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

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on behalf of the

IUCN Ecosystem Red List Thematic Group

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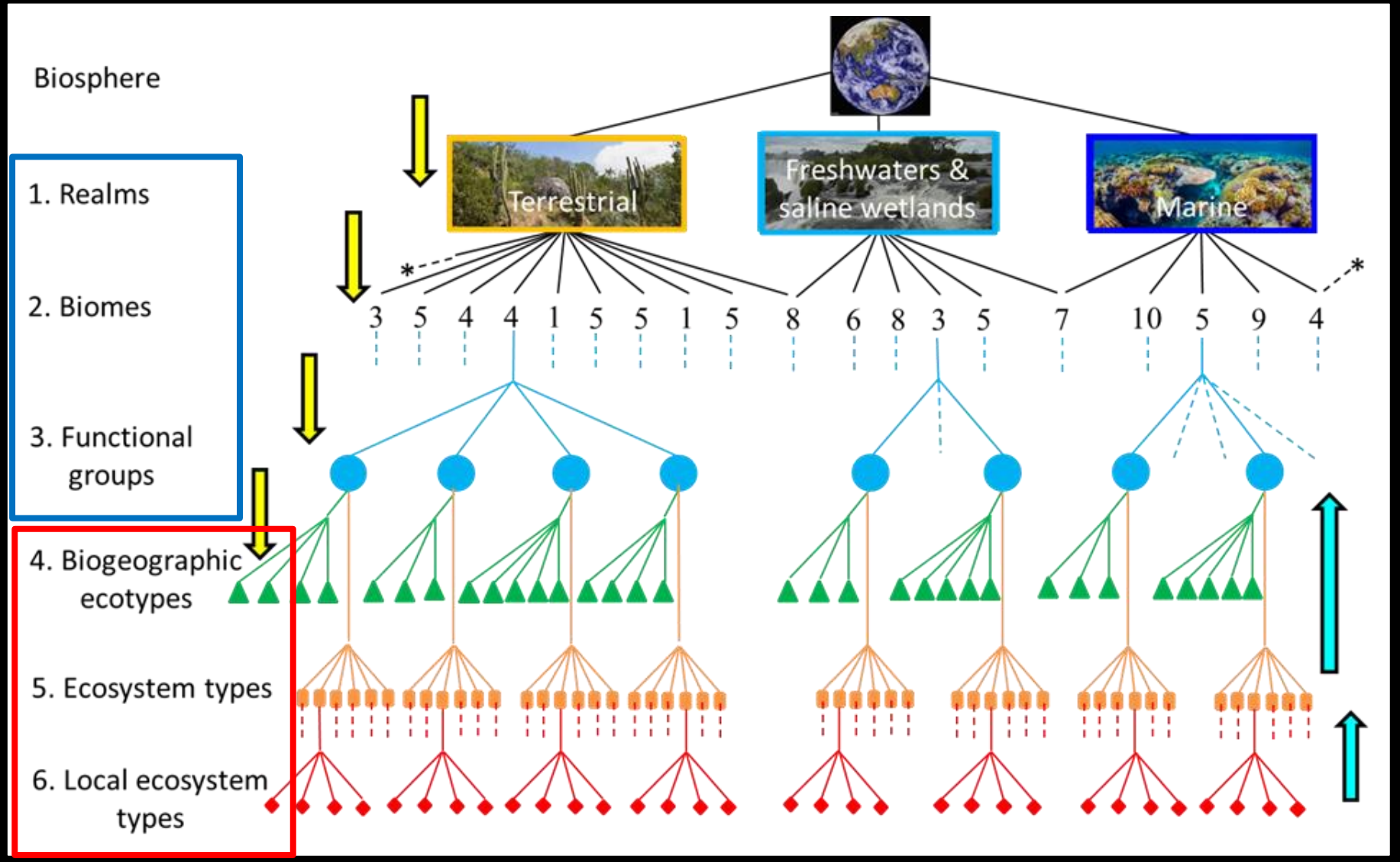
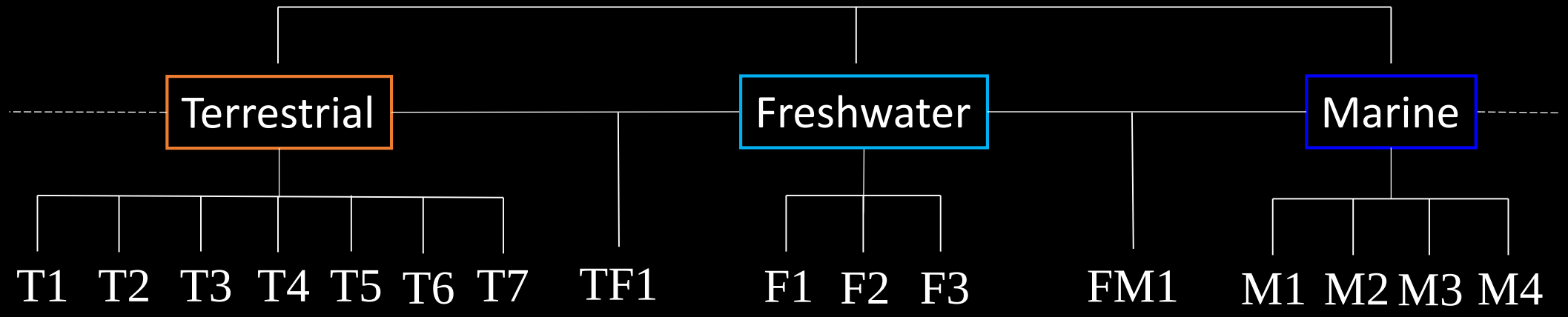
IUCN Global Ecosystem Typology: scope & structure

