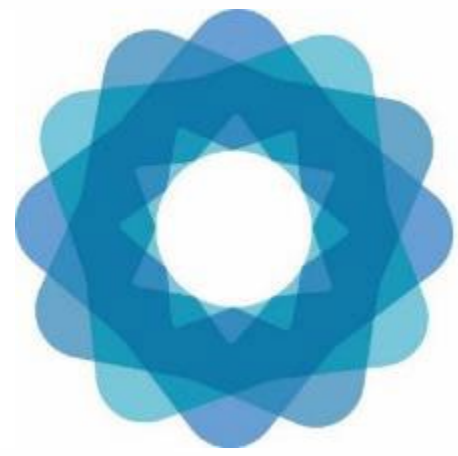




System of
Environmental
Economic
Accounting

Ecosystem extent accounts in the SEEA Ecosystem Accounting

4 August 2026

Chiba, Japan

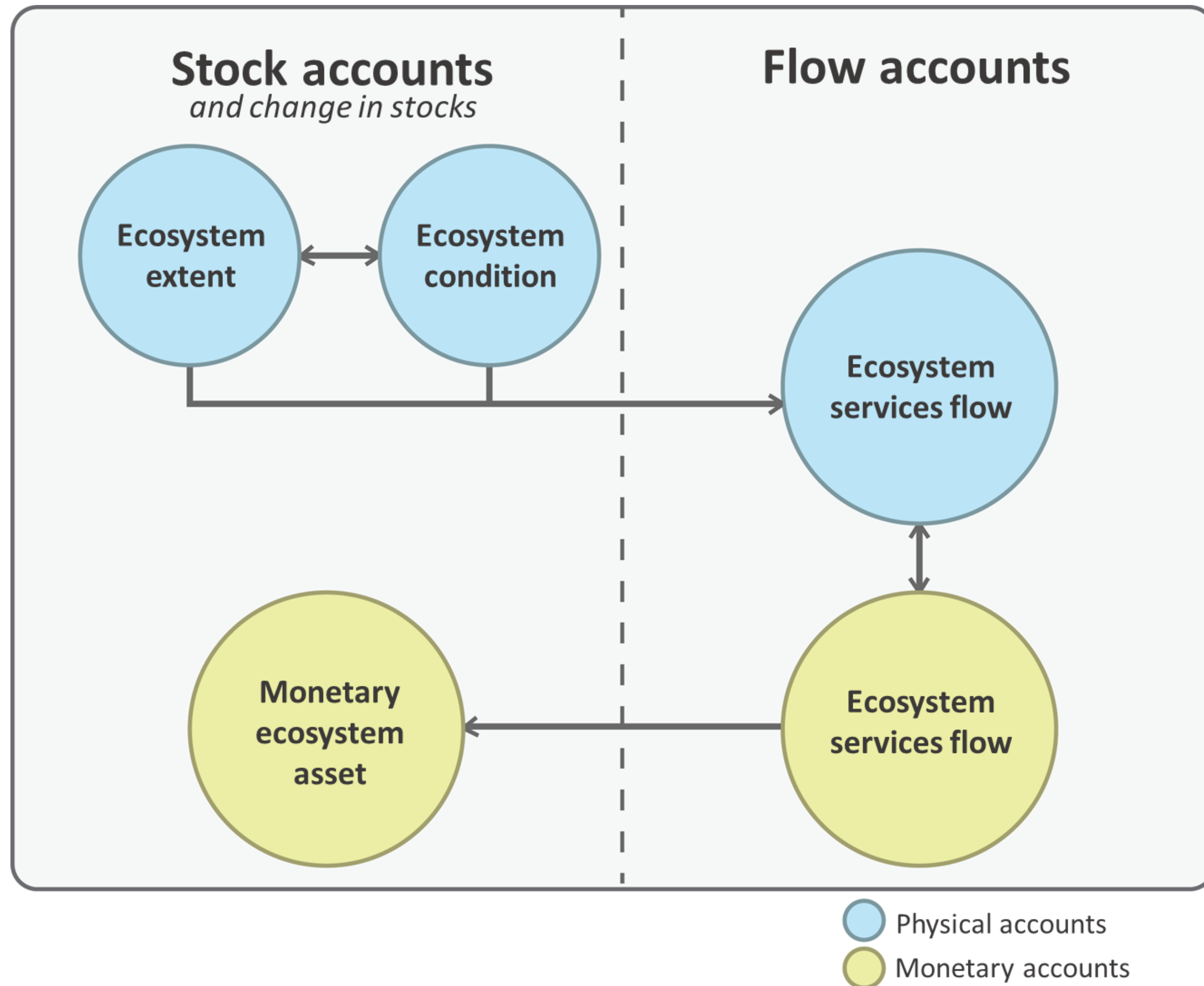
Sokol Vako (SIAP)

