

# **List of Biomes, Ecozones and Ecosystems used in the Ecosystem Services Valuation Database (ESVD 2.0)**

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PLEASE NOTE THIS IS STILL "WORK IN PROGRESS"

## **Docs used for this update:**

-FAO Global Ecological Zoning framework 2015 + corresponding IPCC terminology

-IUCN Global Ecosystem Typology 2020 (this is now the main guiding document, see column IUCN 2020)

+feedback ESVD team and some reviewers on an earlier version + FEEDBACK FAO-ABC-Map Team dd 3 August

+Corine Codes for Biomes 13-15

The original list (see column "Nr in current ESVD") was based on a mix of classifications, mainly TEEB (2010), MA (2005), Costanza et al (1997) which in turn was based on older classifications from US Geol. Survey, IUCN, WWF, UNEP & FAO and the UK-NEA.

**Note 1:** The `logic` used in the below table is that the Ecosystem (= Level 3 in the below table) should be the main reporting unit for Ecosystem Services and their values. This corresponds, largely, with level 3 in the IUCN report (2020) which is called "Ecosystem Functional Group" (EFG). For Level 2 we used the concept of Ecozone used by FAO (2015), to group Ecosystems within a given Biome. The highest level in our classification is the Biome which largely follows level 2 in IUCN which is also called Biome but has a few different terms and more detail (25 biomes). We also distinguish a 4<sup>th</sup> level (provisionally called Habitat or maybe better Ecotope: "the smallest ecologically distinct landscape feature"). Level 4 is not worked out in detail yet. Some examples are given in the last column.

**Note 2:** Ecosystems within Biomes 1-12 are predominantly natural systems, within Biomes 13, 14 & 15 human dominated systems. It should be noted that even the "predominantly natural ecosystems" are often quite heavily affected by human actions. For data-storage it is therefore essential to indicate the condition of the studied ecosystem, ranging from pristine (which will rarely be the case) to heavily disturbed (or intensively managed).

<b>New LIST IN ESVD</b>		Nr in <b>OLD</b> ESVD	FAO 2015	IUCN 2020	<b>Definition/Description</b> (largely complete now but will probably be adjusted and refined further during applications in the coming year(s))	<b>Remarks and examples</b> (including some examples of Level 4 = habitat or ecotope) <b>To be elaborated further</b> Also checking Corine and EUNIS
<b>1</b>	<b>Marine</b>	1.0			Includes shelf sea, pelagic (eco)zone and deep sea floor ecozone	<a href="#">Corine 5.2.3</a>
<b>1.1</b>	<b>Shelf sea and coral reefs</b>	1.1		<b>M1</b>	IUCN: The Marine shelf biome is distributed globally between the shoreline and deep sea-floor biomes and is dominated by benthic productivity. The marine shelf is shaped by kinetic wave energy and, in polar regions, also ice scour.	(old ESVD: shelf sea/neritic zone)  Deep sea floor starts at 250 m but upwelling systems can be as deep as 500m. Primary prod. upto 200 m. (=start of epipelagic zone 1.2.1)
1.1.1	Seagrass meadows	3.9		M1.1	IUCN: Seagrasses are the only subtidal marine flowering plants and underpin the high productivity of these systems. Typically found in the subtidal zone on soft sedimentary substrates but also occasionally on rocky substrates	
1.1.2	Kelp Forests	3.10		M1.2	IUCN: Kelps are benthic brown macroalgae (Order Laminariales) up to 30 m in length forming canopies that shape the structure and function of these highly productive, diverse ecosystems.	
1.1.3	Coral reefs	2.0		M1.3	IUCN: Coral reefs are limited to warm, shallow (rarely >60 m deep), clear, relatively nutrient poor, open coastal waters, where salinity is 3.0–3.8‰ and sea temperatures vary (17–34°C).	<b>Habitats</b> , eg old ESVD had 2.1-2.5: -barrier reefs -atolls -fringing reefs -patch reefs -other
1.1.4	Shellfish beds and reefs	3.8		M1.4	IUCN: biogenic structures formed primarily by high densities of oysters and/or mussels.... Structural profiles may be high (reefs) or low (beds)	
1.1.5	Benthic systems	x		M1.5	IUCN: benthic systems characterised by high densities of megabenthic, sessile heterotrophic suspension including sponges, aphotic corals, hydroids, ascidians, hydrocorals, bryozoans, polychaetes and bivalves	

1.1.6	Subtidal rocky reefs	x		M1.6	IUCN: Minerogenic rocky substrates with variable topography and cobbles. A strong depth gradient and substrate structures (e.g. overhangs and caves) limit light availability, as does turbidity.		
1.1.7	Subtidal sand beds	x		M1.7	IUCN: Medium to coarse-grained, unvegetated and soft minerogenic sediments. Low in organic matter, relatively homogeneous, structurally simple and mobile.		
1.1.8	Subtidal mud plains	x		M1.8	IUCN: Muddy, depositional systems characterised by low kinetic energy (weak turbulence and currents), which promotes the accumulation of fine-textured, stable sediments		
1.1.9	Upwelling zones	x		M1.9	IUCN: Upwelling is a wind-driven process that draws cold, nutrient-rich water towards the surface, displacing warmer, nutrient-depleted waters. The main upwelling systems around the world extend to depths of up to 500 m		
<b>1.2</b>	<b>Pelagic</b>	1.3		<b>M2</b>	IUCN: The <u>Pelagic ocean waters biome</u> is the largest on earth, comprising the open-ocean water column across all latitudes		
1.2.1	Epipelagic zone	1.3		M2.1	IUCN: The epipelagic or euphotic zone of the open ocean is the uppermost layer that is penetrated by enough light to support photosynthesis. Up to 200 m deep		
1.2.2	Mesopelagic zone	1.3		M2.2	IUCN: The mesopelagic, dysphotic, or 'twilight' zone, begins below the epipelagic layer and receives enough light to discern diurnal cycles but too little for photosynthesis. Depth of ~200 m down to 1,000 m.		
1.2.3	Bathypelagic zone	1.3		M2.3	IUCN: These are deep, open-ocean ecosystems in the water column, generally between 1,000–3,000 m in depth. No light penetrates from the ocean surface to bathypelagic waters		
1.2.4	Abysopelagic zone	1.3		M2.4	IUCN: deep, open-ocean ecosystems span depths from 3,000 to 6,000 m.		

