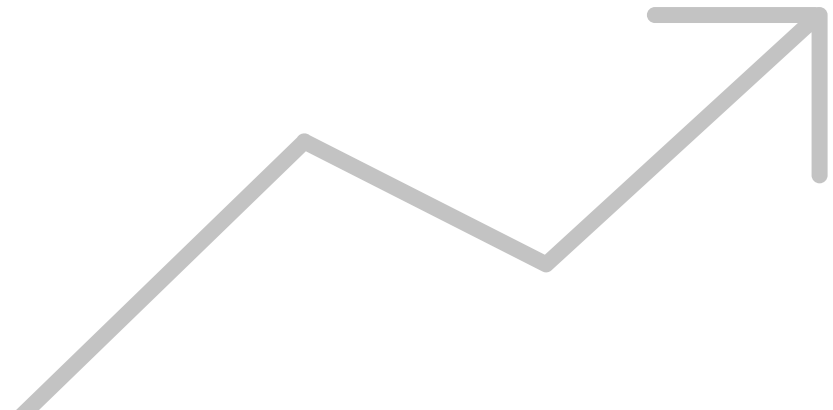


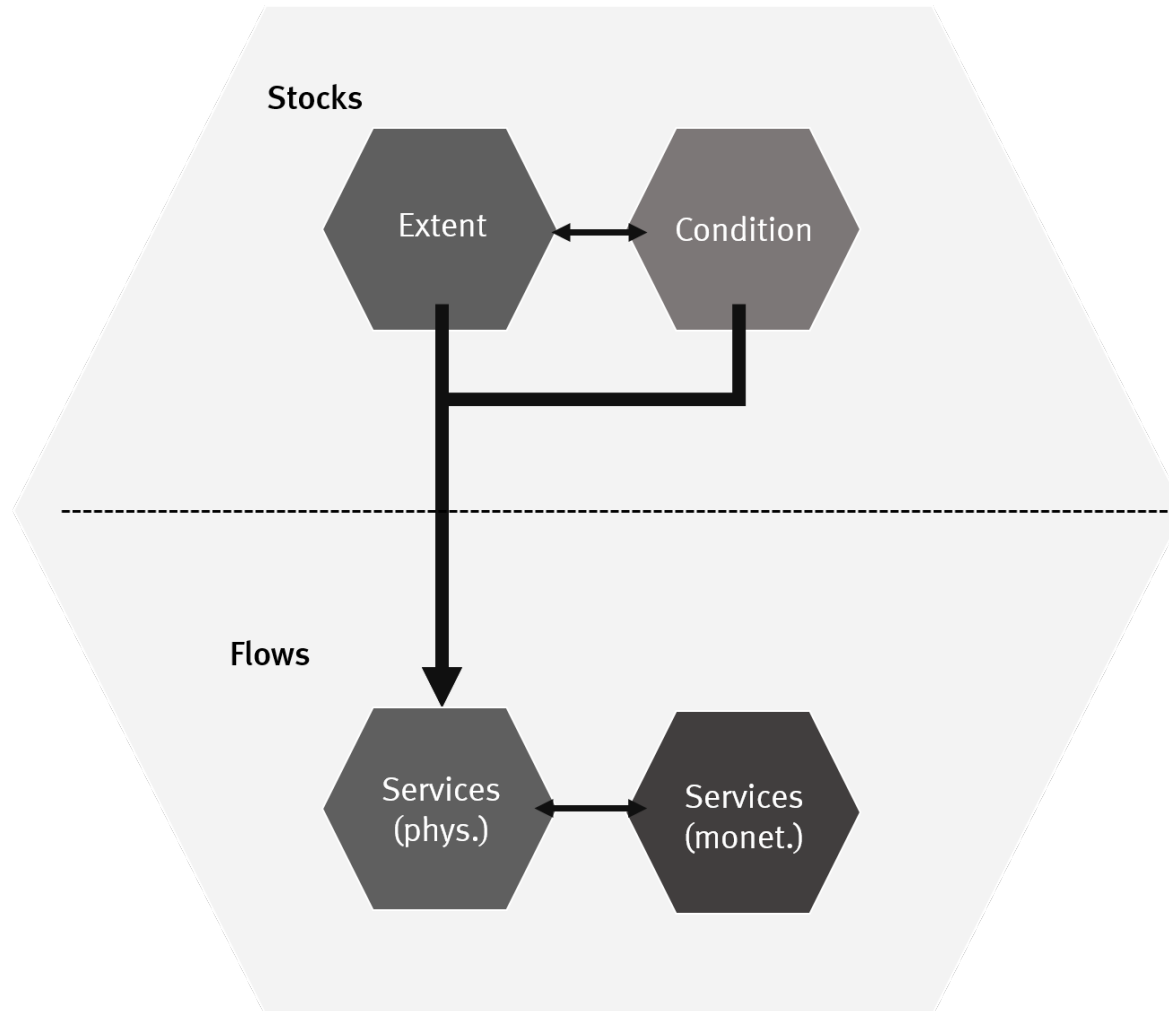
Ecosystem Accounting

Extent Account: Germany

Simon Schürz, Federal Statistical Office Germany



Extent Accounting



Goals of Extent Accounting

- Create a common conceptual and geographical definition of ecosystems
 - Nationally and internationally compatible
 - Simple but sufficiently detailed