With thanks to UNSD colleagues for their inputs



United Nations

Ecosystem accounts – core accounts



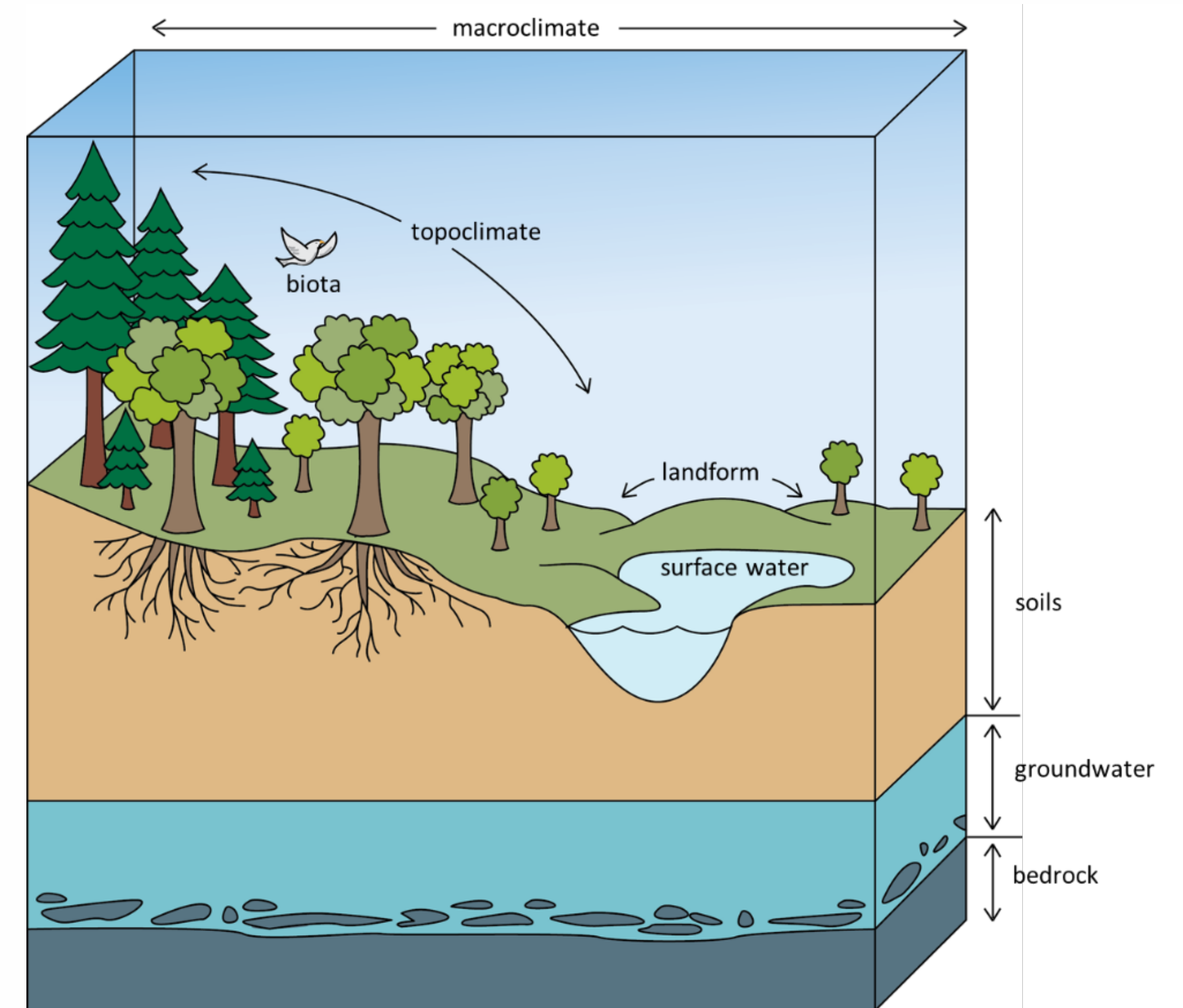
Ecosystem extent account - overview

- What?
 - > Starting point for ecosystem accounting
 - > Records the areas of different ecosystems, and changes in the areas
 - > National coverage of terrestrial, freshwater, coastal and marine areas
 - > Mutually exclusive and exhaustive coverage
 - > In physical units – i.e., ha, km², etc.
- Why?
 - > Input for land management, conservation policies
 - > Supports the derivation of coherent indicators of deforestation, desertification, agricultural conversion, urbanization, ecosystem diversity etc.
 - > Spatial foundation for other accounts → basis for allocating macro data to spatial units

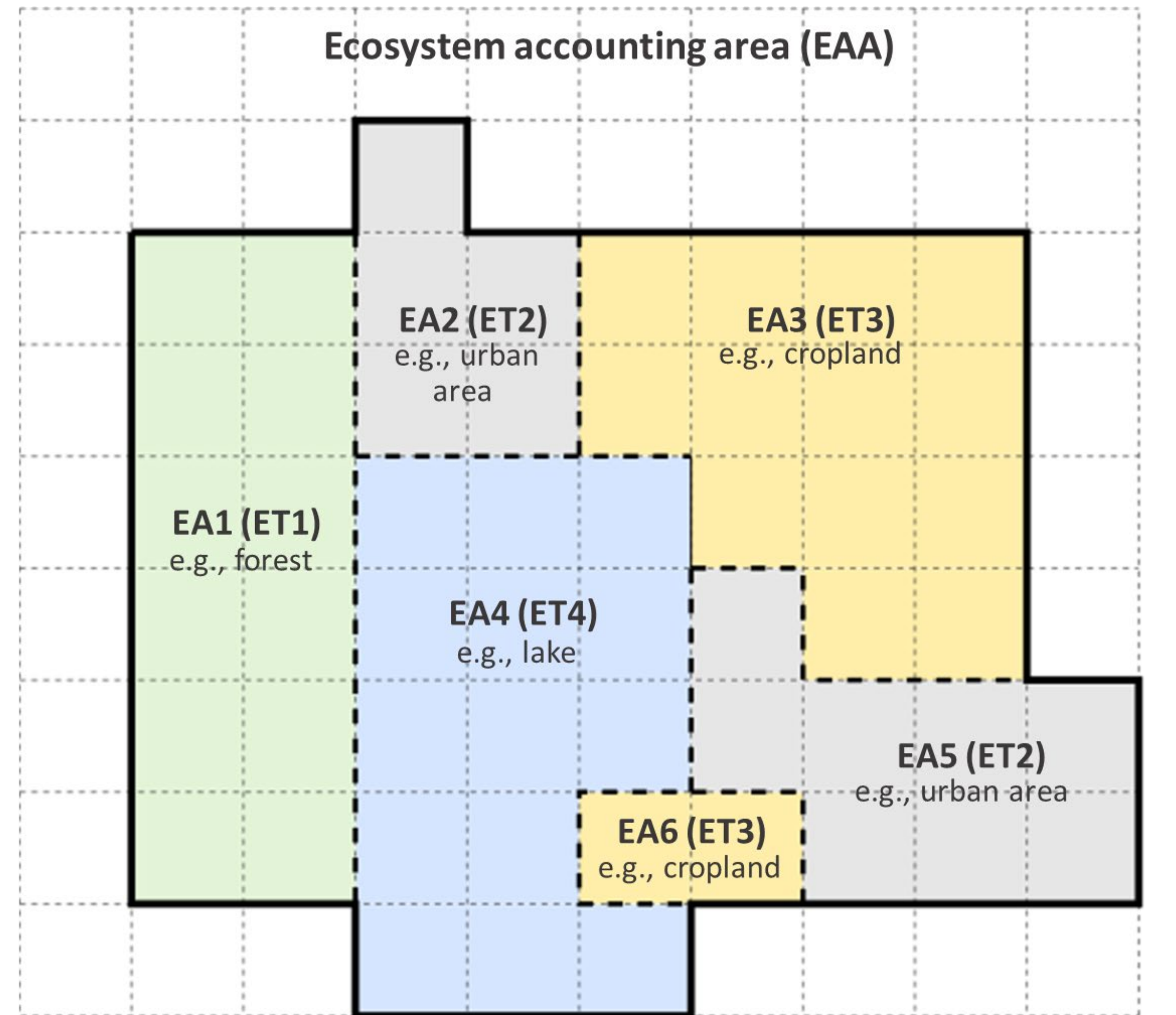
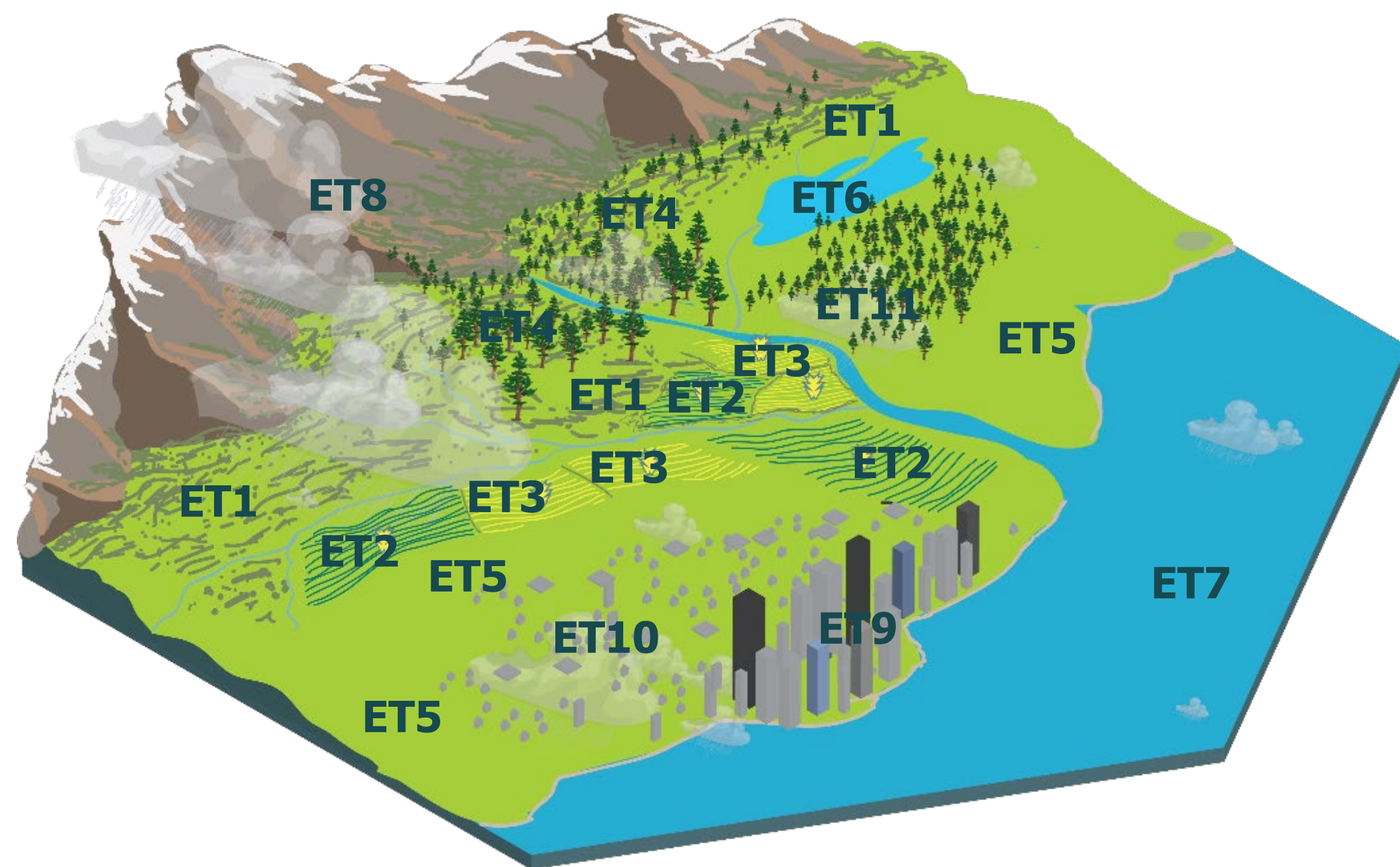
Ecosystem assets

