



System of
Environmental
Economic
Accounting

Ecosystem extent accounts in the SEEA Ecosystem Accounting

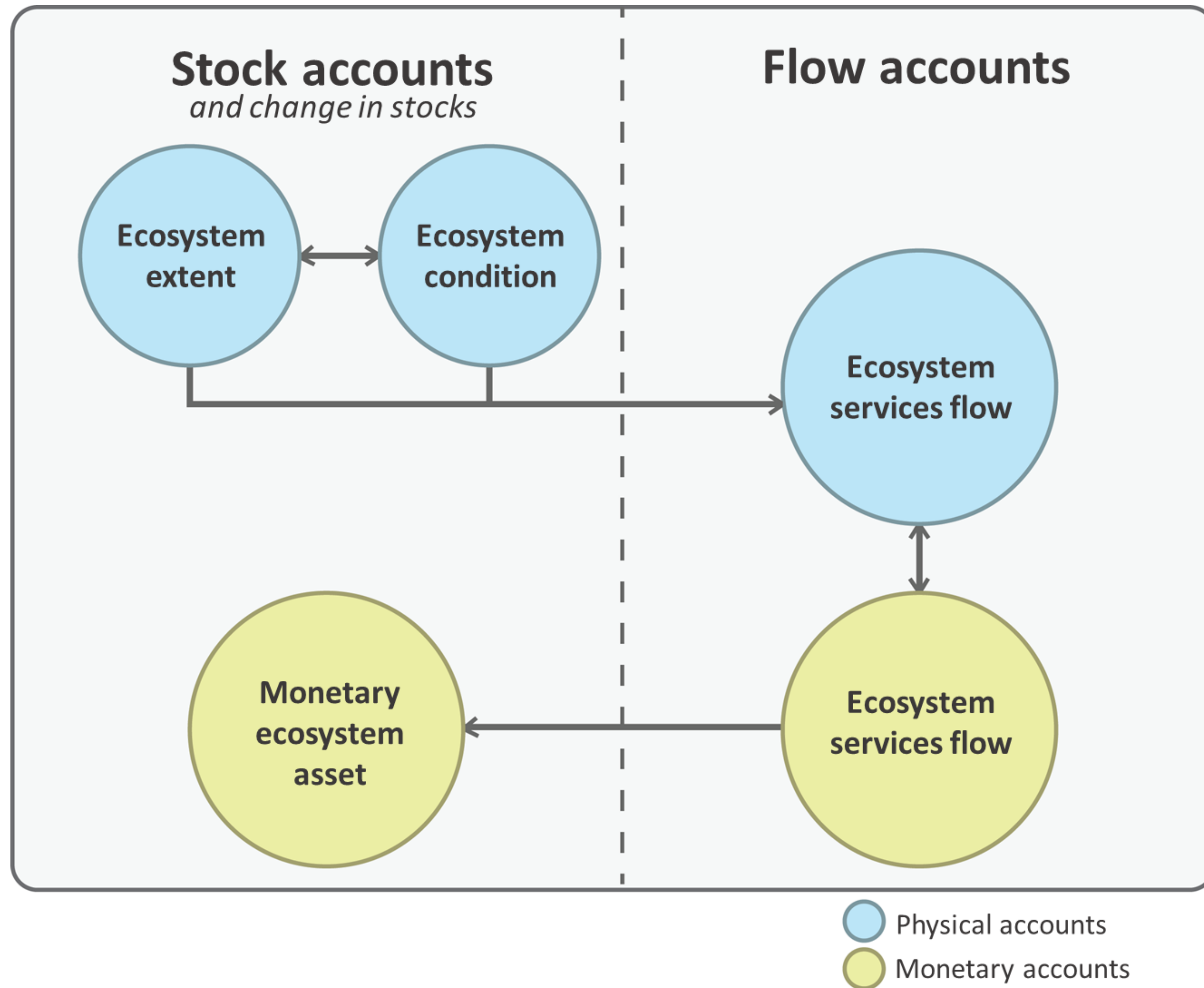
ARIES for SEEA workshop, 13-14 June 2024, Bilbao, Spain