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



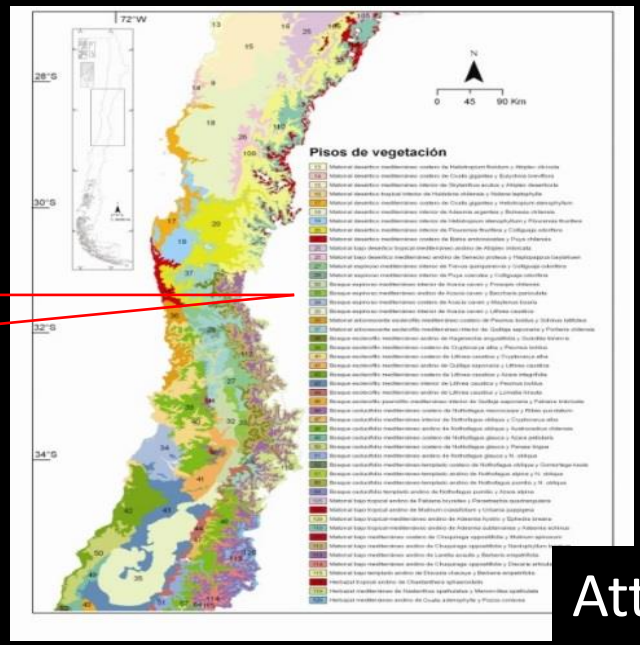
Crosswalks: Integrating established national classification systems (Level 6) into the global framework



Level 1 Realms

Level 2 Biomes

T1. Tropical/subtropical forests
T1.1 Tropical/subtropical lowland rainforests
T1.2 Tropical/subtropical dry forests
T1.3 Tropical/subtropical montane forests
T1.4 Tropical heath forests