1.2.5	Sea Ice	x		M2.5	IUCN: The seasonally frozen surface of polar oceans (1–2 m thick in the Antarctic and 2–3 m thick in the Arctic) may be connected to land or permanent ice shelves and is one of the most dynamic ecosystems on earth.		
<b>1.3</b>	<b>Deep sea floor</b>	1.2		<b>M3</b>	IUCN: The Deep-sea floor covers the entire oceanic benthos below ~250 m deep, where there is not enough light to support primary productivity through photosynthesis. It extends from the upper bathyal seafloor to the deepest parts of the ocean, at just under 11 km in the Mariana Trench old ESVD:Deep sea/ abyssal zone		
1.3.1	Continental and island slopes	1.2		M3.1	IUCN: These aphotic heterotrophic ecosystems fringe the margins of continental plates and islands, extending from the shelf break (~250 m deep) to the abyssal basins (4,000 m)		
1.3.2	Submarine canyons	1.2		M3.2	IUCN: Submarine canyons cover 11.2% of continental slopes, with 9,000 large canyons recorded globally. Most of their extent is distributed below 200 m, with a mean depth of 2,000 m.		
1.3.3	Abyssal plains	1.2		M3.3	IUCN: Seafloor of all oceans between 3,000 and 6,000 m deep, accounting for 76% of the total seafloor area, segmented by mid-ocean ridges, island arcs and trenches.		
1.3.4	Seamounts, ridges and plateaus	1.2		M3.4	IUCN: Seamounts, rising more than 1,000 m above the sediment-covered seabed, and smaller peaks, knobs and hills are topographically isolated features, mostly of volcanic origin. Mid-ocean ridges are semi-continuous mountain chains that mark the spreading margins of adjacent tectonic plates		
1.3.5	Deepwater beds	1.2		M3.5	IUCN: Benthic, sessile suspension-feeders, such as aphotic corals, sponges and bivalves, form structurally complex, three-dimensional structures or 'animal		

					forests' in the deep oceans below 250 m deep. [see also M1.5]		
1.3.6	Trenches and troughs	1.2		M3.6	IUCN: The hadal benthic zone extends from 6,000 to 11,000 m deep and includes 27 disjoint deep -ocean trenches, 13 troughs and 7 faults		
1.3.7	Chemosynthetic-based ecosystems	x		M3.7	IUCN: Chemosynthetic-based ecosystems (CBEs) include three major types of habitats between bathyal and abyssal depths:	<ul style="list-style-type: none"> <li>- <b>hydrothermal vents</b> on mid-ocean ridges, back-arc basins, and active seamounts;</li> <li>- <b>cold seeps</b> on active and passive continental margins; and</li> <li>- <b>large organic falls</b> of whales or wood.</li> </ul>	
<b>2</b>	<b>Coastal systems</b>	3.0				<b>(incl coastal wetlands: 2.4)</b>	
<b>2.1</b>	<b>Shorelines</b>	3.1		<b>MT1</b>	IUCN: The Shoreline systems biome comprises naturally formed, Inter-tidal abiogenic habitats situated at the interface between land and sea		
2.1.1	Rocky shorelines	3.1		MT1.1	IUCN: These intertidal benthic systems, composed of sessile and mobile species are found globally at the margins of oceans where waves are eroding rocks.		
2.1.2	Muddy shorelines	x		MT1.2	IUCN: Muddy shorelines occur along low-energy coastlines, in estuaries and embayments where the velocity of water is so low that the finest particles can settle to the bottom		
2.1.3	Sandy shorelines	3.1		MT1.3	IUCN: Sandy shorelines include beaches, sand bars and spits.	<ul style="list-style-type: none"> <li>- beaches</li> <li>- sand bars</li> <li>- spits</li> </ul>	
2.1.4	Boulder and cobble shores	x		MT1.4	IUCN: Cobble beaches occur where rivers or glaciers delivered cobbles to the coast or where they were eroded from nearby coastal cliffs.		
<b>2.2</b>	<b>Coastal dunes and cliffs</b>	x		<b>MT2</b>	IUCN: The Supralittoral coastal biome marks the landward extent of the transition from marine to terrestrial biomes. It is elevated above the direct influence of waves and tides and beyond the direct influence of freshwater seepage or rivers, including <b>coastal dunes and cliffs</b>	Note Dolf: check Shrublands (Biome 8) and grasslands (biome 9) for possible overlap	
2.2.1	Coastal dunes			MT2.1	IUCN: Relatively low productivity	Q Dolf: Subdivision needed?	

					<b>grasslands, shrublands and low forests</b> on exposed coastlines, limited by salt influx, water deficit and recurring disturbances.		
2.2.2	Coastal cliffs				e.g. coastal cliffs		
<b>2.3</b>	<b>Coastal inlets</b>	x		<b>FM1</b>	IUCN: The Transitional waters biome includes coastal inlets that are influenced by inputs of both fresh and marine water from terrestrial catchments and ocean tides, waves and currents. They include deep-water coastal inlets or fjords mostly restricted to high latitudes, as well as estuaries, bays and lagoons.		
2.3.1	Deepwater coastal inlets	x		FM1.1	IUCN: Deepwater coastal inlets (e.g. fjords, sea lochs) are semi-confined aquatic systems with many features of open oceans. Deepwater coastal systems may exceed 300 km in length and 2 km in depth. Almost all have glacial origins and many are fed by active glaciers.	<b>Habitats:</b> -fjords -sea lochs -other?	
2.3.2	Riverine estuaries and bays	3.6		FM1.2	IUCN: These coastal water bodies are mosaic systems characterised by high spatial and temporal variabilities in structure and function. Geomorphology ranges from wave dominated estuaries to drowned river valleys, tiny inlets and enormous bays.	<b>5.2.2</b> (=Corine code) <b>Habitats</b> , e.g.: -estuaries -drowned river valleys, -tiny inlets -enormous bays	
2.3.3	Coastal lakes and lagoons	3.5		FM1.3	IUCN: These are shallow coastal water bodies that are intermittently connected with the ocean. Some lagoons are mostly open, closing only once every few decades. Some open and close frequently, and some are closed most of the time	<b>5.2.1</b> <b>Habitats</b> , e.g -Open lagoons -(mostly) closed lagoons	
<b>2.4</b>	<b>Coastal wetlands and river deltas</b>			<b>MFT1</b>	<b>ESVD: Coastal wetlands</b> IUCN: The Brackish tidal systems biome is associated with prograding depositional shorelines at the interface of terrestrial, freshwater, and marine realms. The relative influences of marine, freshwater, and terrestrial processes vary from strongly fluvial deltas to marine-dominated intertidal		