Marko Javorsek
Environmental Economic Accounts Section
United Nations Statistics Division



United Nations

Ecosystem accounts – core accounts



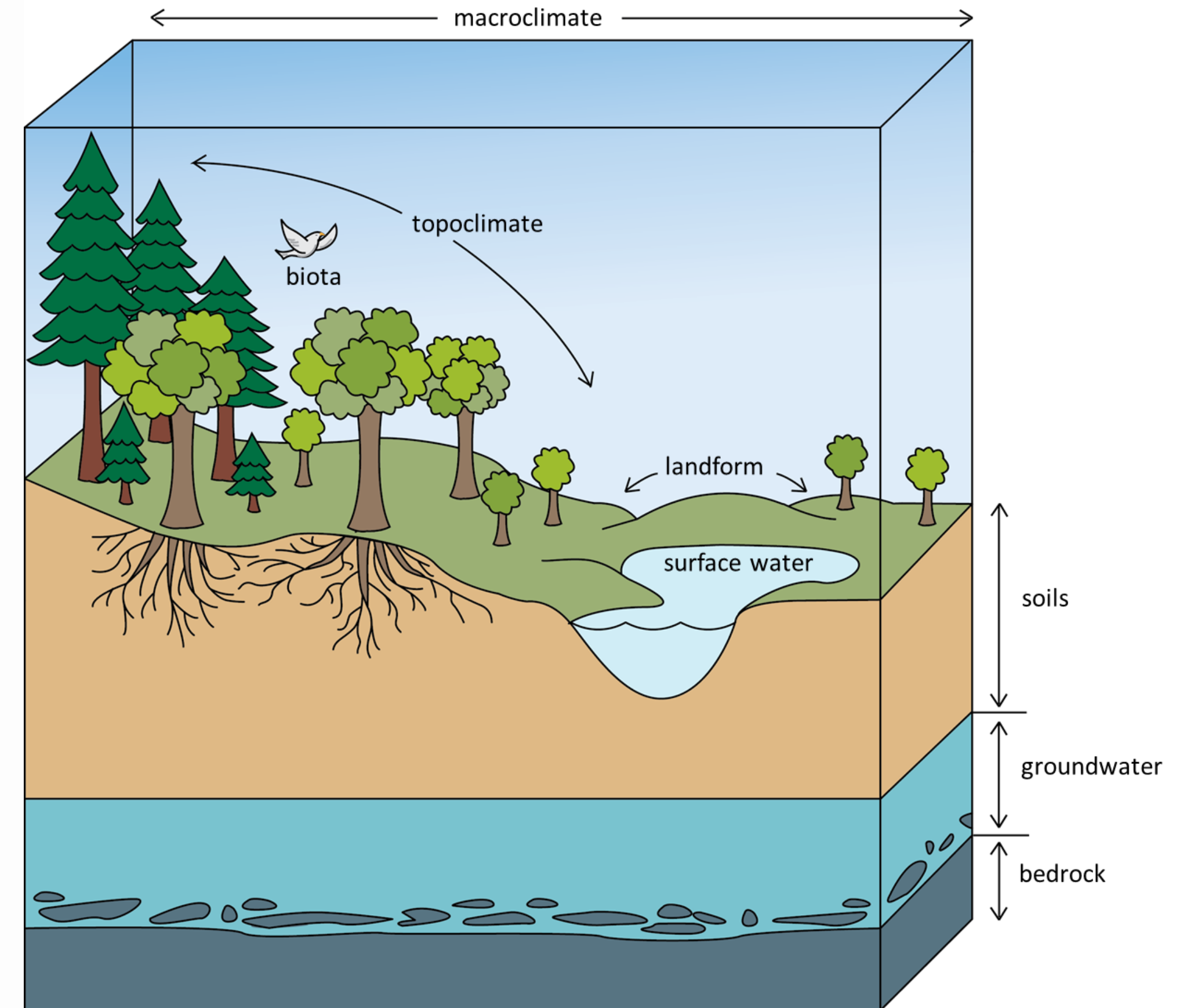
Ecosystem extent account - overview

- 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