Types of spatial units:

- **Ecosystem assets (EAs)** are contiguous spaces of a specific ecosystem type characterized by a distinct set of biotic and abiotic components and their interactions
- Ecosystem assets are classified by **ecosystem type (ET)**
- **Ecosystem accounting area (EAA)** is the geographical territory for which an ecosystem account is compiled
- **IUCN Global Ecosystem Typology** is the SEEA Ecosystem Type reference classification
 - > UN Statistical Commission endorsed it as an international statistical classification, and recommended it be included in the international family of classifications



Spatial units in SEEA EA



Linking land cover and ecosystem extent

- Both are spatially explicit
- Land accounts, particularly land cover, are a basis for ecosystem accounting
 - > Land cover is a fundamental layer, but extent requires more
- For terrestrial and freshwater areas, should be a reasonable concordance between land cover and ecosystem extent
- But key differences between land cover and ecosystems
 - > Definition of ecosystems in SEEA EA: a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit
 - > vs. definition of land cover: the observed physical and biological cover of the Earth's surface and includes natural vegetation and abiotic (non-living) surfaces

Linking land cover and ecosystem extent—an example

- > Land Cover class 6: Tree-covered areas
- > Many ecosystem types such as:
 - T1.1: Tropical/subtropical lowland rainforests
 - T2.1: Boreal and temperate high montane forests and woodlands
 - T2.2: Deciduous temperate forests
 - And others...

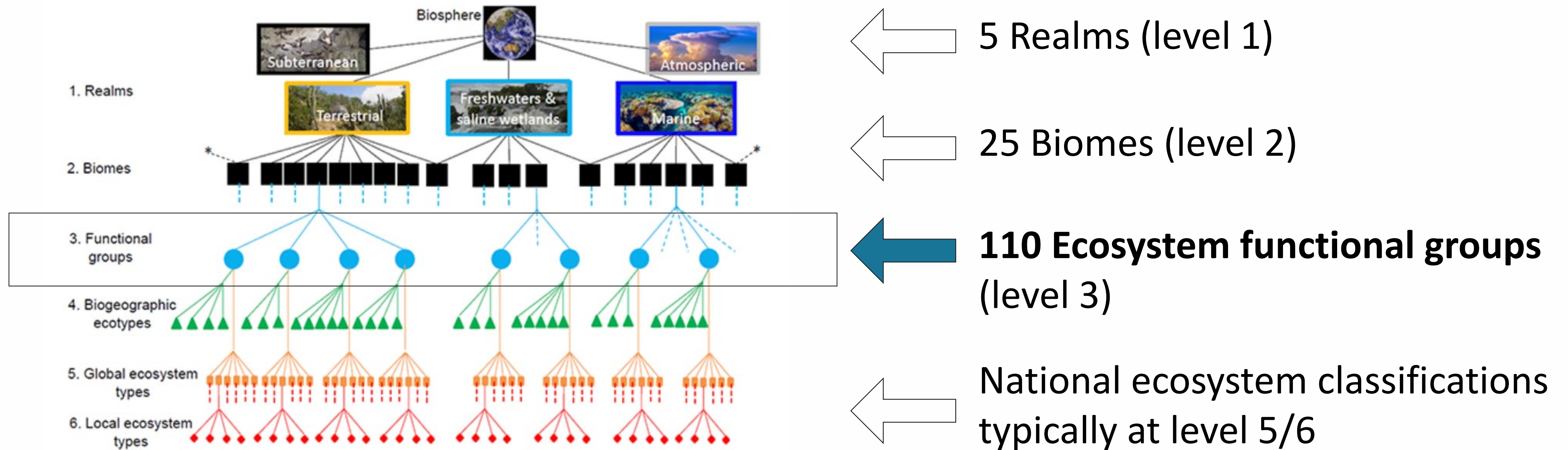


Linking land cover and ecosystem extent—another example

- > Land Cover class 01 Artificial surfaces (including urban and associated areas) The class is composed of any type of areas with a predominant artificial surface. Any urban or related feature is included in this class, for example, urban parks (parks, parkland and lawns). The class also includes industrial areas, and waste dump deposit and extraction sites.
- > One ecosystem type!
 - T7.4 Urban and industrial ecosystems