					forests and terrestrial-dominated coastal saltmarsh.	
2.4.1	Coastal river deltas			MFT1.1	IUCN: Coastal river deltas are prograding depositional systems, shaped by freshwater flows and influenced by wave and tidal flow regimes and substrate composition	Diff. with 2.3.2 = high deposition on sea-side
2.4.2	Mangroves	3.4		MFT1.2	IUCN: Intertidal <u>forests</u> and shrublands. <i>Mangroves are sometimes also placed in Forest biome</i>	<b>Habitats:</b> <i>Split in different types of mangrove systems?</i>
2.4.3	Coastal salt marshes and reedbeds	3.2 & 3.3		MFT1.3	Wiki: <b>Salt marshes</b> are flat muddy areas that often surround estuaries and bays. Internet: <b>Reedbeds</b> are wetlands that form on the margins of estuaries and floodplains, dominated by one plant: the reed	IUCN does not give a very clear def. for salt (or tidal) marsh and does not explain reedbed. Maybe use Level 4 to split this ecosystem in salt marsh and reedbed. See also: <a href="#">4.2.1</a>
<b>3</b>	<b>Inland wetlands</b>	<b>4.0</b>		<b>TF1</b>	<b>ESVD: Inland wetlands</b> IUCN: At the interface of terrestrial and freshwater realms, the Palustrine wetlands biome includes vegetated floodplains, groundwater seeps, and mires with permanent or intermittent surface water.	
3.1	<b>Peatlands</b>				Peatlands are terrestrial wetland ecosystems in which waterlogged conditions prevent plant material from fully decomposing	<i>Added at advice of FAO (3 August)</i>
3.1.1	Tropical flooded forests and peat forests	4.3 & 4.4		TF1.1	IUCN: Closed-canopy forests in tropical swamps and riparian zones; high biomass and LAI, with unseasonal growth and reproductive phenology. The canopy foliage is evergreen,	Riparian Forest, Venezuela Peat swamp for., Malaysia
3.1.2	Subtropical-temperate forested peatlands	4.3 & 4.6		TF1.2	IUCN: hydrophilic forests and thickets; open to closed tree or shrub canopy, 2–40 m tall, dependent on flood regimes or groundwater lenses. Typically dominated by one or very few woody species.	e.g. Murray-Darling Austr.
3.1.3	Peat bogs	4.5		TF1.6	IUCN: patterned peatlands, dominated by a dense cover (high LAI) of hydrophytic mosses, graminoids, and shrubs, sometimes with scattered trees	Found in temperate, boreal, and montane areas e.g. Kemer Bog, Latvia. <a href="#">4.1.2</a>
3.1.4	Fens	4.5		TF1.7	IUCN: Fens are peatland ecosystems	Found in Temperate and Boreal areas

					dominated by hydrophytic grasses, sedges, or forbs. Fens have higher productivity but lower functional diversity than bogs	e.g. Muonio Fen, Finland.	
3.2	<b>Marshes and swamps</b>	4.1& 4.2		TF1.3	IUCN: shallow, permanently inundated fresh-water wetlands. Lack woody vegetation but are dominated by emergent macrophytes growing in extensive, often monospecific groves of rhizomatous grasses, sedges, rushes, or reeds in mosaics with patches of open water.	Everlasting Swamp, Clarence River floodplain, Australia <a href="#">4.1.1</a>	
3.3	<b>Seasonal floodplain marshes</b>	4.8		TF1.4	IUCN: high-productivity floodplain wetlands fed regularly by large inputs of allochthonous resources that drive strong bottom-up regulation, and smaller areas of disconnected oligotrophic wetlands	e.g. Pantanal also Okavanga delta?	
3.4	<b>Episodic arid floodplains</b>	x		TF1.5	IUCN: low-productivity systems during long, dry periods (maybe years), with periodic spikes of very high productivity when first inundated ESVD: Riparian forest / vegetation	e.g. Eyre Creek, Australia	
3.5	<b>Groundwater dependent wetlands</b>	4.7			<b>No IUCN equivalent</b>	Lets keep it for now and decide later if we need it or not	
<b>4</b>	<b>Rivers and lakes Biome</b>	<b>5.0</b>			Rivers and Lakes <i>[Usually freshwater but some lakes have very high salinity -&gt; placed in separate ecozone: salt lakes (4.3)]</i>		
<b>4.1</b>	<b>Rivers and streams</b>	5.1		<b>F1</b>	IUCN: Rivers and streams include lotic (running water) ecosystems, flowing from elevated uplands or underground springs to deltas, estuaries, and lakes	<a href="#">5.1.1</a>	
4.1.1	Permanent upland streams	X		F1.1	IUCN: These 1st-3rd order streams generally have steep gradients, fast flows, coarse substrates, often with a riffle-pool (shallow and fast vs deeper and slow) sequence of habitats, and periodic (usually seasonal) high-flow events		
4.1.2	Permanent lowland rivers	X		F1.2	IUCN: These rivers are distinguished by shallow gradients, low turbulence, low to moderate flow velocity and moderate flow volumes (<10,000m <sup>3</sup> /s).		



					Flows are continuous but may vary seasonally depending on catchment precipitation. This combination of features is most common at low altitudes below 200 m and rarely occurs above 1,500 m.		
4.1.3	Freeze-thaw rivers and streams	X		F1.3	IUCN: In seasonally cold montane and boreal environments, the surfaces of both small streams and large rivers freeze in winter.		
4.1.4	Seasonal upland rivers	X		F1.4	IUCN: Upland streams (orders 1-4) with highly seasonal flows generally have low to moderate productivity and a simpler trophic structure than lowland rivers. They tend to be shallow.		
4.1.5	Seasonal lowland rivers	X		F1.5	IUCN: These large riverine systems (stream orders 5-9) are driven by cyclical, seasonal flow regimes. High-volume flows and floods occur during summer in the tropics or winter-spring at temperate latitudes, with two peaks in some areas.		
4.1.6	Episodic arid rivers	X		F1.6	IUCN: These mostly lowland systems are distinguished by highly episodic flows and flood regimes that vary with catchment size and precipitation. Low elevational gradients and shallow channels result in low turbulence and low to moderate flow velocity		
4.1.7	Large lowland rivers	x		F1.7	Large lowland rivers (typically stream orders 8-12) have shallow gradients with low turbulence, low to moderate flow velocity and very high flow volumes (>10,000 m <sup>3</sup> /s), which are continuous but may vary seasonally depending on catchment area and precipitation.	e.g. Amazon	
<b>4.2</b>	<b>Freshwater Lakes</b>	5.2		<b>F2</b>	IUCN: The Lakes biome includes lentic ecosystems defined by their still waters. Water regimes vary from permanent open waters to seasonal or episodic filling and drying on interannual time scales.	<b>5.1.2</b>	
4.2.1	Large permanent freshwater lakes	x		F2.1	IUCN: Large permanent freshwater lakes, generally exceeding 100 km <sup>2</sup> . High niche diversity and large volumes of permanent water support complex	Ex: Lake Malawi, Africa.	