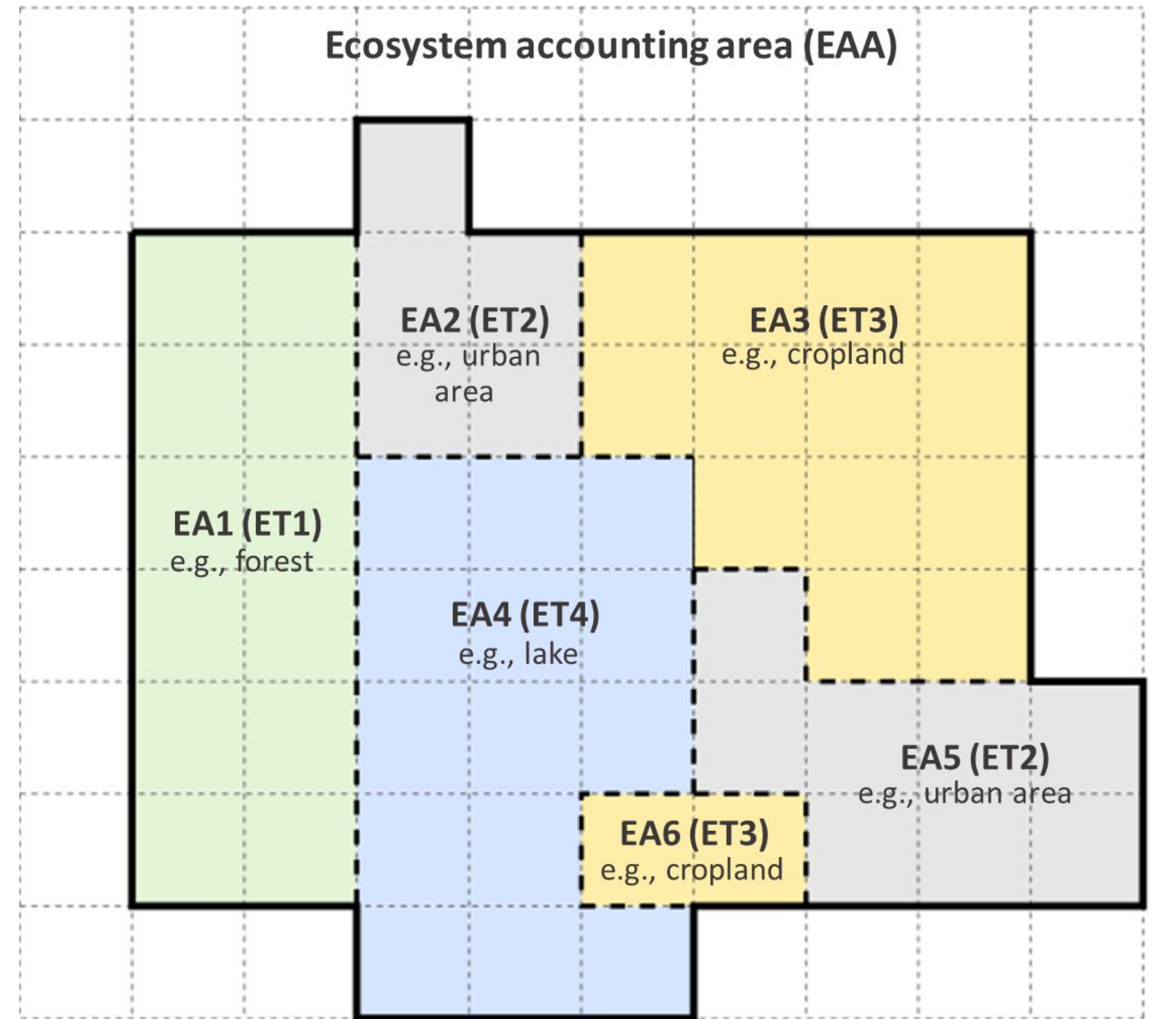
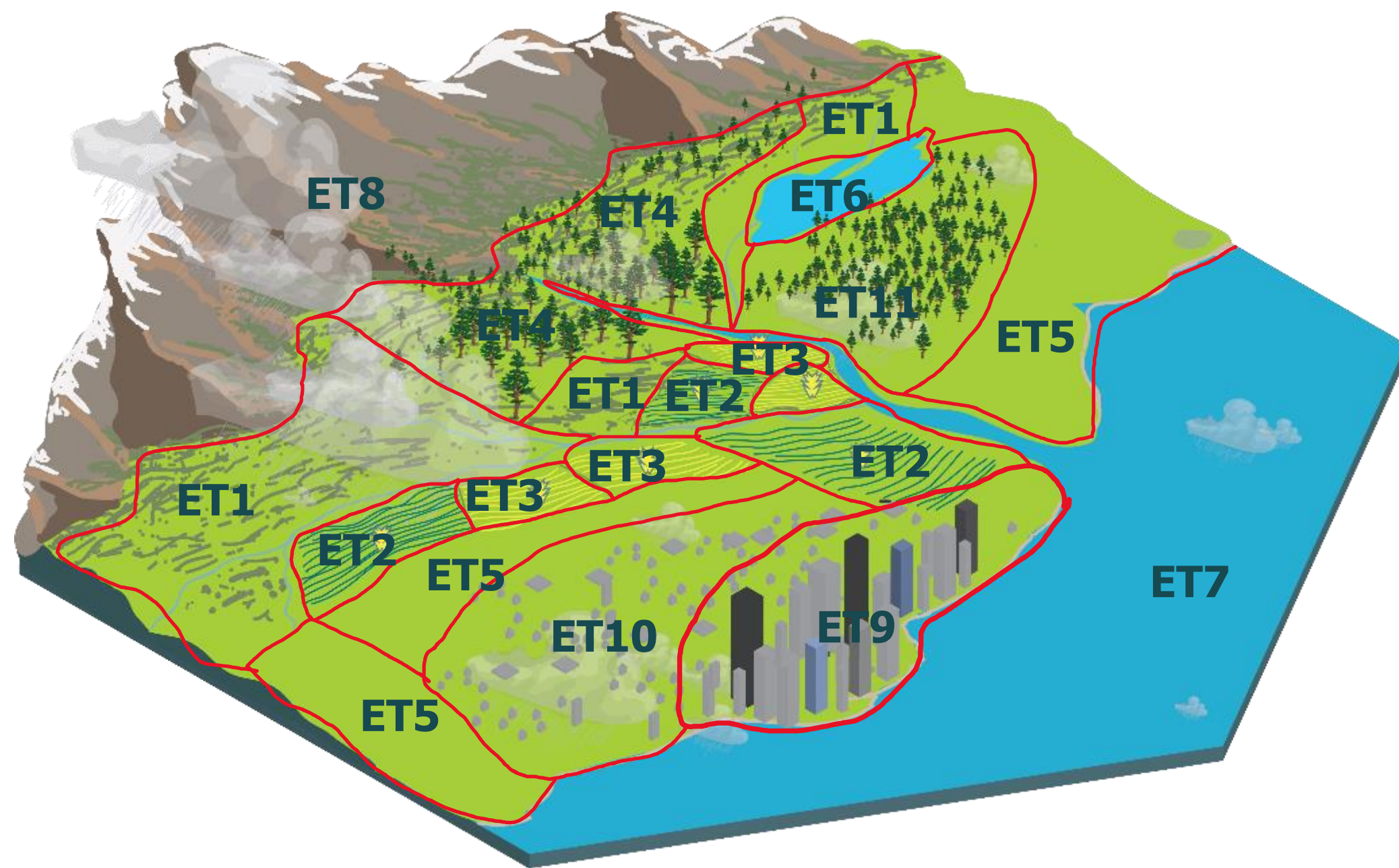
Ecosystem assets