IUCN Global Ecosystem Typology



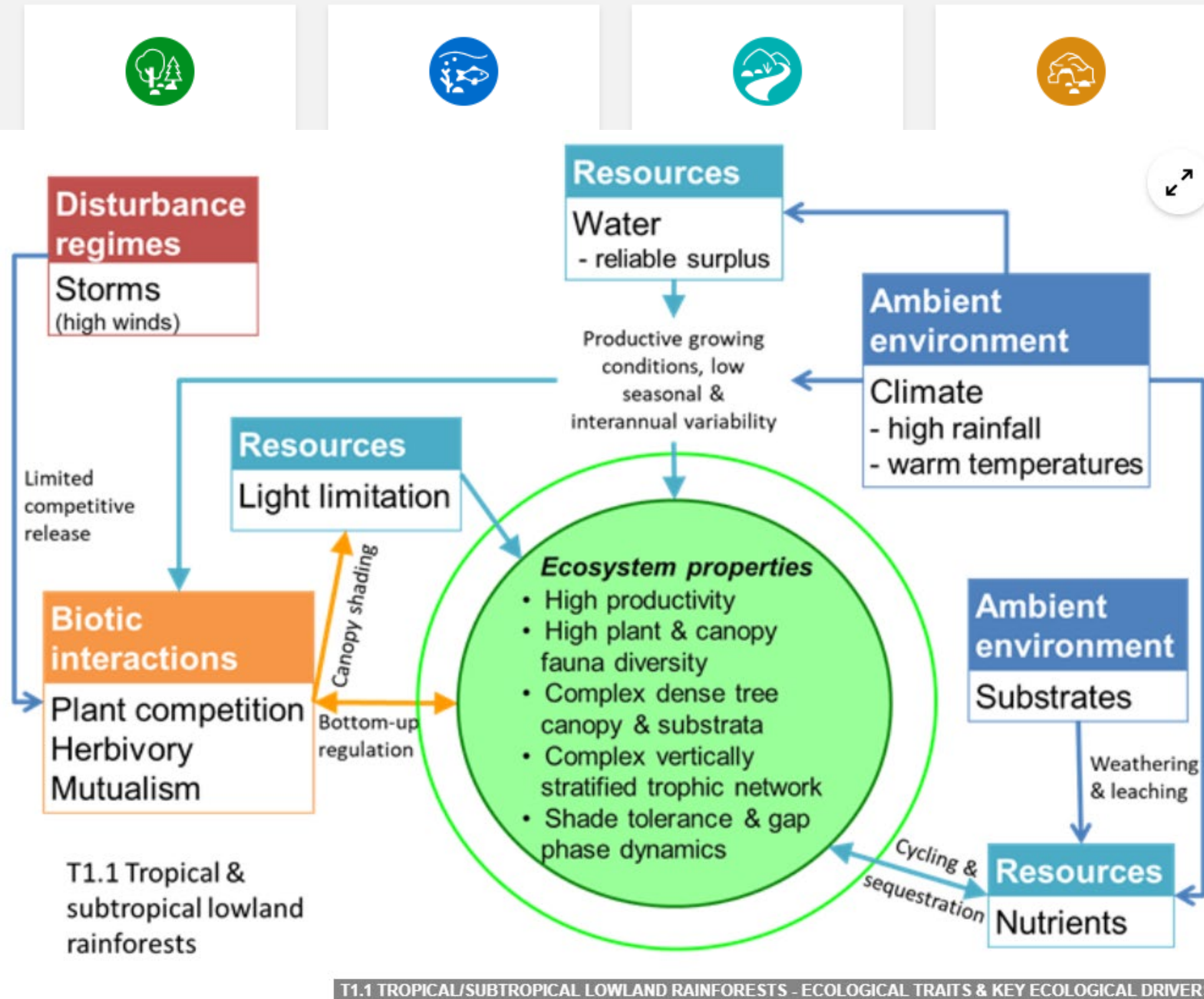
Of the 110 ecosystem functional groups,
98 are natural and 12 are anthropogenic

