.3% | 0.1% | -0.3% | -0.1% | -0.4% | 0.5% | 0.1% | |
| Total turnover of ecosystem extent (reductions + additions) | 10,436 | 17,846 | 5,390 | 98,115 | 2,638 | 4,447 | 789 | 1,302 | 162 | 141,129 |
| Total turnover as % of initial extent | 4.5% | 0.9% | 0.8% | 4.9% | 0.9% | 1.3% | 0.6% | 0.9% | 0.5% | 2.4% |
| Stable ecosystem stock | 232,035 | 2,015,446 | 644,596 | 1,963,129 | 282,971 | 347,845 | 128,926 | 140,279 | 29,395 | 5,784,223 |
| % of ecosystem stock | 99.2% | 99.5% | 99.4% | 97.6% | 99.4% | 99.3% | 99.5% | 99.8% | 99.8% | 98.8% |
| Ecosystem extent 2006 | 240,510 | 2,022,158 | 646,351 | 2,012,708 | 283,397 | 349,830 | 129,073 | 141,265 | 29,494 | 5,854,788 |

Source: EEA - CLC accounting layers v20

- *Combining satellite & in situ data*
- *Using AI & modelling*
- *Utilising big data approaches*

*EEA ecosystem type 'map' v3.1*

From 9 MAES ecosystem types to 46 level 2 types, 137 level 3 types, and 200+ EUNIS types in future?

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# Next steps to integrate habitat mapping in ecosystem accounting

## EEA plans for work in the coming years:

1. Continue work towards wall-to-wall EUNIS habitat mapping based on EEA sponsored pilot work in 2022
2. Seek cooperation with ESA, Eurostat and other EU players in support of EU habitat mapping & ecosystem accounting
3. Create a working group to exchange experiences gathered at national level with (satellite-based) habitat mapping (with Biodiversa+ research partnership)
4. Invest further in compiling auxiliary and in-situ data for validation and enhancement (from national and European data sources)
5. Understand which methods and data sources work best for which habitat types (e.g. retain field survey approach for some complex habitat types?)

Elements for habitat mapping:

- Habitat modelling (incl. AI)
- Remote sensing (Copernicus)
- In situ and mapping data
- Country-level experience
- Shared habitat classification and geo-spatial database

Challenges for accounting:

- Regular, comparable time series
- Combining different data types in GIS operation
- Computing power for big data work & geo-spatial referencing

# Thank you for your attention.

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