Types of spatial units:

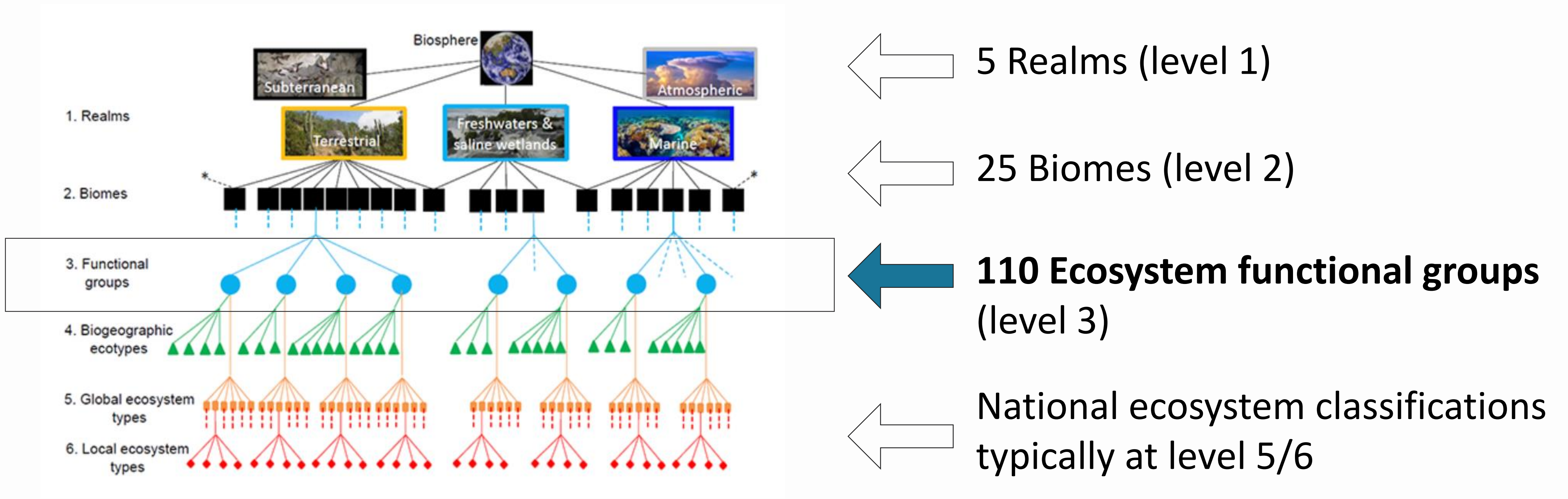
- **Ecosystem assets (EAs)** are contiguous spaces of a specific ecosystem type characterized by a distinct set of biotic and abiotic components and their interactions
- Ecosystem assets are classified by **ecosystem type (ET)**
- **Ecosystem accounting area (EAA)** is the geographical territory for 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



IUCN Global Ecosystem Typology



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

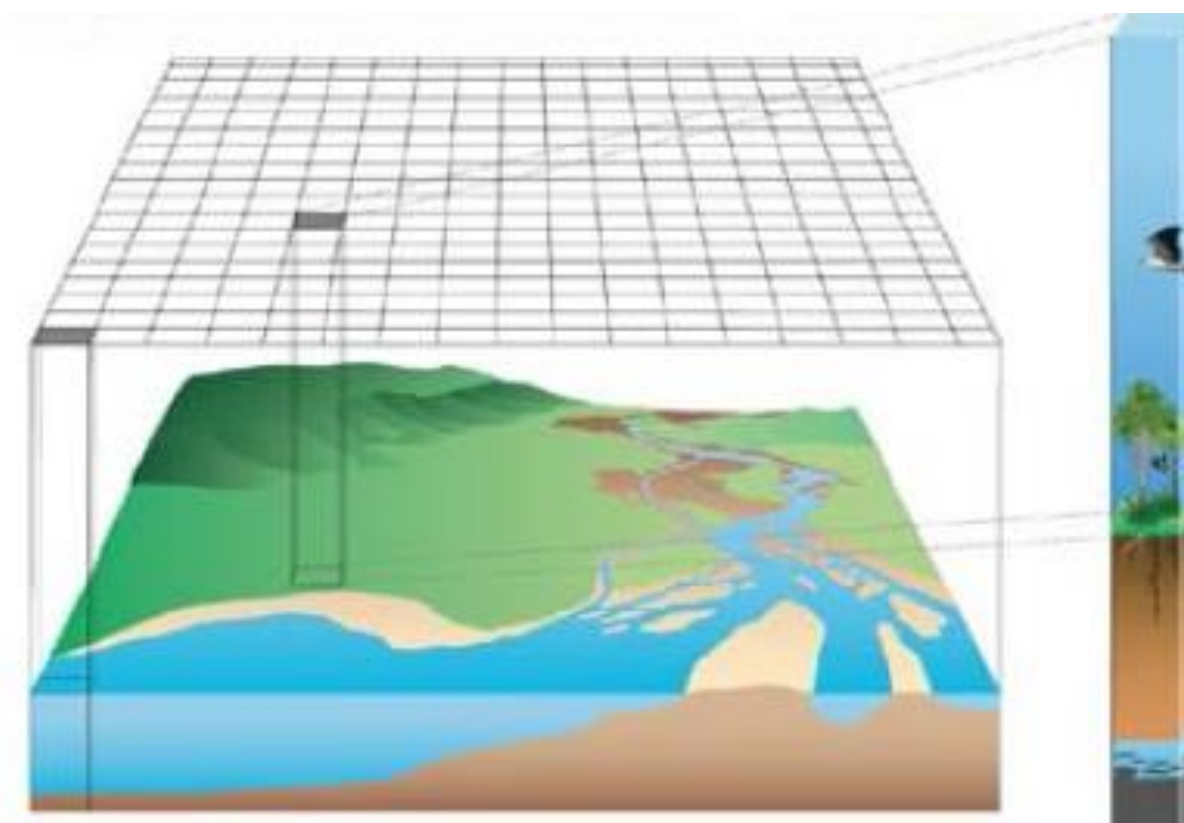
Principles of ecosystem asset delineation