Ecosystem types <https://global-ecosystems.org/explore>

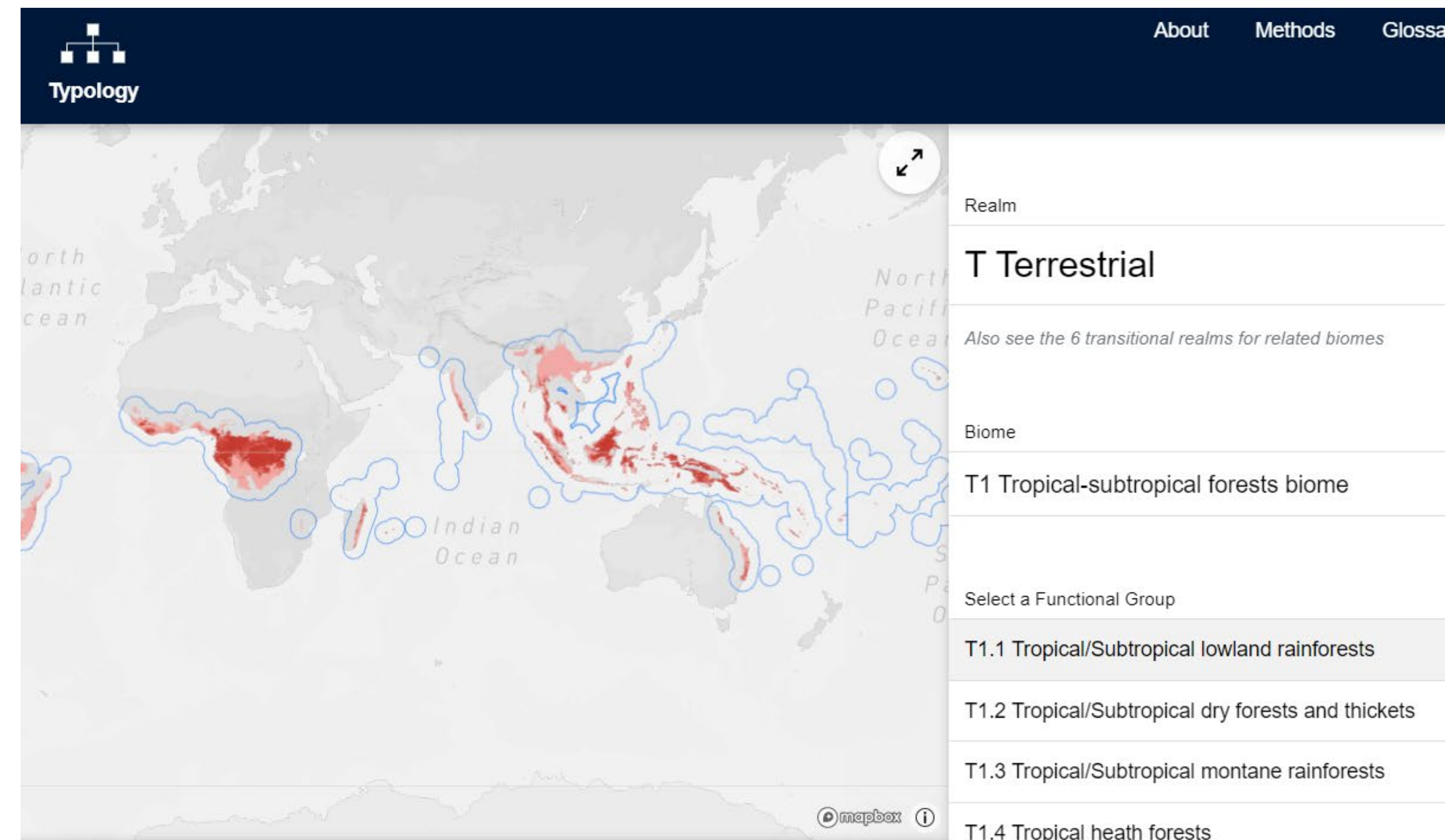
Explore the Global Ecosystem Typology

Start by selecting a Realm of interest, then drill down to learn more about its Biomes and Ecosystem Functional Groups

4 CORE REALMS



- Probabilistic maps with major and minor occurrences
- Can show if an ecosystem is **likely** found in your country
- Description of ecosystem properties, ecological drivers, global distribution



Principles of ecosystem asset delineation

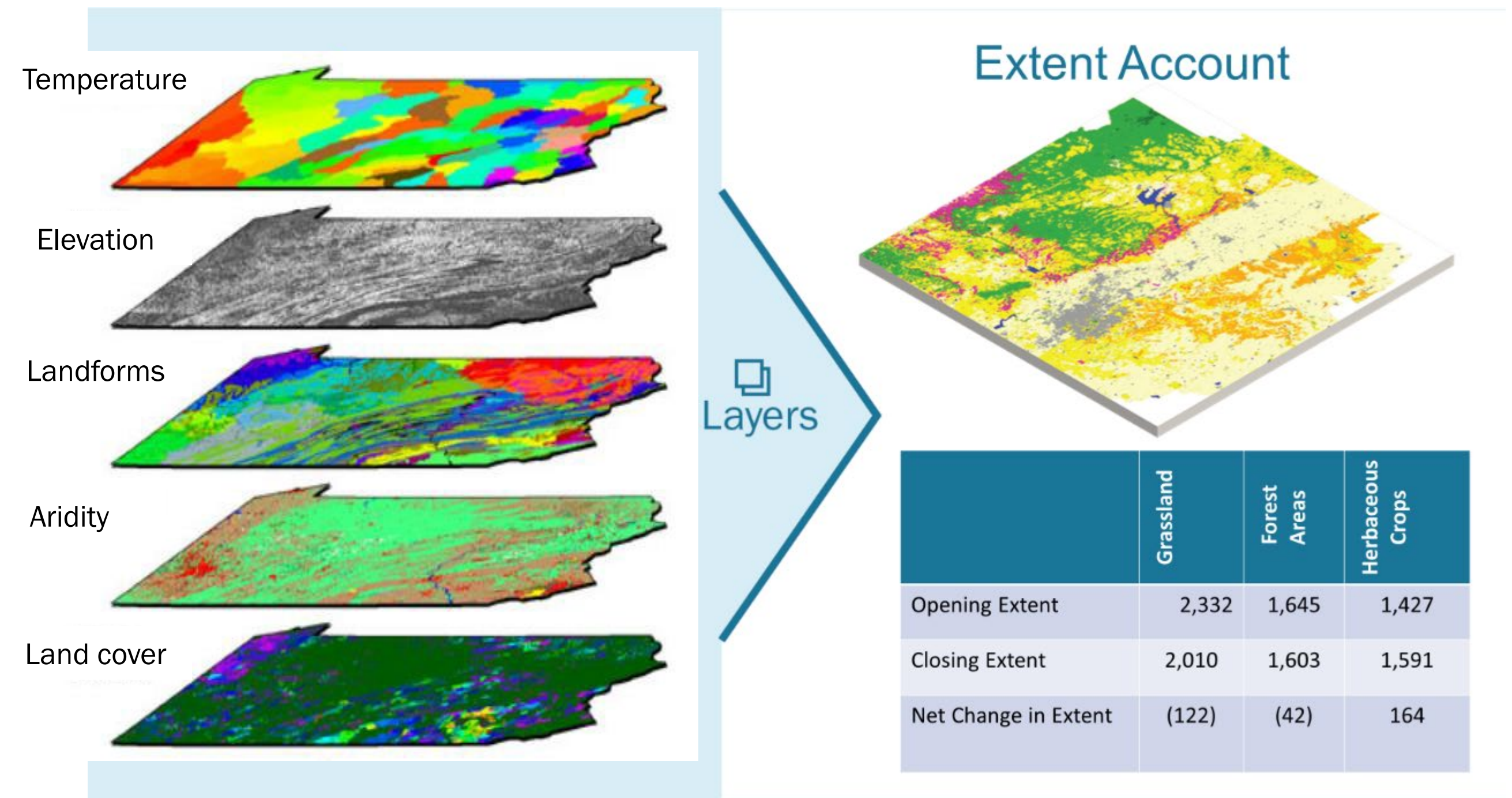
- Ecosystem assets should **represent ecosystems**
 - > Alignment with CBD ecosystem definition (consideration of organisms, their environmental setting and ecosystem processes)
 - > Keep it realistic: perfect is the enemy of good
- Ecosystem assets should be **capable of being mapped**
 - > Location; size; shape
- Ecosystem assets should be **geographically and conceptually exhaustive** across ecological realms
 - > Spatially comprehensive (no gaps)
 - > Conceptually comprehensive
- Ecosystem assets should be **mutually exclusive**
 - > Conceptually (single ecosystem type)
 - > Geographically (no overlaps between e.g. land and ocean).

Three ways to to compile ecosystem maps

- Use existing national ecosystem classification / maps
 - > Cross walk to IUCN classification
- Use existing global maps & tools
 - > GeoAtlas, ARIES, WES, IUCN, etc.
- Construct your own ecosystem classification / maps
 - > Based on combining different maps, such as land cover, elevation, rainfall, temperature, etc.
 - > Based on historical ecosystem (vegetation) types overlaying with anthropogenic changes

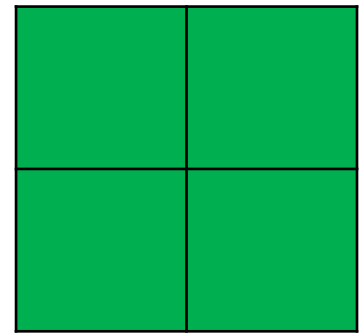
Compiling extent accounts

- Maps based on ecological ground-truthing would be ideal, but probably not practical/feasible
- Model extent on the basis of a multi-dimensional look-up table
 - > Inputs: land cover map, digital elevation model, temperature and landforms, etc.
 - Time series of land cover maps
 - Comparable maps (i.e. same classification; preferably also same techniques)
 - > Model derives which ecosystem type is to be found, where.

