Classifying and mapping ecosystem assets in a global context: *The IUCN Global Ecosystem Typology*

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on behalf of the











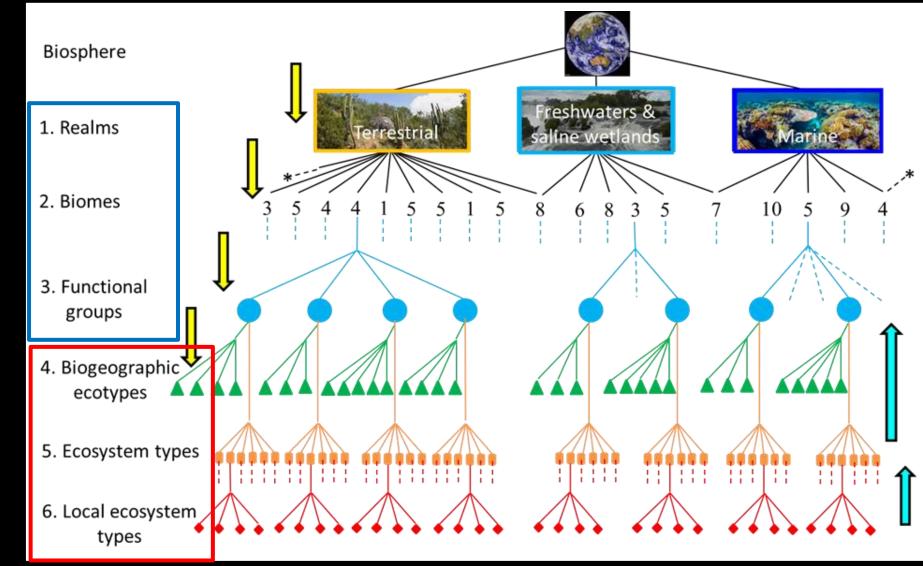




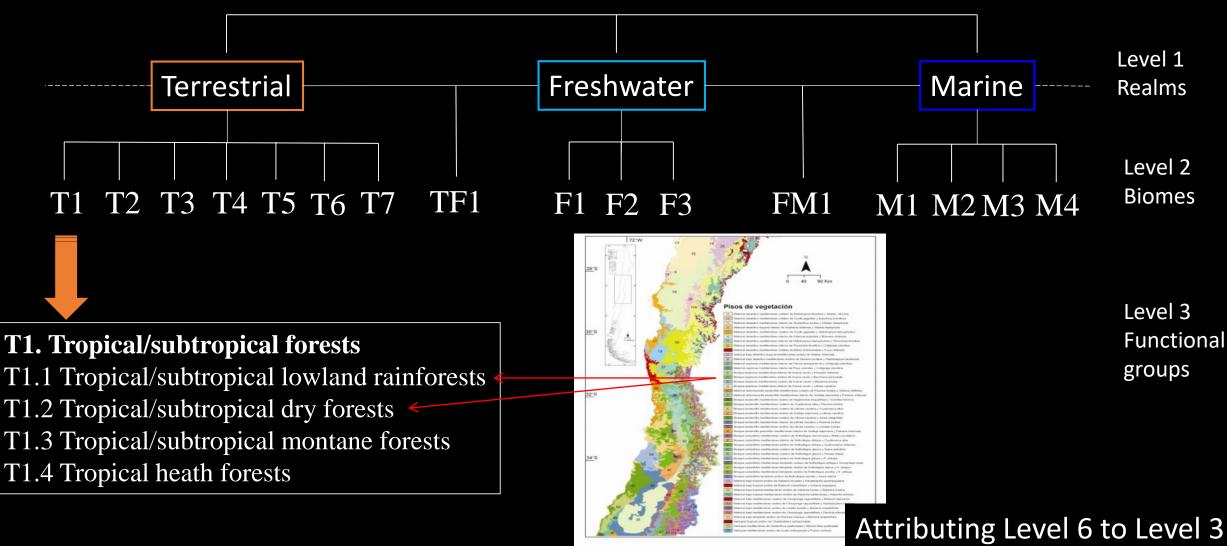


IUCN Global Ecosystem Typology: scope & structure

- All ecosystems of the biosphere
- Hierarchical structure
- Representation of *function* – upper levels, top-down
- Representation of *composition* – lower levels, bottom-up



Crosswalks: Integrating established national classification systems (Level 6) into the global framework



- key drivers & traits described

IUCN Global Ecosystem Typology

Current information resources

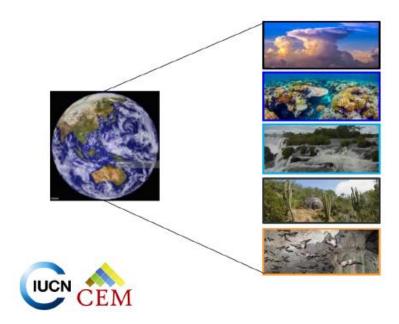
- report describing details of the typology structure and the descriptive profiles for all Ecosystem Functional Groups
- version 1.01 (version 2.0 in prep)
- Available for download from <u>https://iucnrle.org/about-rle/ongoing-</u> <u>initiatives/global-ecosystem-typology/</u> since February 2020