DESTATIS
Statistisches Bundesamt



Bundesamt
für Kartographie
und Geodäsie

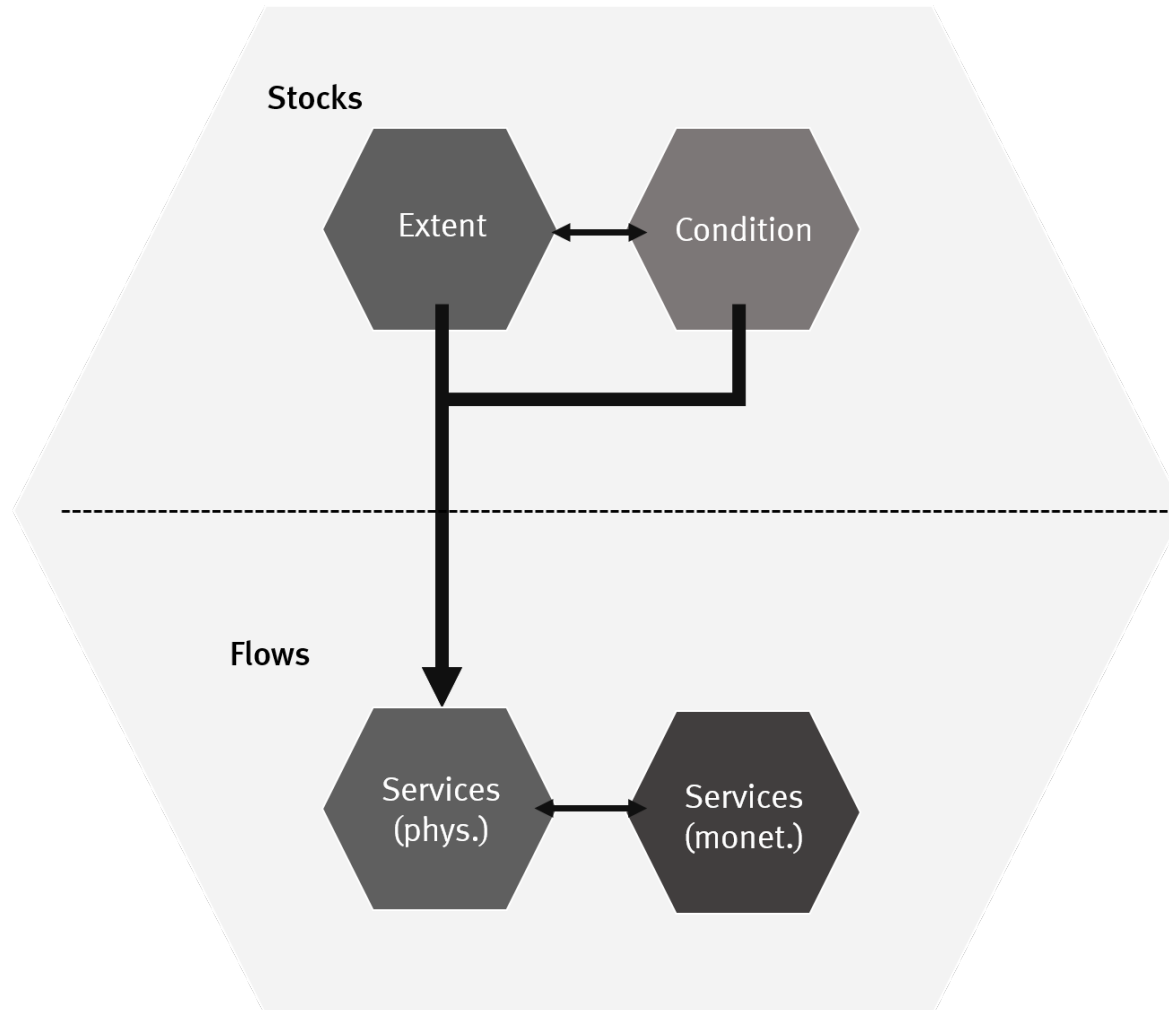


Leibniz-Institut
für ökologische
Raumentwicklung



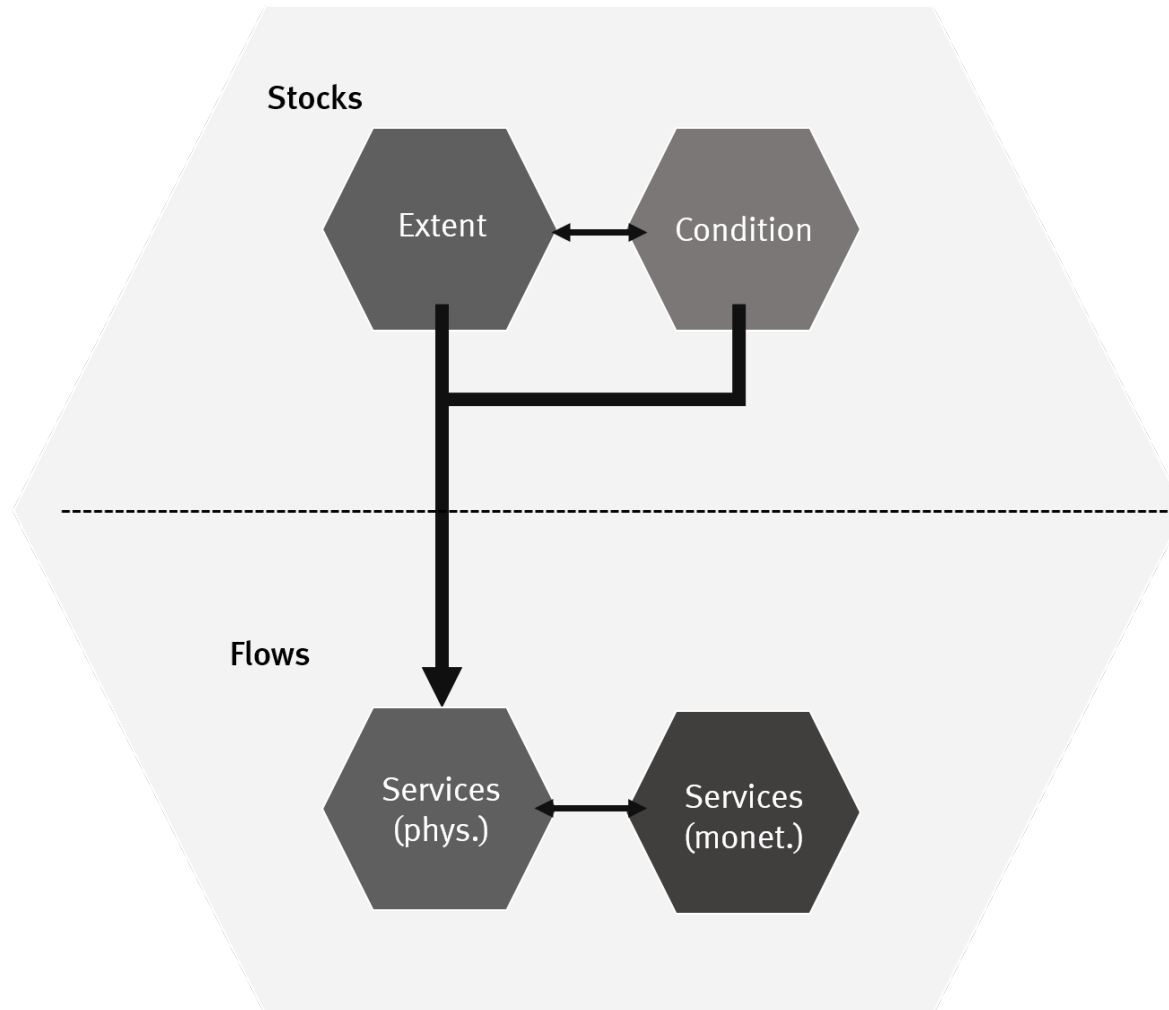
iDiv

**Umwelt
Bundesamt**



Goals of Extent Accounting

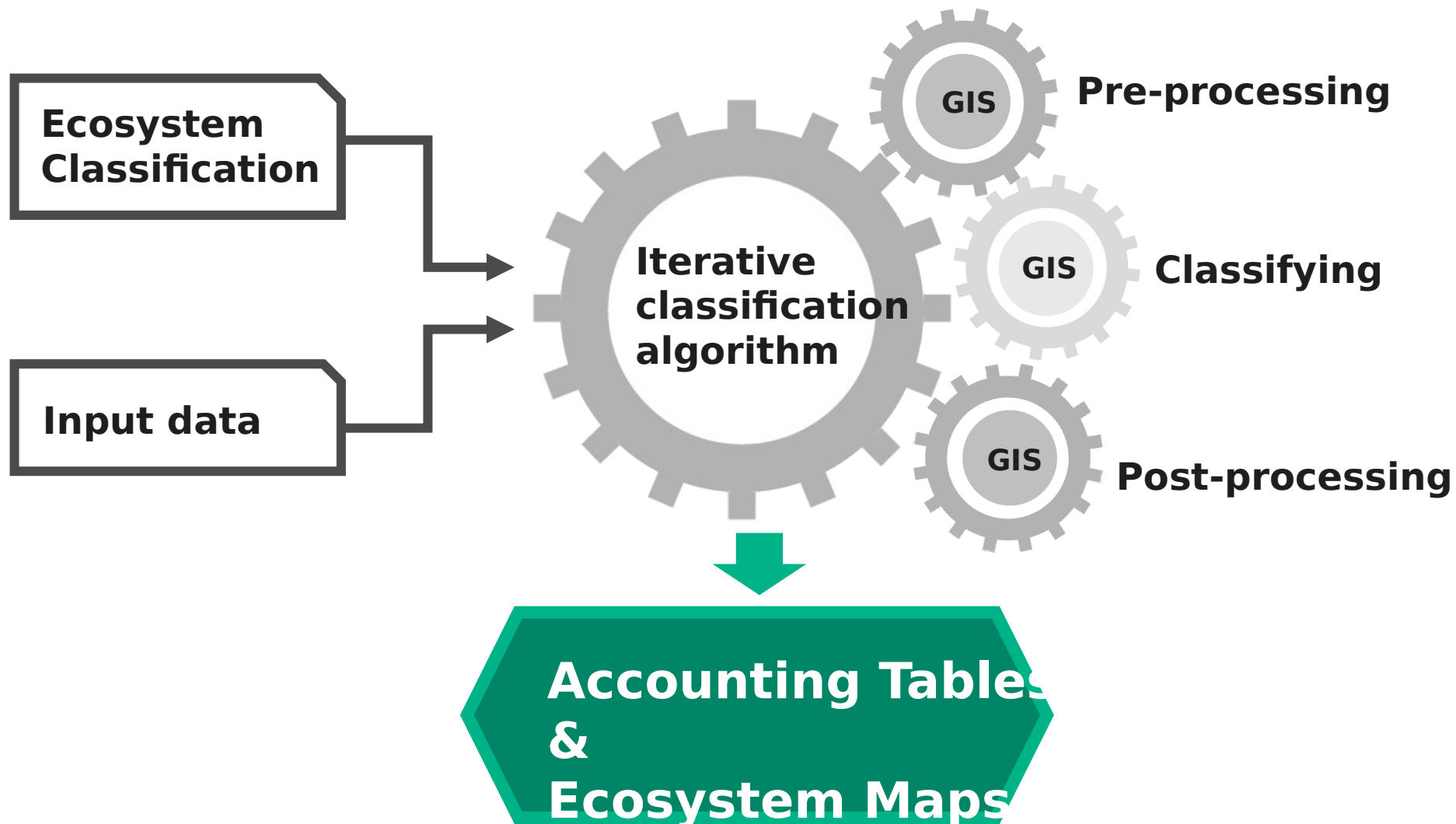
- Create a common conceptual and geographical definition of ecosystems
 - Nationally and internationally compatible
 - Simple but sufficiently detailed
- Monitoring of ecosystem areas and their distribution over time
 - Automated accounting with high-resolution spatial data
 - Consistent data and methods