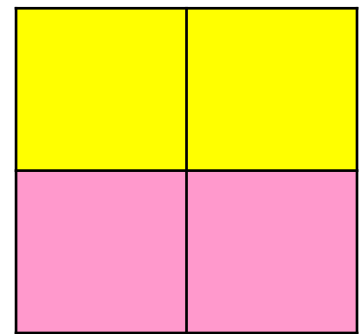


Compiling extent accounts

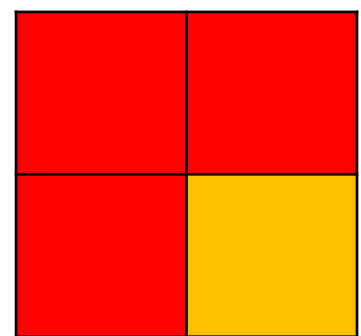
- Combining maps--simple example for illustration purposes only!



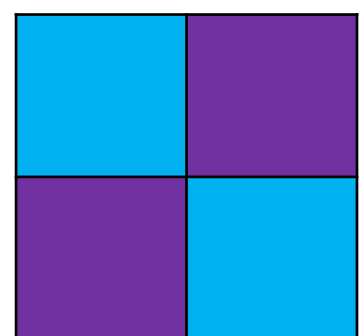
- Land cover
 - > Grey = non tree-covered area
 - > Green = tree-covered area



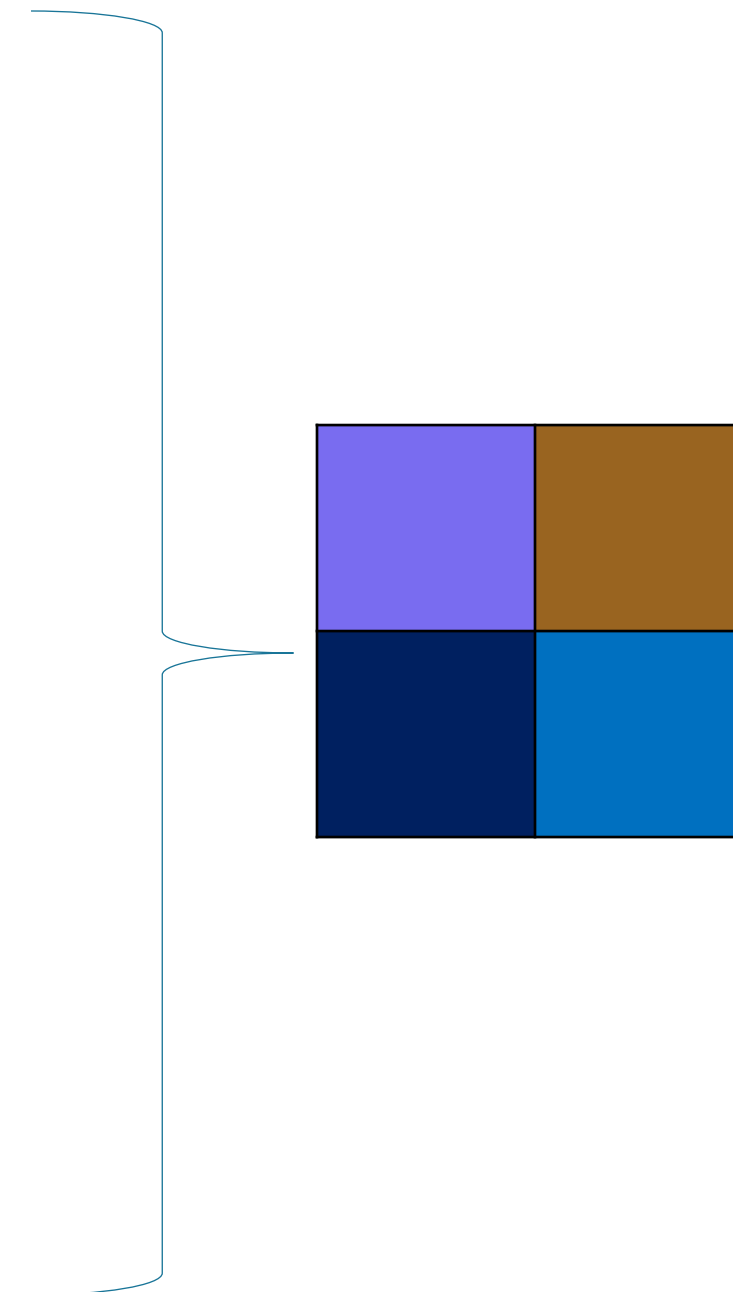
- Temperature
 - > Yellow = annual mean temperature > 18 C
 - > Pink = annual mean temperature <= 18 C



- Aridity
 - > Red = aridity index >.65 (moist)
 - > Orange = aridity index <= .65 (dry)



- Elevation
 - > Purple = elevation < 300m
 - > Blue = elevation >= 300m



- Hot, humid, elevated forest
 - > T1.3 Tropical/subtropical montane rainforests
- Hot, humid, low-lying forest
 - > T1.1 Tropical/subtropical lowland rainforests
- Temperate, humid, low-lying forest
 - > T2.5 Temperate pyric humid forests
- Temperate, dry, elevated forest
 - > T2.6 Temperate pyric sclerophyll forests and woodlands

- Vegetation
- Hydrology
- Pedology
- Elevation
- Bio-climate
- Etc.

[illegible]

Extent account - structure

Ecosystem types (based on the EFG level 3 of IUCN GET)																			
Terrestrial													Freshwater			Marine			
T1 Tropical-subtropical forests				T2 Temperate-boreal forests and woodlands				...		T7		F1	...	FM1	M1	...	MFT1		
Tropical/subtropical lowland rainforests	Tropical/subtropical dry forests and scrubs	Tropical/subtropical montane rainforests	Tropical hardwood forests	Boreal and temperate coniferous forests	Deciduous forests	...	Temperate forests	...	...	...	Derived natural features and wetlands	Permanently flooded wetlands	...	Intermittently flooded wetlands and open lakes	Seagrass meadows	...	Coastal salt marshes and reed beds		
T1.1	T1.2	T1.3	T1.4	T2.1	T2.2	...	T2.6	...	...	...	T7.5	F1.1	...	FM1.3	M1.1	...	MFT1.3	TOTAL	
Opening extent																			
Additions to extent				Additions to extent															
Managed expansion																			
Unmanaged expansion																			
Reduction in extent																			
Managed reductions				Reductions in extent															
Unmanaged reductions																			
Net change in extent																			
Closing																			

Ecosystem type change matrix

The ET change matrix shows :

- the area of different ecosystem types at the beginning of the accounting period;
- the increases and decreases in this area according to the ecosystem type it was converted from or to;
- the area covered by different ecosystem types at the end of the accounting period.