					trophic webs with high diversity and abundance.		
4.2.2	Small permanent freshwater lakes	x		F2.2	IUCN: Small permanent freshwater lakes, pools or ponds. Most are <1 km <sup>2</sup> in area, but this functional group includes lakes of transitional sizes up to 100 km <sup>2</sup> . These lakes may be hydrologically isolated, groundwater-dependent or connected to rivers as terminal or flow-through systems		
4.2.3	Seasonal Freshwater lakes	x		F2.3	IUCN: These small (mostly <5 km <sup>2</sup> in area) and shallow (<2 m deep) seasonal freshwater lakes, vernal pools, turloughs, or gnammas (panholes, rock pools), are characterised by a seasonal aquatic biota.		
4.2.4	Freeze-thaw freshwater lakes	x		F2.4	IUCN: The majority of surface of these lakes is frozen for at least a month in most years.		
4.2.5	Ephemeral freshwater lakes	x		F2.5	IUCN: Shallow ephemeral freshwater bodies are also known as depressions, playas, clay pans or pans. Long periods of low productivity during dry phases are punctuated by episodes of high production after filling		
4.2.6	Springs and oases	x		F2.8	IUCN: These groundwater-dependent systems are fed by artesian waters that discharge to the surface. They are surrounded by dry landscapes and receive little surface inflow		
4.2.7	Geothermal pools and wetlands	x		F2.9	IUCN: These hot springs, geysers, mud pots and associated wetlands result from interactions of deeply circulating groundwater with magma and hot rocks that produce chemically precipitated substrates.		
4.2.8	Sub-glacial lakes	x		F2.10	IUCN: Remarkable lacustrine ecosystems occur beneath permanent ice sheets. Subglacial lakes vary in size from less than 1 km <sup>2</sup> to ~10,000 km <sup>2</sup> , and most are 10–20 m deep, but Lake Vostok (Antarctica) is at least 1,000 m deep.	Example: Lake Vostok (Antarctica)	
<b>4.3</b>	<b>Salt lakes</b>	5.3			<i>Not a separate category in IUCN but part of Freshwater lakes (F2). Which is a bit curious because salt water is not fresh</i>		

					-> I did make a sub-division (ecozone) salt lakes	
4.3.1	Permanent salt lakes	5.3		F2.6	IUCN: These lakes are united by relatively constant, high inorganic solute concentrations (notably sodium ions) and an associated specialist biota. Lakes may be thousands of hectares in size and several metres deep while some volcanic lakes are small and deep.	Ex: Caspian Sea
4.3.2	Ephemeral salt lakes	5.3		F2.7	IUCN: Ephemeral salt lakes or playas have relatively short-lived wet phases and long dry periods of years to decades. During filling phases, inflow dilutes salinity to moderate levels. Salinity varies from 0.3% up to 40%. Up to 10,000 km <sup>2</sup> in area and usually less than a few metres deep.	
<b>5</b>	<b>Tropical and subtropical forests</b>	<b>6.0</b>		<b>T1</b>	IUCN: The Tropical-subtropical forests biome includes moderate to highly productive ecosystems with closed tree canopies occurring at lower latitudes north and south of the equator	Where in corine?
<b>5.1</b>	<b>Tropical and subtropical lowland rain forests</b>			<b>T1.1</b>	IUCN: These closed-canopy forests are renowned for their complex structure and high primary productivity. Precipitation exceeds evapotranspiration with low intra- and inter-annual variability. Temperatures are warm with low-moderate diurnal and seasonal variation (mean winter minima rarely <10°C)	Example: Tropical rainforest, Daintree, northeast Australia.
5.1.1	Tropical rain forests	6.1	TAr		FAO: All months without frost; in marine areas, temperature >18°C; Wet: 0 – 3 months dry. When dry period, during winter IPCC: Tropical wet forest	
5.1.2	Tropical moist forests	X	TAwa		FAO: All months without frost; in marine areas, temperature >18°C; Wet/dry: 3 – 5 months dry, during winter IPCC: = Tropical moist forest	
5.1.3	Subtropical humid forests	X	SCf		FAO: Eight months or more over 10°C Humid: No dry season IPCC: warm temp. moist forest	
<b>5.2</b>	<b>Tropical and subtropical dry forests</b>			<b>T1.2</b>	IUCN: These closed-canopy forests and	Example: Tropical dry forest, northern Minas Gerais, Brazil.

					thickets have drought-deciduous or semi-deciduous phenology in at least some woody plants (rarely fully evergreen). These forests may be involved in fire-regulated stable-state dynamics with savannas. Overall water surplus (or small deficit <100 mm). Warm temperatures (minima rarely <10°C)	
5.2.1	Tropical dry forests	6.2	TAWb		FAO: All months without frost; in marine areas, temperature >18°C; Dry/wet: 5 – 8 months dry, during winter IPCC: Tropical dry forest	
5.2.2	Subtropical dry forests	X	SCs		FAO: Eight months or more over 10°C Seasonally Dry: Winter rains, dry summer IPCC: warm temperate dry forest	
<b>5.3</b>	<b>Tropical and subtropical mountain forests</b>			<b>T.1.3</b>	IUCN: Closed-canopy evergreen forests on tropical mountains usually have a single-layer low tree canopy (~5–20 m tall) with small leaf sizes. Substantial cloud moisture and high humidity underpin a reliable year-round rainfall surplus over evapo-transpiration. Winter monthly mean minima may be around 0°C in some areas.	Example: Cloud forest, Mt Gower, Lord Howe Island, Oceania.
5.3.1	Tropical cloud forests	6.3	TM		FAO: Tropical mountain systems. Definition: approximate > 1000 m altitude (local variations) IPCC: Tropical montane forest	
5.3.2	Subtropical mountain forests		SM		FAO: Subtropical mountain systems. Eight months or more over 10°C; Appr. > 800-1000 m altitude IPCC: warm temp. moist or dry forest	
<b>5.4</b>	<b>Tropical heath forests</b>	x	TAr	<b>T1.4</b>	IUCN: Structurally simple evergreen forest with closed to open canopies, typically 5-10 m tall. Tree stems are slender (generally <20 cm in diameter). Epiphytes are usually abundant but lianas are rare and ground vegetation is sparse. FAO: under Tropical Rain Forest (TAr)	Example: Bako NP, Sarawak, Malaysia
<b>6</b>	<b>Temperate forests and woodlands</b>	<b>7.0</b>		<b>T2</b>	IUCN: Temperate-boreal forests and woodlands biome include moderate to highly productive tree-dominated	Where in corine?