- 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

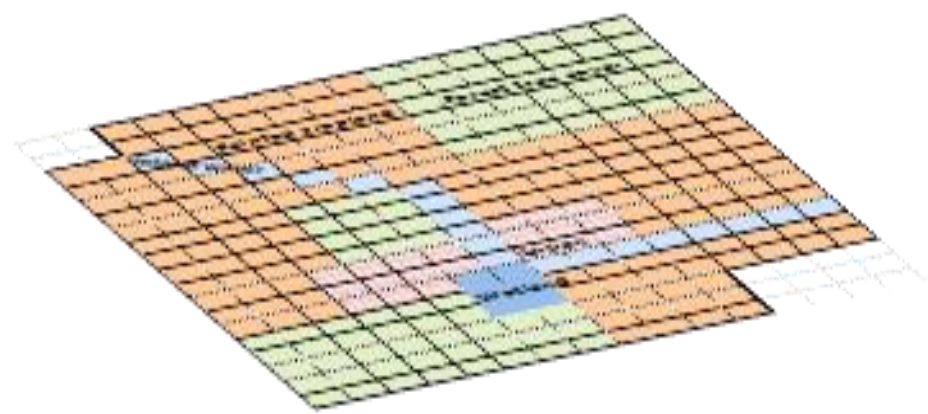
- Use existing national ecosystem classification / maps
 - > Cross walk to IUCN classification
- Use existing global maps & tools
 - > GeoAtlas, ARIES, WES, IUCN, etc.
- Construct your own ecosystem classification / maps
 - > Based on combining different maps, such as land cover, elevation, rainfall,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

Extent account

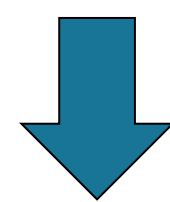


- Vegetation
- Hydrology
- Pedology
- Elevation
- Bio-climate
- Etc.

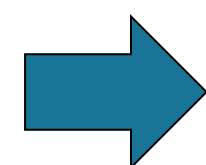
Maps



Ecosystem type



Spatial units
Classifications



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 heath forests	Boreal and temperate 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 salt marshes 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	TOTAL	
Opening extent																				
Additions to extent																				
Managed expansion																				
Unmanaged expansion																				
Reduction in extent																				
Managed reductions																				
Unmanaged reductions																				
Net change in extent																				
Closing extent																				