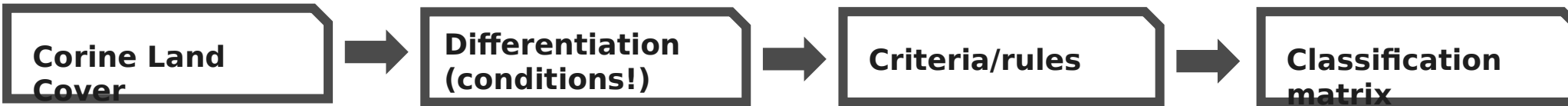
Goals of Extent Accounting

- Create a common conceptual and geographical definition of ecosystems
 - Nationally and internationally compatible
 - Simple but sufficiently detailed
- Monitoring of ecosystem areas and their distribution over time
 - Automated accounting with high-resolution spatial data
 - Consistent data and methods
- Basis for condition and service accounts
 - Unit of analysis for follow-up accounts
 - Influences condition and service measurements

Extent Accounting



Ecosystem Classification



A01 Settlement areas and transport infrastructure																
A01.1 Settlement areas with high building density			A01.2 Settlement areas with low building density			A01.3 Transport infrastructure				A01.4 Mining area, dumpsites and construction sites			A01.5 Leisure and urban green areas			
A01.11 Residential area with high building density	A01.12 Industrial areas with high building density	A01.13 Commercial areas and public facilities with high building density	A01.21 Residential area with low building density	A01.22 Industrial areas with low building density	A01.23 Commercial areas and public facilities with low building density	A01.31 Roads	A01.32 Railroads	A01.33 Ports	A01.34 Airports	A01.41 Mining areas	A01.42 Dumpsites	A01.43 Construction sites	A01.51 Green urban areas	A01.52 Sport- and leisure areas	A01.59 Other green urban areas	
A02 Agricultural land																
A02.1 Arable land		A02.2 Permanent cropland						A02.3 Pastures		A02.4 Hedgerows						
A02.11 Non-irrigated arable land	A02.19 Other arable land	A02.21 Vineyards	A02.22 Fruit tree and berry plantations		A02.23 Orchard meadows	A02.24 Tree nurseries		A02.29 Other permanent cropland		A02.30 Pastures		A02.40 Hedgerows				
A03 Forests and woodland																
A03.1 Broadleaf forests			A03.2 Coniferous forests				A03.3 Mixed forests			A03.4 Transitional wood- and shrubland						
A03.11 Montane and subalpine broadleaf forests	A03.12 Broadleaf bog forests	A03.13 Riparian forests	A03.19 Other broadleaf forests	A03.21 Montane and subalpine coniferous forests	A03.22 Coniferous bog forests	A03.29 Other coniferous forests	A03.31 Montane and subalpine mixed forests	A03.32 Mixed bog forests	A03.39 Other mixed forests		A03.41 Reforestation	A03.42 Forest glades and forest regeneration	A03.49 Other transitional wood- and shrubland			
A04 Semi-natural areas and wetlands																
A04.1 Natural or extensively used grassland			A04.2 Wetlands						A04.3 Sparsely or non-vegetated areas							
A04.11 Heathland	A04.12 Alpine meadows	A04.19 Other natural or extensively used grassland	A04.21 Marshes	A04.22 Peat bogs with active cutting	A04.23 Natural or renaturalized peatbogs	A04.24 Natural or renaturalized fens	A04.25 Salt marshes	A04.29 Other wetlands	A04.31 Sand or pebble beaches inhomogeneous coast, Dunes	A04.32 Coastal dunes	A04.33 Inland sand-, soil or rock surfaces	A04.34 Montane erosion areas	A04.35 Natural bare rock	A04.36 Glaciers and perpetual snow	A04.37 Montane and subalpine heath or shrubland	A04.39 Other sparsely or non-vegetated areas
B01 Inland waters																
B01.1 Watercourses						B01.2 Standing bodies of water										
B01.11 Large natural watercourses		B01.12 Large modified watercourses		B01.13 Large artificial watercourses		B01.19 Other, small watercourses		B01.21 Large natural standing bodies of water		B01.22 Large modified standing bodies of water		B01.23 Large artificial standing bodies of water		B01.29 Other small standing bodies of water		
B02 Marine waters																
B02.3 Tidal flats			B02.1 Coastal sea water					B02.2 Open sea								
B02.11 Tidal flats with macrophytes		B02.12 Tidal flats with mussel beds	B02.19 Other tidal flats		B02.21 Coastal sea with macrophytes	B02.22 Coastal reefs	B02.23 Coastal sandbanks	B02.29 Other coastal seabed		B02.31 Open sea with macrophytes		B02.32 Open sea reefs	B02.33 Open sea sandbanks		B02.39 Other seabed at open sea	