					systems with a wide range of physiognomic and structural expressions distributed from warm-temperate to boreal latitudes	
<b>6.1</b>	<b>Temperate rain or evergreen forests</b>	7.1				<b>3.1.1 (Broadleaved)</b>
6.1.1	Cool temperate moist forests		TeDo	T2.3	IUCN: Cool temperate evergreen forest: Broadleaf and needleleaf rainforests in cool temperate climates have evergreen or semi-deciduous tree canopies with high LAI. There is a large water surplus, rarely with summer deficits. Cool winters (minima typically <0-5°C for three months) FAO: 4-8 months over 10oC; Oceanic climate: coldest month > 0oC IPCC: cool temperate moist forest	IUCN: e.g. Hwequehwe, Chile FAO: e.g. Atlantic Rain Forest
6.1.2	Warm temperate rainforests		Scf	T2.4	IUCN: Relatively productive but structurally simple closed-canopy forests with high LAI occur in humid warm-temperate to subtropical climates. Mean annual rainfall is typically 1,200-2,500 mm. Mild frosts may occur	e.g. Royal National Park, Australia.
<b>6.2</b>	<b>Temperate deciduous forests</b>	7.2		T2.2	IUCN: These structurally simple, winter deciduous forests have high productivity and LAI in summer. Winter dormancy, hibernation and migration are common life histories among plants and animals. Phenological processes in these forests are driven by large seasonal temp. ranges (mean winter temperatures <-1°C, summer means up to 22°C)	Example: Deciduous forest, Inkoo, Finland. <b>Split/add mixed forest? 3.1.3?</b>
6.2.1	Temperate continental forests		TeDc		FAO: 4-8 months over 10oC; Continental climate: coldest month < 0oC IPCC: cool temp. dry forest	
6.2.2	Temperate mountain forests		TeM		FAO: temp. mountain systems. 4-8 months over 10oC, Approx. > 800 m altitude IPCC: cool temp moist or dry	
<b>6.3</b>	<b>Temperate pyric forests</b>	x			"Pyric means fire-adjusted"	Is right term?
6.3.1	Temperate pyric humid forests	X		T2.5	IUCN: This group includes the tallest forests on earth. They are moist, multi-layered forests in wet-temperate climates with complex spatial structure and very high biomass and LAI. The	Australia (Eucalyptus)

					upper layer is an open canopy of sclerophyllous trees 40–90 m tall. There is an annual water surplus with seasonal variation.	
6.3.2	Temperate pyric sclerophyll forests	X		T2.6	Forests and woodlands, typically 10–30 m tall with an open evergreen sclerophyllous tree canopy and low-moderate LAI. Hot summers generate a marked but variable summer water deficit, usually with a modest winter surplus,	Dry sclerophyll forest, Royal National Park, Australia. Also in Mediterranean regions
<b>7</b>	<b>Boreal and montane forests and woodlands</b>			T2.1	IUCN: Evergreen, structurally simple forests and woodlands in cold climates, dominated by needleleaf conifers. Structure varies from dense forest up to 30 m tall to stunted open woodlands <5 m tall. These systems are driven by large seasonal temperature ranges, cold winters with prolonged winter snow, low light, short growing seasons	Example: Boreal forest, Liesjärvi National Park, Tammela, Finland. <b>3.1.2 ? Coniferous</b>
7.1	Boreal Coniferous forests	7.3	Ba		<b>ESVD: Taiga</b> FAO: upto three months over 10oC IPCC: boreal moist forest [11% of land mass -> worlds largest biome/ecozone]	Eurasia (Taiga) and N.America
7.2	High mountain forests	8.3 12.1	BM		FAO: Boreal mountain systems: Upto 3 months over 10oC; approx. > 600 m altitude IPCC: Boreal moist or dry forest ESVD (old): Boreal montane woodland (8.3) and High Mountain-forest (12.1)	<i>Need to check still what goes here; it seems IUCN does not distinguish this</i>
<b>8</b>	<b>Shrublands and shrubby woodlands</b>	<b>8.0</b>		<b>T3</b>	IUCN: The Shrublands and shrub-dominated woodlands biome includes oligotrophic systems occurring on acidic, sandy soils that are often shallow or skeletal	
8.1	Seasonally dry tropical shrublands	8.1	TBSh	T3.1	IUCN: mostly evergreen shrublands, shrubby grasslands and low, open forests (generally <6 m tall) FAO: Tropical shrubland: all months without frost; in marine areas, temp. >18°C. Semi-Arid: Evaporation > Precipitation IPCC: Tropical dry shrubland	Ex: Venezuelan Tepui and Brazilian Campos