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 conifer forests	Deciduous forests	...	Temperate forests	Derivatives	...	Permanents	...	Intermittent and open lakes	Seagrass meadows	...	Coastal salt marshes and reed beds	TOTAL	
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		
Additions to extent																				
Managed expansion																				
Unmanaged expansion																				
Reduction in extent																				
Managed reductions																				
Unmanaged reductions																				
Net change in extent																				

Ecosystem classification

Opening extent



Additions to extent



Reductions in extent

Closing extent

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

Ecosystem extent account for the Netherlands

	Extent (km ²)	Increase (km ²)	Decrease (km ²)	Net change (km ²)	Extent (km ²)	Increase (km ²)	Decrease (km ²)	Net change (km ²)	Extent (km ²)
	2013	2013- 2015	2013- 2015	2013-2015	2015	2015- 2018	2015- 2018	2015-2018	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 South Africa

Natural or semi-natural biomes

Intensively modified biomes

Biomes	Albany Thicket	Desert	Forest	Fynbos	Grassland	IOCB	Nama-Karoo	Savanna	Succulent Karoo	Azonal vegetation	Cultivated*	Built-up*	Water-bodies**	TOTAL
Historical extent	3 531 231	626 207	462 518	8 165 366	33 090 325	1 171 284	24 936 548	39 418 522	7 821 579	2 742 873	-	-	-	121 966 453
Additions to extent	0	0	0	0	0	0	0	0	0	0	16 156 026	3 003 883	2 096 528	21 256 437
Reductions in extent	230 091	8 237	70 673	2 253 375	11 330 606	619 656	420 995	5 396 119	251 373	675 312	-	-	-	21 256 437
Net change in extent	(230 091)	(8 237)	(70 673)	(2 253 375)	(11 330 606)	(619 656)	(420 995)	(5 396 119)	(251 373)	(675 312)	-	-	-	
<i>Net change as % of historical</i>	-6,5%	-1,3%	-15,3%	-27,6%	-34,2%	-52,9%	-1,7%	-13,7%	-3,2%	-24,6%	-	-	-	
Closing extent 1990	3 301 140	617 970	391 845	5 911 991	21 759 719	551 628	24 515 553	34 022 403	7 570 206	2 067 561	16 156 026	3 003 883	2 096 528	121 966 453
Opening extent 1990	3 301 140	617 970	391 845	5 911 991	21 759 719	551 628	24 515 553	34 022 403	7 570 206	2 067 561	16 156 026	3 003 883	2 096 528	121 966 453
Additions to extent	44 432	1 142	24 900	241 184	1 444 446	75 114	146 910	1 160 055	38 422	189 954	1 991 959	597 238	288 754	6 244 510
Reductions in extent	36 008	1 260	7 689	196 035	1 180 183	63 783	78 038	885 303	33 631	58 021	2 339 226	400 503	964 606	6 244 286
Net change in extent	8 424	(118)	17 211	45 149	264 263	11 331	68 872	274 752	4 791	131 933	(347 267)	196 735	(675 852)	
<i>Net change as % of opening</i>	0,3%	0,0%	4,4%	0,8%	1,2%	2,1%	0,3%	0,8%	0,1%	6,4%	-2,1%	6,5%	-32,2%	
Net change in relation to historical extent	(221 667)	(8 355)	(53 462)	(2 208 226)	(11 066 343)	(608 325)	(352 123)	(5 121 367)	(246 582)	(543 379)	-	-	-	
<i>Net change as % of historical</i>	-6,3%	-1,3%	-11,6%	-27,0%	-33,4%	-51,9%	-1,4%	-13,0%	-3,2%	-19,8%	-	-	-	
Closing extent 2014	3 309 564	617 852	409 056	5 957 140	22 023 982	562 959	24 584 425	34 297 155	7 574 997	2 199 270	15 808 759	3 200 618	1 420 676	121 966 453

* Cultivated areas, built-up areas and waterbodies are treated as biomes for the purpose of the ecosystem extent account table. There is no reliable spatial information on the historical extent of waterbodies, subsistence cultivation or habitation.

** The large net decrease in the extent of waterbodies reflects primarily that 1990 was a much wetter year than 2014. Waterbodies include both natural and artificial water bodies (such as dams).

THANK YOU

seea@un.org // <https://seea.un.org/>