The IUCN Global Ecosystem Typology v1.01: Descriptive profiles for Biomes and Ecosystem Functional Groups

David A. Keith, Jose R. Ferrer, Emily Nicholson, Melanie J. Bishop, Beth A. Polidoro, Eva Ramirez-Llodra, Mark G. Tozer, Jeanne L. Nel, Ralph Mac Nally, Edward J. Gregr, Kate E. Watermeyer, Franz Essl, Don Faber-Langendoen, Janet Franklin, Caroline E. R. Lehmann, Andres Etter, Dirk J. Roux, Jonathan S. Stark, Jessica A. Rowland, Neil A. Brummitt, Ulla C. Fernandez-Arcaya, Iain M. Suthers, Susan K. Wiser, Ian Donohue, Leland J. Jackson, R. Toby Pennington, Nathalie Pettorelli, Angela Andrade, Tytti Kontula, Arild Lindgaard, Teemu Tahvanainan, Aleks Terauds, Oscar Venter, James E. M. Watson, Michael A Chadwick, Nicholas J. Murray, Justin Moat, Patricio Pliscoff, Irene Zager, Richard T. Kingsford

Adapted from: 'Earth's ecosystems: a function-based typology for conservation and sustainable management'

February 2020



IUCN Global Ecosystem Typology

Information resources

Dedicated website

- Functionality
 - Explore structure of typology
 - Thematic and spatial searches
 - Map queries
 - Spatial analysis (e.g. summaries for countries)
- Preliminary release June 2020
 - https://global-ecosystems.org/
 - 'Explore' functions live, spatial analysis functions forthcoming

Global Ecosystem Typology Explore Typology			About Methods Glossary Q
A global typolog Earth's ecosyste	gy for ems		
The new IUCN global ecosystem typology is framework for Earth's ecosystems that integroup compositional features. This new typology critical for biodiversity conservation, researce into the future.	rates their functional and vill help identify the ecosystems most		
	learn about the ecosyst m and drill down to learn more a		Contemporaries and analyse functional groups
✓A Terrestrial 7 Biomes 33 Functional groups	Marine 4 Biomes 25 Functional groups	S Freshwater 3 Biomes 22 Functional groups	All functinal groups
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		T1 Tropical-subtropical	forests biome
		T2 Temperate-boreal for woodlands biome	prests and
Street States	Image by Boudhayan	Bardhan on Unsplash T3 Shrublands and shr	ubby woodlands



Explore > Realm > Biome > Functional group

T Terrestrial

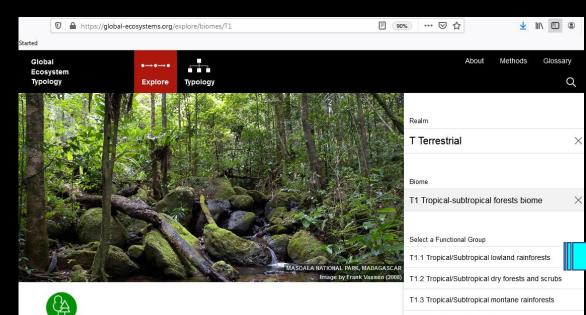
The **Terrestrial realm** includes all dry land, its vegetation cover, proximate atmosphere and substrate (soils, rocks) to the rooting depth of plants, and associated animals and microbes.

Water and nutrients are the principal resource drivers, with energy, oxygen and carbon rarely limiting. Temperature and its variability on interannual, seasonal and diurnal time scales, is a major ambient environmental driver, with ecosystem function and structure responding to global latitudinal and altitudinal climatic gradients. Fire is a major ecosystem driver, essentially unique to the terrestrial realm, although it may occur rarely

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T3 S biom		and shrubb	y woodlands
T4 S	avannas	and grasslar	nds biome
T5 D	eserts an	d semi-dese	erts biome
T6 P	olar/alpin	e (cryogenic) biome
T7 Ir	tensive la	Ind-use bion	ne

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subtropical forests biome	forests and woodlands biome	shrubby woodlands biome	T2 Temperate-boreal forests and w biome	roodlands	
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		ALL THE	T4 Savannas and grasslands biome		
	- White	AND I SA	T5 Deserts and semi-deserts biome	e	
T4 Savannas and	T5 Deserts and semi-	T6 Polar/alpine	T6 Polar/alpine (cryogenic) biome		
grasslands biome	deserts biome	(cryogenic) biome	T7 Intensive land-use biome		
5 Functional groups	5 Functional groups	5 Functional groups			
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T1.4 Tropical heath forests