- Mappable,
- Mutually exclusive
- Complete
- Linkable
- (Baselines) and cover, land use, ecological and structural criteria

Input data

Land cover mode

- Land cover
- Land use
- Vegetation coverage
- Soil sealing

Description	Source
Land cover and use (incl. soil sealing, vegetation)	Land Cover Model Germany (LBM-DE, Federal Agency for Cartography and Geodesy)
Highlands/Alpine Zones	Landscapes Germany (Federal Agency for Nature Conservation)
Elevation in m	Digital Terrain Model Germany (Federal Agency for Cartography and Geodesy)
Riparian zone	Copernicus Riparian Zones High Resolution Layer
Bog/peat	Digital Landscape Model Germany (Federal Agency for Cartography and Geodesy)
Bog/peat soil types	Soil Map Germany 1:200.000 (Federal Institute for Geosciences and Natural Resources)
Reefs	EU Habitat Mapping (Federal Agency for Nature Conservation)
Sandbanks	EU Habitat Mapping (Federal Agency for Nature Conservation)
Seagrass and green algae	EU Habitat Mapping (Regional Agencies)
Mussel beds on tidal flats	EU Habitat Mapping (Regional Agencies)
Modified and artificial water bodies	EU Water Framework Directive (Federal Institute of Hydrology)
Coastal water bodies	EU Water Framework Directive (Federal Institute of Hydrology)
EEZ and open sea	Federal Maritime and Hydrographic Agency + EU Water Framework Directive (Federal Institute of Hydrology)
Rivers	Digital Landscape Model Germany (Federal Agency for Cartography and Geodesy) + Water Framework Directive (Federal Institute of Hydrology)
Hedgerows	Digital Landscape Model Germany (Federal Agency for Cartography and Geodesy) + Copernicus Small Woody Features High Resolution Layer
Roads	Digital Landscape Model Germany (Federal Agency for Cartography and Geodesy)
Railroads	Digital Landscape Model Germany (Federal Agency for Cartography and Geodesy)
Dunes	Biotope Mapping (Authorities of the federal states)
Building volumes	2,5D Model LoD1-DE (Federal Agency for Cartography and Geodesy)
Orchards meadows	Biotope Mapping (Authorities of the federal states)

Area classification

Pre-process

Classify

Post-process

- Build new geometries
e.g. roads, railways, hedgerows



Geodata: © GeoBasis-DE / BKG 2021

Area classification

Pre-process

Classify

Post-process

- Build new geometries
e.g. roads, railways, hedgerows
- Intersect geodata
e.g. riparian forests, bog forests



Sources: LBM-DE, Copernicus Riparian Zones High Resolution Layer, Basis-DLM; eigene Berechnung