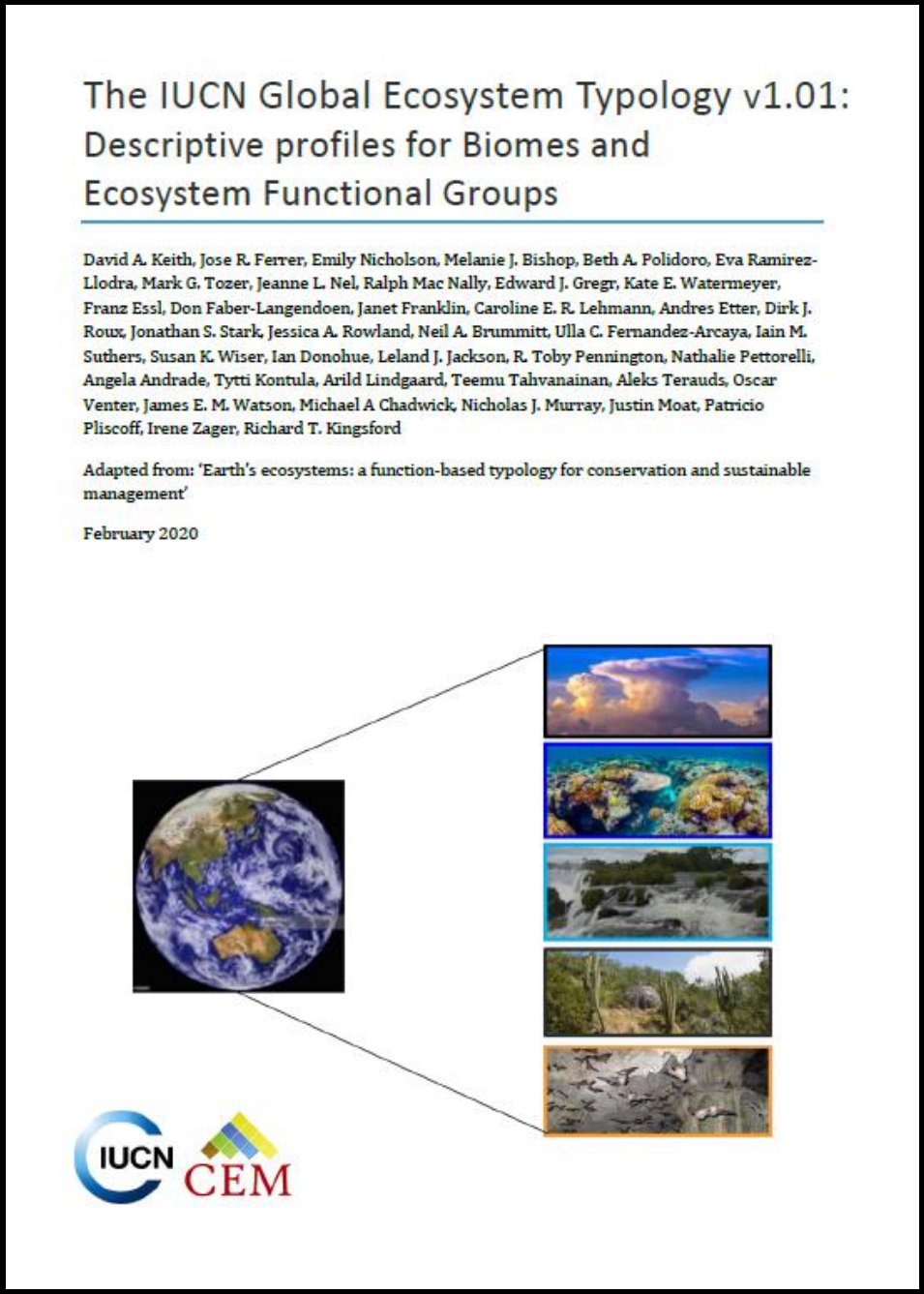
Level 3 Functional groups

Attributing Level 6 to Level 3
- 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 https://iucnrle.org/about-rle/ongoing-initiatives/global-ecosystem-typology/ since February 2020