8.2	Seasonally dry temperate heath and shrublands	8.2		T3.2	IUCN: Sclerophyllous, evergreen shrublands are distinctive ecosystems of humid and subhumid climates in mid-latitudes. Marked summer water deficit and a modest winter surplus.	Chapparal (US), Fynbos (S Africa), Maquis (Europe),
8.3	Cool Temperate Heathlands	8.4		T3.3	IUCN: vegetation cover is >70% and mostly less than 1 m tall, dominated by low, semi-sclerophyllous shrubs with ferns and C3 graminoids. Unlike most other heathlands, these ecosystems have an overall water surplus, although sometimes with small summer deficits	Mainly W.Eur. and N.Am
8.5	Inland rock formations	13.0 & 13.2		T.3.4	IUCN: Rocky pavements, lava flows & screes: Vegetation dominated by lichens and bryophytes with scattered shrubs. Very low LAI develops on skeletal rocky substrates. EUNIS: inland habitat with no or little soil	<b>Habitats:</b> -Inland cliffs, -screes, -pavements, -outcrops, -volcanic features and lava flows <b>3.3.2 bare rocks</b> Possibly move to 10.2??
<b>9</b>	<b>Rangelands, natural grasslands and savannas</b>	<b>9.0</b>		<b>T4</b>	EPA: Lands on which the native vegetation (climax or natural potential plant community) is predominantly grasses, grass-like plants, forbs, or shrubs suitable for grazing or browsing use. <b>Rangelands include</b> natural grassland, savannas, many wetlands, some deserts, tundra, and certain forb and shrub communities.	FAO/UNCCD: Rangelands and Grasslands provide many ecosystem services of vital importance for local communities, including climate regulation. They are a significant source of livestock feed and of livelihoods for stock raisers and herders.
9.1	Tropical and sub-tropical savannas	9.1 & 9.2	SBSH	T4.1	IUCN: trophic savannas: grassy woodlands and grasslands that are kept short by vertebrate grazers. High annual rainfall deficit of 400 mm to >1,800 mm. Annual rainfall generally varies from 300mm to 700mm FAO: Subtropical steppe: 8 months or more >0 oC; Semi-arid IPCC: warm temp. dry steppe	e.g. Serengeti, Kruger NP
9.2	Grassy woodlands and dry grasslands	X		T4.2	IUCN: Grassy woodlands and [dry] grasslands with variable tree cover. An overall rainfall deficit up to ~1,200 mm or a modest surplus of up to 500 mm, always with strong seasonal (winter) drought. Mean annual rainfall varies from 650 mm to 1,500 mm	e.g. Gran Sabana, Venezuela and N.Australia

9.3	Hummock savannas	X		T4.3	IUCN: open woodlands dominated by hummock grasses ...with sclerophyllous trees and shrubs. Large overall rainfall deficit up to ~2,000 mm, always with a seasonal (winter) drought. Mean annual rainfall is generally 400–1,000 mm	Only in N.Australia e.g Hamersley Range, Australia
9.4	Temperate grassy woodlands	X		T4.4	IUCN: structurally simple woodlands characterised by space between open tree crowns and a ground layer with tussock grasses, interstitial forbs, and a variable shrub component. Mean annual rainfall is 350–1,000 mm. A water deficit occurs seasonally in summer. <i>[seems more woodland than grassland but for sake of systematic consistency stick to IUCN classif.]</i>	Temperate southeast and southwest Australia, Patagonia and Pampas of South America, western and eastern North America, the Mediterranean region, and temperate Eurasia.
9.5	Temperate subhumid grasslands	9.3 & 9.4	TeBSk	T4.5	IUCN: Structurally simple tussock grasslands with interstitial forbs ..; Isolated trees or shrubs may be present in very low densities. A strong seasonal water deficit in summer. Mean annual rainfall varies from 250 mm to 750 mm. Cold winter temperatures FAO: temperate steppe: 4-8 months >10oC Semi-arid IPCC: cool temp. dry steppe	Pampas in SA, great plains USA, Eurasia
<b>10</b>	<b>Desert and semi-deserts</b>	<b>10.0</b>		<b>T5</b>	IUCN: Deserts and semi-deserts biome includes low to very low biomass ecosystems occurring in arid or semi-arid climates, principally associated with the subtropical high-pressure belts and major continental rain shadows	
<b>10.1</b>	<b>Semi-deserts</b>	10.2				
10.1.1	Semi-desert steppe			T5.1	IUCN: mixed semi-deserts dominated by suffrutescent (i.e. with a woody base) or sub-succulent (semi-fleshy) perennial shrubs and tussock grasses.	e.g. sagebrush steppe, USA, big parts of the Sahara
10.1.2	Succulent or thorny semi-desert	X	SBWh	T5.2	IUCN: characterised by long-lived perennial plants, many with spines and/or succulent stem tissues or leaves [e.g cactea] FAO: subtropical desert: Eight months or more over 10°C. Arid: All months dry IPCC: warm temp. dry desert	e.g. Thorny desert, Mexico



10.1.3	Sclerophyll hot semi-deserts	X		T5.3	IUCN: Arid systems dominated by hardleaved (sclerophyll) vegetation	Only in central Australia
10.1.4	Cool semi-deserts	X	TeBwk	T5.4	IUCN: Vegetation cover varies from near zero to >50% in upland grasslands and shrublands FAO: Temperate desert: Four to eight months over 10°C. Arid: All months dry IPCC: cool temp. dry desert	"cool, temperate plains and plateaus" e.g. Gobi desert, Mongolia
<b>10.2</b>	<b>True deserts</b>	10.1			Sand rock and salt deserts	
10.2.1	Hyper and arid deserts		TBWh	T5.5	IUCN: Vegetation cover is very sparse (<1%) and low in stature (.. a few centimetres tall),.. unstable, shifting sand or stony gibber with no soil profile development FAO: tropical desert: All months without frost; in marine areas, temperature >18°C; Arid: All months dry IPCC: tropical dry desert	e.g. Sahara, Atacama, Namib
10.2.2	Salt deserts				check; no equivalent in IUCN system?	Incl. salt pans
10.2.3	Rocky deserts					
<b>11</b>	<b>Polar-alpine</b>	<b>12.0</b>		T6	ESVD: was: High mountain & Polar systems (Cryogenic) IUCN: The Polar-alpine biome encompasses the extensive Arctic and Antarctic regions as well as high mountainous areas across all continental land masses	
11.1	Ice sheets, glaciers and perennial snowfields	12.3		T6.1	IUCN: Permanent but dynamic ice cover accumulates by periodic snow fall and is reduced in summer by melting, sublimation, and calving	Polar regions and high mountains in the W. Americas, central Asia, Europe, and New Zealand, covering ~10% of the earth's surface. <a href="#">3.3.5</a>
11.2	Polar-alpine rocky outcrops	12.4	P	T6.2	IUCN: Permanently ice-free areas of Antarctica, Greenland, the Arctic Circle, and high mountains FAO: Polar: all months below 10oC IPCC: Polar moist or dry	Rocky mountains around Paradise Bay, Antarctica.
11.3	Polar tundra and deserts	11.0 & 11.2	Bp	T6.3	IUCN: peaty permafrost substrates in which only the surface horizon thaws seasonally. Vegetation is <u>treeless</u> and dominated by a largely continuous cover of cold-tolerant bryophytes, lichens, C3	Tundra vegetation at Sydkap, inner Scoresby Sund, East Greenland.