Explore > Realm > Biome > Functional group

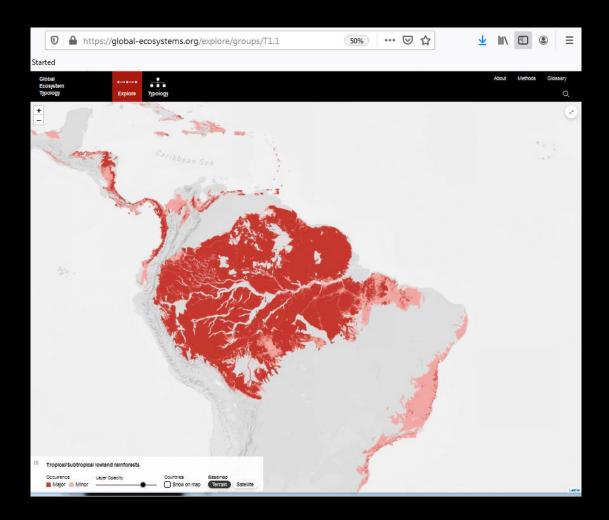
T1 Tropical-subtropical forests biome

Realm: T Terrestrial

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. Fragmented occurrences extend to the subtropics in suitable mesoclimates.

High primary productivity is underpinned by high insolation, warm temperatures, relatively low seasonal variation in day length and temperature (increasing to the subtropics), and strong water surpluses associated with the intertropical convergence zone extending to wetter parts of the seasonal tropics and subtropics. Productivity and biomass vary in response to: i) strong rainfall gradients associated with seasonal migration of the intertropical convergence zone, ii) altitudinal gradients in precipitation, cloud cover, and temperatures, and iii) edaphic gradients that influence the availability of soil nutrients.

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	T1.2 Tropical/Subtropical dry forests and scrubs	
	T1.3 Tropical/Subtropical montane rainforests	
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Explore > Realm > Blome > Functional group

T1.1 Tropical/Subtropical lowland rainforests

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SHORT DESCRIPTION IN PREPARATION

Ecological Traits

These closed-canopy forests are renowned for their complex structure and high primary productivity, which support high functional and taxonomic diversity. At subtropical latitudes they transition to warm temperate forests (T2.4). Bottom-up regulatory processes are fuelled by large autochthonous energy sources that support very high primary productivity, biomass and LAI. The structurally complex, multilayered, evergreen tree canopy has a large range of leaf sizes (typically macrophyli-notophyli) and high SLA, reflecting rapid growth and turnover. Diverse plant life forms include buttressed trees, bamboos (sometimes abundant), epiphytes, ilanas and ferns, but grasses and hydrophytes are absent or rare. Trophic networks are complex and vertically stratified with low exclusivity and diverse representation of herbivorous, frugivorous, and carnivorous vertebrates. Tree canopies support a vast diversity of invertebrate herbivores and their predators. Mammals and birds play critical roles in plant diaspore dispersal and pollination. Growth and reproductive phenology may be seasonal or unseasonal, and reproductive masting is common in trees and regulates diaspore predation. Fungal, microbial, and diverse Invertebrate decomposers and detritivores dominate the forest floor and the subsoli. Diversity is high across taxa, especially at the upper taxonomic levels of trees, vertebrates, fungi, and invertebrate fauna. Neutral processes, as well as micro-niche partitioning, may have a role in sustaining high diversity, but evidence is limited. Many plants are in the shade, forming seedling banks that exploit gap-phase dynamics initiated by individual tree-fail or stand-level canopy disruption by tropical storms in near coastal forests. Seed banks regulated by dormancy are uncommon. Many trees exhibit leaf form plasticity enabling photosynthetic function in deep shade, dappled light or full sun, even on a single individual. Some species germinate on tree trunks, gaining quicker access to canopy light, while roots absorb microcilmatic moisture until they reach the soil.

Key Ecological Drivers

Precipitation exceeds exaportanspiration with low intra- and inter-annual variability creating a reliable year-round surgius, while closed tree canopies maintain humid microclimate and shade. Temperatures are warm with low-moderate diumal and seasonal variation (mean wither minima ranke) +10°C except in subtropical transitional zones). Solis are molist but not regularily inunciated or peat/ (see <u>TF1.1</u>). Most nutrient capital is sequestered in wegetation or cycled through the dynamic little tays, ortificat for retaining nutrients that would otherwise be leached or lost to nundt. In some coastal regions outside equatorial latitudes (mostly - 10° and excluding extensive forests in continental America and Africa), decadal regimes of tropical storms one cycles of canopy destruction and reneval.

Distribution

Humid tropical and subtropical regions in Central and West Africa, Southeast Asia, Oceania, northeast Australia, Central and tropical South America and the Caribbean.

Major and minor occurrences were identified using consensus land-cover maps (Tuanmu et al. 2014) cropped to selected terrestrial ecoregions (Dinerstein et al. 2017).

References Contributors: DA Keith

Main references

Content version: v2.0, updated 2020-06-15.

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1.2 Tropical/Subtropical dry forests a	ind scrubs		
1.3 Tropical/Subtropical montane rail	nforests		
1.4 Tropical heath forests			

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