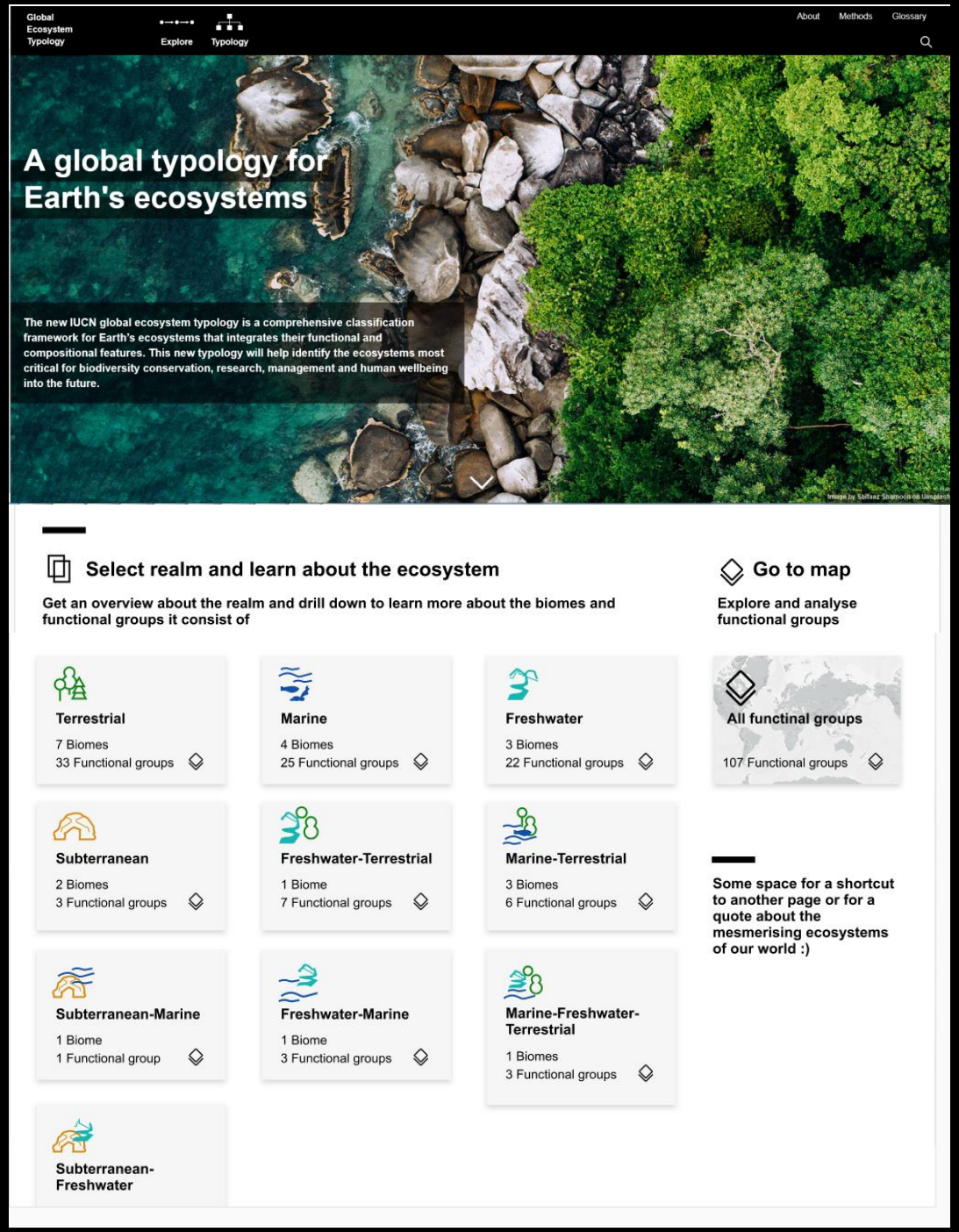


IUCN Global Ecosystem Typology

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



https://global-ecosystems.org/explore/realms/T

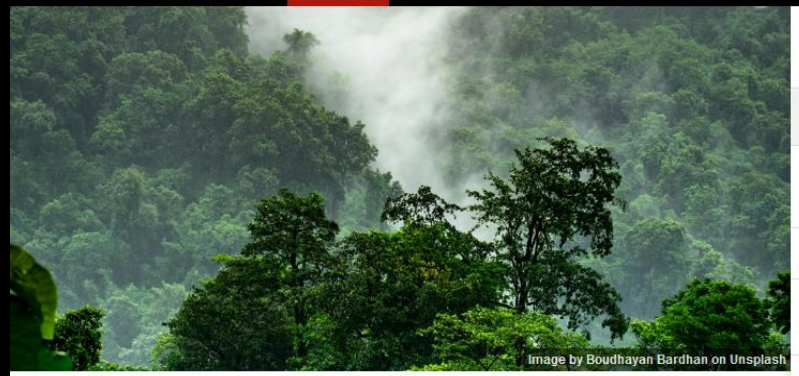
Started

Global Ecosystem Typology

Explore

Typology

About Methods Glossary



Realm

T Terrestrial

Select a Biome

- T1 Tropical-subtropical forests biome
- T2 Temperate-boreal forests and woodlands biome
- T3 Shrublands and shrubby woodlands biome
- T4 Savannas and grasslands biome
- T5 Deserts and semi-deserts biome
- T6 Polar/alpine (cryogenic) biome
- T7 Intensive land-use biome

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

https://global-ecosystems.org/explore/realms/T 90%

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Global Ecosystem Typology

Explore

Typology

About Methods Glossary

The 7 biomes of the Terrestrial realm

Select a biome to learn more

T1 Tropical-subtropical forests biome

4 Functional groups

T2 Temperate-boreal forests and woodlands biome