					grasses, sedges, forbs and dwarf and prostrate shrubs. FAO: Boreal tundra <u>woodland</u> : Up to 3 months over 10°C IPCC: Boreal dry tundra woodland	
11.4	Temperate alpine meadows and shrublands	11.1 & 12.2		T6.4	IUCN: Mountain systems beyond the cold climatic treeline are dominated by grasses, herbs, or low shrubs typically <1 m tall)	Alpine grassland with diverse herbs, Davos Klosters, Switzerland. (including Alpine Tundra)
11.5	Tropical alpine grasslands and herbfields	X		T6.5	IUCN: Treeless mountain systems dominated by an open to dense cover of cold-tolerant C3 perennial tussock grasses, herbs, small shrubs and distinctive arborescent rosette or cushion growth forms. Lichens and bryophytes are also common.	e.g. Rwenzori mountains, Uganda
<b>12</b>	<b>Subterranean</b>	<b>13.1</b>			ESVD: Underground systems	
12.1	Subterranean lithic systems			S1	Aerobic caves and endolithic systems	
12.2	Anthropogenic subterranean voids			S2	Anthropogenic Subterranean Voids	Move to 14 or 15?
12.3	Subterranean freshwater			SF1	Underground streams & pools, groundwater ecosystems	
12.4	Anthropogenic subterranean freshwater			SF2	Water pipes and subterranean canals	Move to 14 or 15?
12.5	Subterranean tidal caves			SM1	Anchialine caves	
<b>13</b>	<b>Intensive land use</b>	<b>14.0</b>		T7	IUCN: Human intervention is a dominating influence on this biome, also known as the 'anthrome' ESVD (old): Rural and peri-urban landscapes.	<i>[human dominated ecosystems but of natural origin, as opposed to 14.</i>
13.1	<b>Annual cropland</b>	14.1		T7.1	ESVD: Arable land IUCN: These systems are dominated by one or few shallow-rooted annual plant species, such as grains (mostly C3 grasses), vegetables, 'flowers', legumes, or fibre species harvested annually	<b>Corine</b> : 2.1.1 (non-irrigated), 2.1.2 (permanently irrigated land)
13.1.1	Intensive annual cropland				FAO: High external input agriculture, conventional agriculture, mostly with a degree of regional specialization.	NB: Level 4 =diff. crops
13.1.2	Extensive annual cropland				FAO: Subsistence and traditional farming, extensive farming and low external input agriculture.	NB: Level 4 =diff. crops
13.1.3	Irrigated annual cropland				FAO: Irrigation-based agriculture, drainage-based agriculture	NB: Level 4 =diff. crops

13.2	<b>Sown pastures and fields</b>	14.2		T7.2	IUCN: dominated by one or few selected plant species (perennial pasture grasses and/or herbaceous legumes) and animal species (usually large mammalian herbivores) for commercial production. FAO: maybe include woodlands, native pastures, and croplands producing forages. <b>Corine: 2.3</b>	FAO: Lands that are primarily used for the production of adapted, domesticated forage plants for livestock. Lands that have been seeded, usually to introduced species (e.g., tall fescue) or in some cases to native plants (e.g., switchgrass). Are intensively managed using agronomy practices and control of livestock.	
13.3	<b>Perennial agro-forestry</b>	14.3		T7.3a	<b>Note:</b> IUCN calls T7.3 Plantations and includes everything from extensive agroforestry to intensive monoculture	<b>Corine: 2.4.4</b> 14.3 was called: Orchards/agroforestry Orchards now separate: 13.4.3	
13.3.1	Fallow				FAO: Land rested from cultivation, but comprises planted and managed trees, often leguminous, shrubs and herbaceous cover crops before it is cultivated again. Includes improved and natural fallows, and can be implemented before any of the following systems		
13.3.2	Hedgerows				FAO: Linear plantation around fields, including shelterbelts, windbreaks, boundary plantings and live fences		
13.3.3	Alley cropping				FAO: Fast-growing, usually leguminous, woody species (mainly shrubs) grown in crop fields, usually at high densities. The woody species are regularly pruned and the prunings are applied as mulch into the alleys as a source of organic matter and nutrients. Also known as intercropping		
13.3.4	Multi-strata systems				FAO: Multistorey combinations of a large number of various trees and perennial and annual crops. They include home gardens and agroforests		
13.3.5	Parklands				FAO: Intercropping of agricultural crops or grazing land under low density mature scattered trees. Typical of dry areas like Sahel (e.g. Faidherbia albida)		
13.3.6	Shaded perennial crop systems				FAO: Growing shade-tolerant species such as cacao and coffee under, or in between, overstorey shade trees that can be used for timber or other commercial tree products		
13.3.7	Silvo-arable systems				FAO: Woody species planted in parallel tree rows to allow mechanization and		

					intercropped with an annual crop; usually used for timber (e.p. Juglans spp), but also for fuel (e.p. Populus spp). Usually low tree density per hectare	
13.3.8	Silvo-pastoral systems				FAO: Woody species <b>planted</b> on permanent grasslands, often grazed	<b>Q Vince:</b> what about the other way around: Grazing under plantations/ woody species. This would also fall under this I would say
13.4	<b>Perennial monoculture</b>	14.4		T7.3b	<b>Note:</b> IUCN calls T7.3 Plantations and includes everything from extensive agroforestry to intensive mono-culture	
13.4.1	Plantations	14.4			FAO: Monoculture plantation crops such as tea, coffee and cacao grown without shade trees, as well as oil palms, rubber and coconuts	
13.4.2	Vinyards				FAO: A plantation of vines, typically producing grapes used for winemaking, but also kiwifruit or passionfruit	<b>Corine:</b> 2.2.1
13.4.3	Orchards	14.3			FAO: Land planted with woody vegetation, often fruit trees (eg. apple, pear, plum, nut trees). Understorey vegetation is usually mowed or grazed	<b>Corine:</b> 2.2.2 + 2.2.3 = olive groves?
13.4.4	Short rotation coppice				[Definition Serbia FAO-Lex] Fast-growing species of trees or other plant species grown on agricultural or forest land for a short period of up to eight years between two fellings or harvests for the purpose of producing high biomass yields for energy purposes.	
13.5	<b>Semi-natural pastures and old fields</b>	14.7		T7.5	IUCN: Extensive 'semi-natural' grasslands and open shrublands where woody components of vegetation have been removed or greatly modified for agricultural land uses. ... These novel ecosystems may persist in a steady self-maintaining state, or undergo passive transformation (i.e. oldfield succession), unless actively maintained in disequilibrium	Ex: South Downs in England  <b>Note:</b> Rather curious category; seems to refer to abandoned land in general, and covers a very big part of the world map => might eventually need a subdivision?
13.6	<b>Rice paddies</b>	14.5		F3.3	IUCN: artificial wetlands with low horizontal and vertical heterogeneity fed by rain or irrigation water diverted from rivers. They are predominantly temporary wetlands, regularly filled and	<b>Corine:</b> 2.1.3