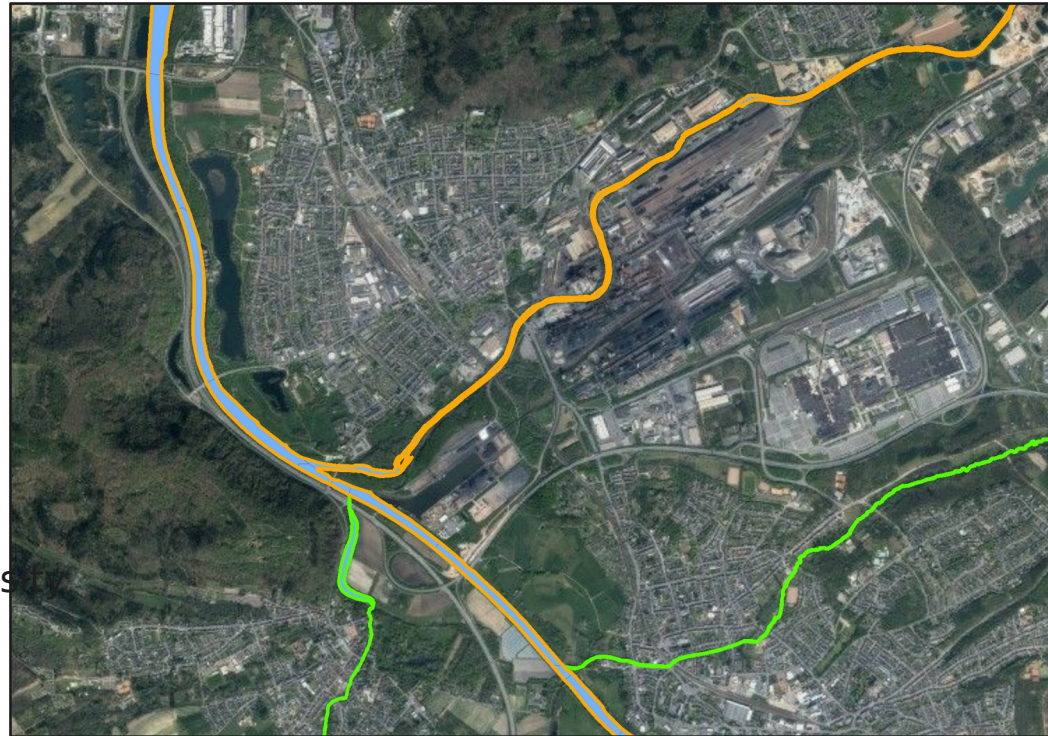
Area classification

Pre-process

Classify

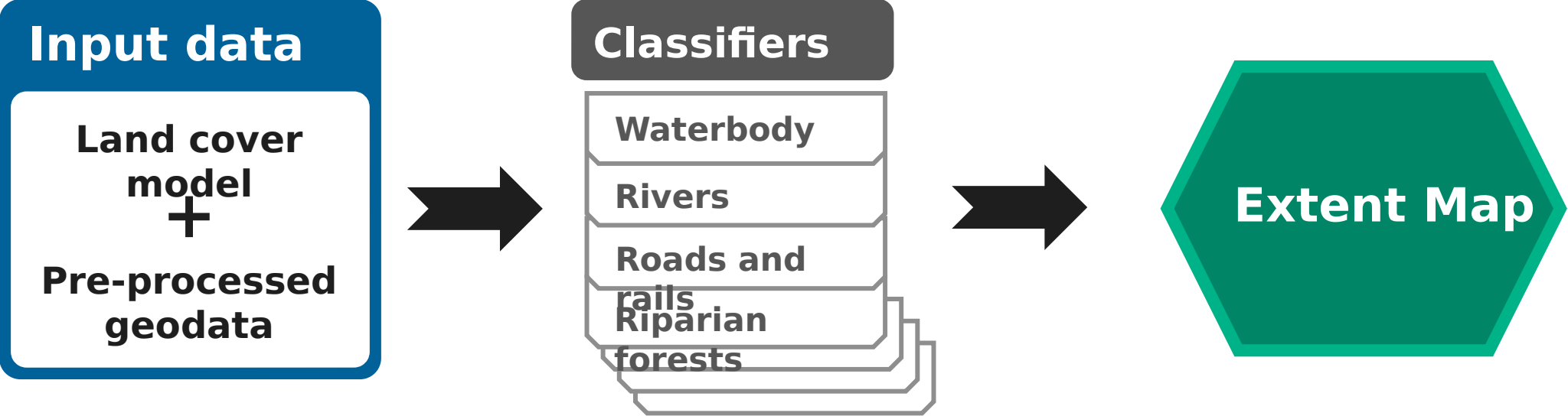
Post-process

- Build new geometries
e.g. roads, railways, hedgerows
- Intersect geodata
e.g. riparian forests, bog forests
- Add data on existing geometries
e.g. waterbody morphology, beaches, building density



Geodata: © GeoBasis-DE / BKG 2021, © WasserBLICK / BfG 2021

Area classification



Area classification

Pre-process

Classify

Post-process

- Repair geometries, quality control
- Aggregation to administrative units
- Generate accounting tables