6 Functional groups

T3 Shrublands and shrubby woodlands biome

4 Functional groups

T4 Savannas and grasslands biome

5 Functional groups

T5 Deserts and semi-deserts biome

5 Functional groups

T6 Polar/alpine (cryogenic) biome

5 Functional groups

T7 Intensive land-use biome

5 Functional groups

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https://global-ecosystems.org/explore/biomes/T1

Global Ecosystem Typology

Explore | Typology | About | Methods | Glossary

Realm: T Terrestrial

Biome: T1 Tropical-subtropical forests biome

Select a Functional Group

- T1.1 Tropical/Subtropical lowland rainforests
- T1.2 Tropical/Subtropical dry forests and scrubs
- T1.3 Tropical/Subtropical montane rainforests
- 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.

https://global-ecosystems.org/explore/groups/T1.1

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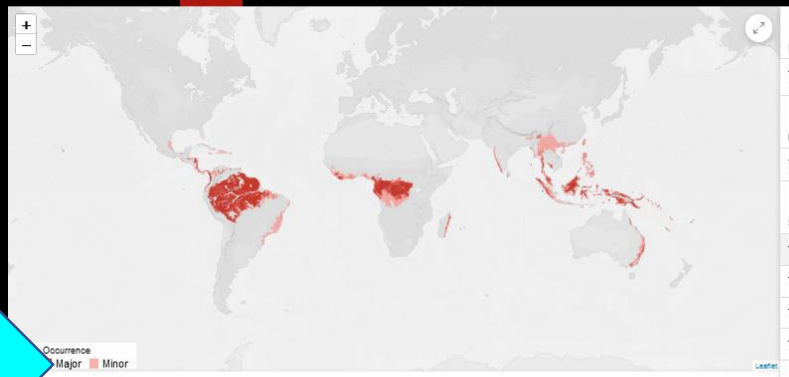
Explore | Typology | About | Methods | Glossary