Ecosystem types (based on the EFG level 3 of IUCN GET)																							
Closing extent																							
					Terrestrial									Freshwater			Marine						
					T1 Tropical-subtropical forests				T2 Temperate-boreal forests and woodlands				...		T7		F1	...	FM1	M1	...	MFT1	
					Tropical/subtropical lowland rainforests	Tropical/subtropical dry forests and scrubs	Tropical/subtropical montane rainforests	Tropical heath forests	Boreal and temperate high montane forests and woodlands	Deciduous temperate forests	...	Temperate pyric sclerophyll forests and woodlands	...	...	...	Derived semi-natural pastures and old fields	Permanent upland streams	...	Intermittently closed and open lakes and lagoons	Seagrass meadows	...	Coastal saltmarshes and reedbeds	
					T1.1	T1.2	T1.3	T1.4	T2.1	T2.2	...	T2.6	...	...	...	T7.5	F1.1	...	FM1.3	M1.1	...	MFT1.3	
Ecosystem types (based on the ecosystem functional group EFG level 3 of IUCN GET) Opening extent					T1 Tropical-subtropical forests				T2 Temperate-boreal forests and woodlands				...		T7		F1.1	...	FM1.3	M1.1	...	MFT1.3	Opening
					T2 Temperate-boreal forests and woodlands				...				T7		F1.1	...	FM1.3	M1.1	...	MFT1.3			
					...				...				T7		F1.1	...	FM1.3	M1.1	...	MFT1.3			
...				...				T7		F1.1	...	FM1.3	M1.1	...	MFT1.3								
...				...				T7		F1.1	...	FM1.3	M1.1	...	MFT1.3								
...				...				T7		F1.1	...	FM1.3	M1.1	...	MFT1.3								
...				...				T7		F1.1	...	FM1.3	M1.1	...	MFT1.3								
...				...				T7		F1.1	...	FM1.3	M1.1	...	MFT1.3								
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Ecosystem extent account for the Netherlands

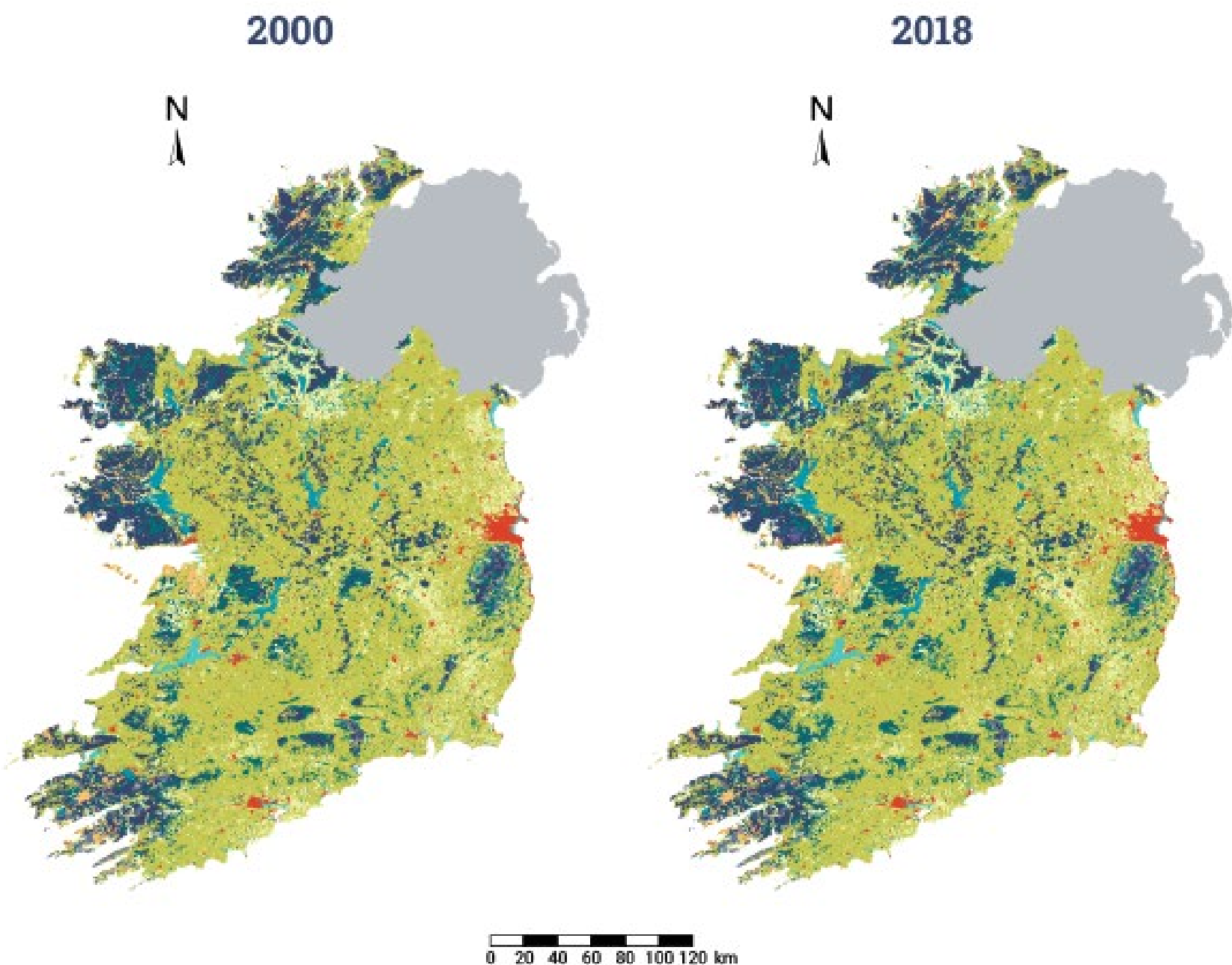
	Extent (km ²)	Increase (km ²) 2013- 2015	Decrease (km ²) 2013- 2015	Net change (km ²) 2013-2015	Extent (km ²) 2015	Increase (km ²) 2015- 2018	Decrease (km ²) 2015- 2018	Net change (km ²) 2015-2018	Extent (km ²) 2018
Total	41.542	3.357	3.357	0	41.542	3.629	3.629	0	41.542
Forest	3.475	74	106	-32	3.443	84	106	-22	3.422
Open nature	1.892	230	246	-17	1.876	240	235	5	1.881
Wetlands	612	42	29	13	625	44	38	6	631
Dunes, beach	497	18	20	-3	494	32	27	5	499
Water	7.861	64	47	17	7.879	86	45	41	7.920
Cropland	8.719	938	1.271	-332	8.386	1.238	1.208	30	8.416
Grassland	9.697	1.467	1.124	343	10.040	1.347	1.471	-123	9.917
Horticulture	203	12	19	-7	196	15	13	2	198
Other agr.	61	27	44	-18	43	34	31	2	46
Build up	7.636	382	373	9	7.645	399	370	29	7.674
Public green	888	104	78	27	915	111	86	25	940