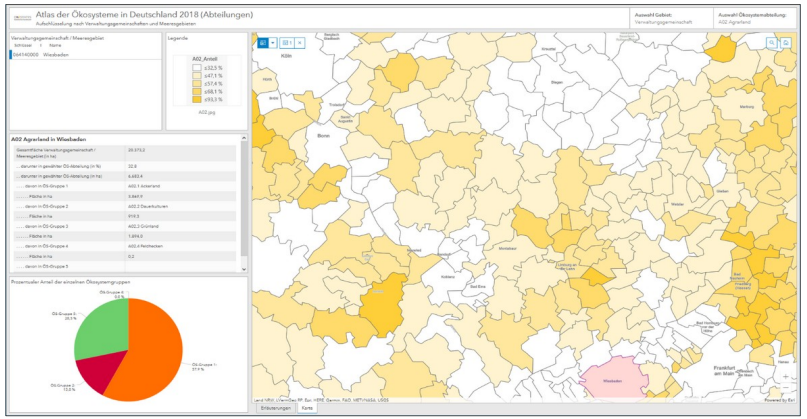


Accounting Tables



Ecosystem Maps

Regionale Gliederung	Ökosystembezeichnung	Ökosystemwert AGL Agrarland	Binnen-Ökosystemklassen												AGL AGL AGL	AGL AGL AGL
			AGL 1.1 Ackerland			AGL 2.1 Grünland			AGL 3.1 Wald			AGL 4.1 Gewässer				
			1	2	3	4	5	6	7	8	9	10	11	12		
Deutschland	Aufwandsland (2018)	18 037 876	12 224 996	12 224 996	389 092	118 793	89 411	140 585	40 343	4 264 442	4 264 442	74 396	74 396	1 330	1 330	
	Nettoertrag	-32 454	-12 145	-12 145	772	130	82	222	-167	-18 877	-18 877	-140	-140	993	993	
	AGL-Index	18 005 515	12 224 793	12 224 793	389 778	119 067	89 593	140 961	39 989	4 247 267	4 247 267	75 776	75 776	1 316	1 316	
Baden-Württemberg	Aufwandsland (2018)	1 459 948	879 211	879 211	149 012	32 795	24 349	156 834	3 025	454 820	454 820	905	905	53	53	
	Nettoertrag	-2 093	-1 026	-1 026	295	9	42	-189	15	-836	-836	24	24	1 402	1 402	
	AGL-Index	1 457 899	875 703	875 703	149 012	32 862	24 341	156 734	2 995	452 362	452 362	893	893	53	53	
Bayern	Aufwandsland (2018)	3 524 508	2 124 500	2 124 500	38 892	4 862	20 762	4 868	3 300	1 372 713	1 372 713	1 402	1 402	549	549	
	Nettoertrag	-8 893	-3 723	-3 723	86	3	12	21	-118	-4 013	-4 013	-270	-270	0	0	
	AGL-Index	3 520 522	2 120 834	2 120 834	38 834	4 839	20 774	4 866	3 210	1 367 913	1 367 913	1 399	1 399	549	549	
Berlin	Aufwandsland (2018)	4 263	1 904	1 904	48	0	0	0	48	2 291	2 291	0	0	0	0	
	Nettoertrag	59	4	4	0	0	0	0	3	41	41	0	0	0	0	
	AGL-Index	4 194	1 912	1 912	44	0	0	0	44	2 218	2 218	0	0	0	0	
Brandenburg	Aufwandsland (2018)	1 447 486	1 009 349	1 009 349	4 203	20	3 429	518	2 015	430 904	430 904	1 030	1 030	38	38	
	Nettoertrag	-2 442	-244	-244	40	0	14	0	48	-1 014	-1 014	39	39	0	0	
	AGL-Index	1 445 044	1 008 105	1 008 105	4 163	20	3 415	518	2 015	430 856	430 856	1 030	1 030	38	38	