					dried, although some are permanently inundated, functioning as simplified marshes.	Laure-Sophie suggests subdivision by nr of crops/year but I (Dolf) think that is Level 4	
13.6.1	Permanently inundated rice paddies						
13.6.2	Temporary inundated rice paddies						
13.7	<b>Freshwater aquaculture</b>	14.6		F3.4	IUCN: Freshwater aquaculture systems are mostly permanent water bodies in either purpose-built ponds, tanks, or enclosed cages within artificial reservoirs, canals, freshwater lakes and/or lowland rivers		
13.7.1	Purpose built constructions for aquaculture						
13.7.2	Cages within natural and semi-natural freshwater						
13.7.3	Rice-fish co-culture					Or maybe put under 13.6?	
13.8	<b>Marine aquaculture</b>	x					
13.8.1	Marine aquafarms			M4.2	IUCN: Marine aquafarms (i.e. mariculture) are localised, high-prod. systems within and around enclosures constructed for the breeding, rearing and harvesting of marine plants and animals, including finfish, molluscs, crustaceans, algae and other marine plants	(Dolf: i.e. intensively managed aquaculture systems)	
13.8.2	Aquaculture ponds in coastal systems				Eg: shrimp & fish-farming <b>in natural mangroves</b>	Suggested by Laure-Sophie; name for 13.8.2. still to be elaborated	
<b>14</b>	<b>Human made structures</b>				<i>[Human <b>made</b> (eco)systems with some natural elements]</i>		
<b>14.1</b>	<b>Anthropogenic freshwater structures</b>	<b>4.9</b>		F3	IUCN: includes built structures that hold or transfer water for human use, treatment, or disposal, including large storage reservoirs, farm dams or ponds, recreational and ornamental wetlands, <b>rice paddies, freshwater aquafarms, wastewater storages and treatment ponds, and canals, ditches and drains.</b>	=Human made wetlands (4.9) in current ESVD; e.g. farm-ponds, wastewater reservoirs., mining-excavations  <b>Note</b> that we included rice paddies and freshwater aquafarms under 13,6 and 13.7	
14.1.1	Large reservoirs	x		F3.1	IUCN: Reservoirs receive water from the rivers they impound. Managed release or	Mainly dam-lakes; IUCN: Globally, there are more than 3,000 reservoirs with a surface area ≥50 km <sup>2</sup> .	

					diversion of water alters natural variability		
14.1.2	Constructed lacustrine wetlands	X		F3.2	IUCN: Shallow open water bodies are constructed for agriculture, mining, stormwater, ornamentation, waste water, or other uses, or fill depressions left by earthworks, obstructing surface flow or headwater channels.		
14.1.3	Artificial water courses	6		F3.5	IUCN: Canals, ditches and storm water drains are artificial streams with low horizontal and vertical heterogeneity. Engineered levees and channels enable managed water flow for human uses, including water delivery for irrigation or recreation, water removal from poorly drained sites or sealed surfaces (i.e. storm water drains), or routes for navigation.		
<b>14.2</b>	<b>Anthropogenic marine structures</b>	<b>X</b>		M4	IUCN: Humans have constructed, deposited or dumped artificial structures in the oceans that either confine managed marine organisms or attract marine biota that would not otherwise occupy such locations		
14.2.1	Submerged artificial structures			M4.1	IUCN: These deployments include submerged structures with high vertical relief including shipwrecks, oil and gas infrastructure, and designed artificial reefs, as well as some low-relief structures (i.e. rubble piles).	Ship wrecks, oil & gas infr. Artificial reefs	
14.2.2	Other anthropogenic marine systems						
<b>14.3</b>	<b>Anthropogenic shoreline structures</b>	x		MT3	IUCN: Constructed sea walls, breakwaters, piers, docks, tidal canals, islands and other coastal infrastructure	Harbours: see 15.3.3 <b>Corine-code</b> 1.2.3	
<b>15</b>	<b>Urban and Industrial areas</b>			T7.4	IUCN: These systems are structurally complex and highly heterogeneous fine-scale spatial mosaics of diverse patch types that may be recognised in fine-scale land use classifications.	IUCN: These elements include: i) buildings; ii) paved surfaces; iii) transport infrastructure; iv) treed areas; v) grassed areas; vi) gardens; vii) mines or quarries; viii) bare ground; and ix) refuse areas.	
15.1	<b>Urban green and blue infrastructure</b>	15.0					
15.1.1	Urban parks and forests	15.1				Areas dominated by trees	

						<b>Corine:</b> 1.4.1	
15.1.2	Lawns, sports fields, golf courses	15.2				Grassland domin. areas	
15.1.3	Urban lakes, ponds, wetlands	15.3				<b>Corine:</b> 1.4.2	
15.1.4	Urban and peri-urban cultivation	15.4			FAO (Laure-Sophie): Urban and peri-urban agriculture can be defined as the production of food and other outputs and related processes, taking place on land and other spaces within cities and surrounding regions.	Water-dominated areas -Gardens -allotments -ornamental parks -ornamental horticulture -greenhouses -etc	
15.1.5	Street trees and shrubs	15.5				Individual or line elements	
15.1.6	Other green infrastructure	15.6				green roofs, rain gardens, swales etc.	
15.1.7	Other blue infrastructure	15.7					
15.2	<b>Artificial urban surfaces</b>	x			Artificial surfaces	1/1.1 (codes from <b>Corine Land Cover Inventory</b> )	
15.2.1	Continuous urban surfaces	x				1.1.1	
15.2.2	Discontinuous urban surfaces	x				1.1.2 (incl. parking lots?)	
15.3	<b>Industrial, commercial and transport units</b>	x				1/1.2	
15.3.1	Industrial and commercial units	x				1.2.1	
15.3.2	Roads and rail networks	x				1.2.2	
15.3.3	Port areas	x				1.2.3 (see also 14.3)	
15.3.4	Airports	x				1.2.4	
15.4	<b>Mine, dump and construction sites</b>					Corine 1.3	
15.4.1	Mineral extraction sites					1.3.1	
15.4.2	Dump sites					1.3.2	
15.4.3	Construction sites					1.3.3	