Ecosystem extent account for Ireland



Map
2.2

Ireland's transitional and terrestrial
ecosystem types in 2000 and 2018



Ecosystem Types

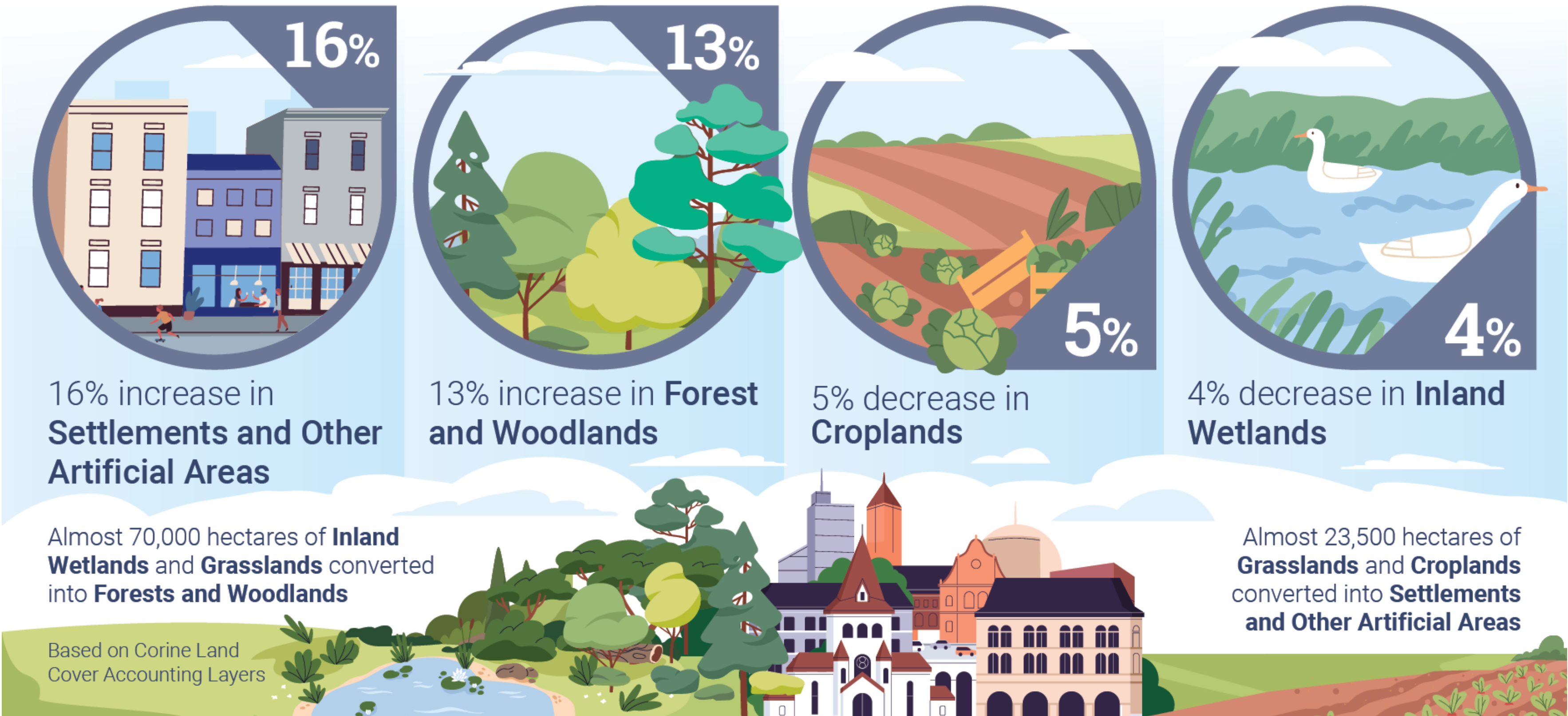
- | | |
|--------------------------------------|---|
| Settlements & Other Artificial Areas | Inland Wetlands |
| Croplands | Rivers & Canals |
| Grasslands | Lakes & Reservoirs |
| Forests & Woodlands | Coastal Beaches, Dunes & Associated Habitats |
| Heathlands & Shrubs | Marine Inlets, Transitional Waters & Wetlands |
| Sparsely Vegetated Ecosystems | Balancing Item |

Ecosystem	Opening extent 2000 (Hectares)	Additions (Hectares)	Reductions (Hectares)	Net change (Hectares)	Closing extent 2018 (Hectares)
1 Settlements and other artificial areas	149,614	24,790	948	23,842	173,456
2 Croplands	917,629	65,207	106,544	-41,337	876,291
3 Grasslands (pastures, semi-natural and natural grasslands)	3,915,515	85,769	115,316	-29,547	3,885,967
4 Forests and woodlands	645,013	84,636	1,944	82,692	727,706
5 Heathlands and shrubs	126,950	191	2,541	-2,350	124,600
6 Sparsely vegetated ecosystems	66,789	0	46	-46	66,743
7 Inland wetlands	1,024,190	303	41,256	-40,953	983,237
8 Rivers and canals	6,826	0	0	0	6,826
9 Lakes and reservoirs	112,361	10	7	3	112,364
10 Coastal beaches, dunes and associated habitats	23,654	36	105	-69	23,586
11 Marine inlets, transitional waters and wetlands	78,916	9	16	-7	78,909
12 Marine ecosystems	71,738,943	35	31	4	71,738,947
Balancing item	556	8,224	457	7,767	8,324
Total Area	78,806,956	269,211	269,211	0	78,806,956

Balancing items: This class corresponds to burnt areas.
Source: Central Statistics Office, Ireland (<https://www.cso.ie/en/releasesandpublications/fp/fp-eea/ecosystemextentaccounts2000-2018/extentaccounts-national/>)

Ecosystem extent account for Ireland

Ecosystem Extent Accounts 2000–2018



Ecosystem extent account for Australia

Extent of terrestrial ecosystems over time, by biome

Graph

Table

Download

Biome	2010-11 (million ha)	2015-16 (million ha)	2020-21 (million ha)
Deserts and semi-deserts	384.46	384.18	383.82
Savannas and grasslands	177.45	176.54	176.53
Intensive land-use	113.21	115.47	116.06
Palustrine wetlands	35.50	35.12	35.04
Temperate-boreal forests and woodlands	24.86	24.54	24.52
Lakes	16.35	16.13	16.11
Shrublands and shrubby woodlands	7.46	7.43	7.38
Unclassified	5.16	5.15	5.15
Semi-confined transitional waters	3.80	3.80	3.80
Tropical-subtropical forests	3.05	3.00	2.93
Brackish tidal	0.00	0.00	1.64
Artificial wetlands	1.21	1.20	1.20
Shorelines	0.83	0.82	0.83
Polar/alpine (cryogenic)	0.33	0.33	0.33
Supralittoral coastal	0.22	0.21	0.21

Source: Australia Bureau of Statistics
(<https://www.abs.gov.au/statistics/environment/environmental-accounts/national-ecosystem-accounts-experimental-estimates/latest-release#terrestrial-realm>)

THANK YOU

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