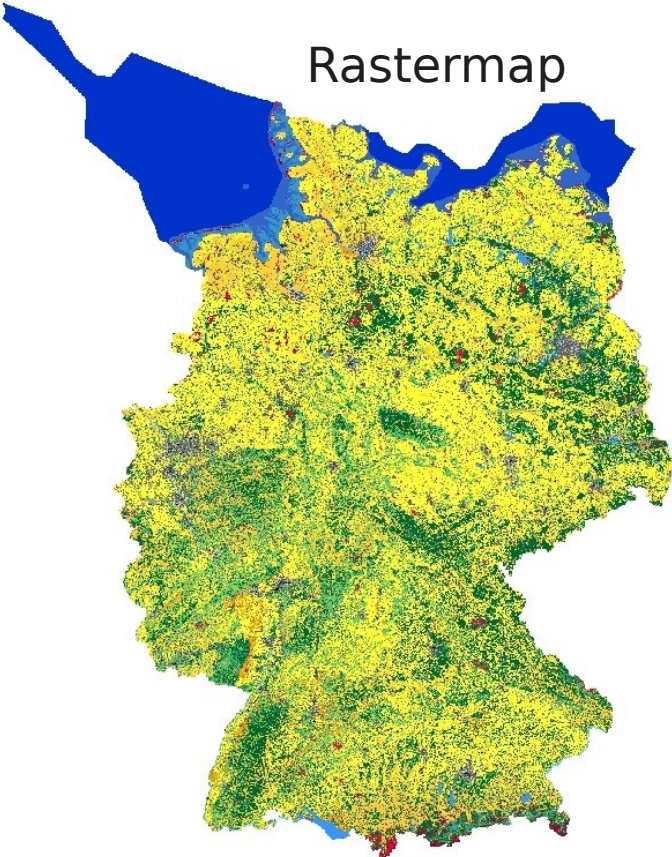


Area classification

Pre-process

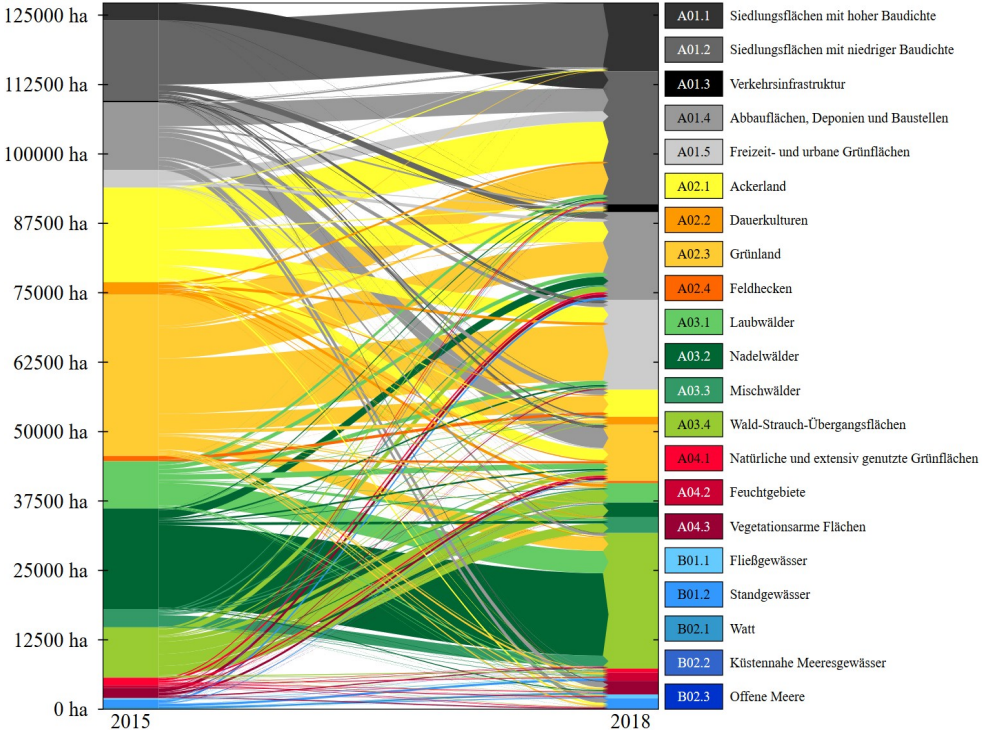
Classify

Post-process

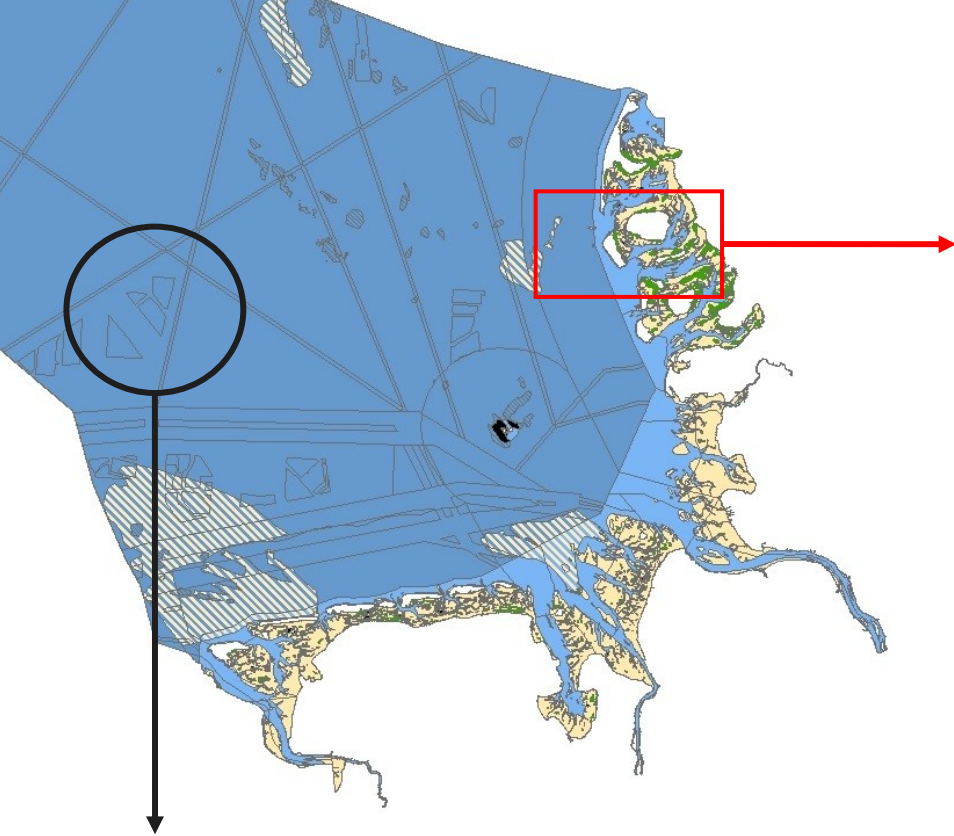


Rastermap

Conversions



Marine Ecosystems



Sea lanes, windparks, EEZ



1 Sandbanks
2 Reefs
3 Tidal flats, makrophytes, mussel beds

Publications

- Ecosystem maps
 - Interactive map at municipality level
 - Rastermap at 100x100m
- Accounting tables
 - National, regional, municipality and marine area level
 - Conversion matrices
- Background information
 - Methodological report
 - Classification



ecosystem
accounting



ecosystem
map

Thank you!

Contact

Simon Schürz
simon.schuerz@destatis.de

www.destatis.de

www.destatis.de/kontakt