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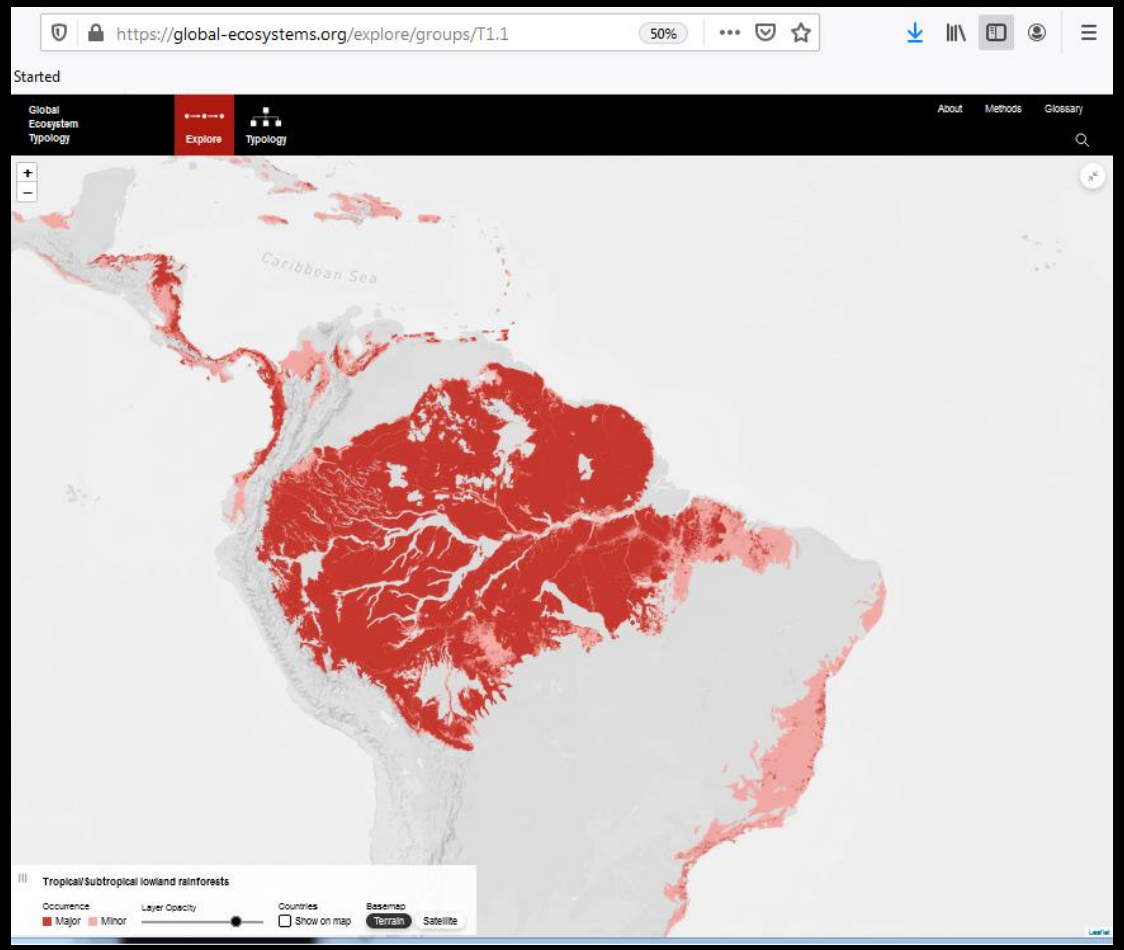
Explore > Realm > Biome > Functional group

T1.1 Tropical/Subtropical lowland rainforests

Realm: T Terrestrial
Biome: T1 Tropical-subtropical forests biome

SHORT DESCRIPTION IN PREPARATION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Explore
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About
Methods
Glossary
Caribbean Sea
Tropical/Subtropical lowland rainforests
Occurrence
Major
Minor
Layer Opacity
Countries
Show on map
Basemap
Terrain
Satellite


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About
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T1.1 Tropical/Subtropical lowland rainforests

Realm: T Terrestrial
Biome: T1 Tropical-subtropical forests biome

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, multi-layered, evergreen tree canopy has a large range of leaf sizes (typically macrophyll-notophyll) and high SLA, reflecting rapid growth and turnover. Diverse plant life forms include buttressed trees, bamboos (sometimes abundant), epiphytes, lianas 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 subsoil. 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-fall 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 microclimatic moisture until they reach the soil.

Key Ecological Drivers

Precipitation exceeds evapotranspiration with low intra- and inter-annual variability, creating a reliable year-round surplus, while closed tree canopies maintain humid microclimate and shade. Temperatures are warm with low-moderate diurnal and seasonal variation (mean winter minima rarely <10°C except in subtropical transitional zones). Soils are moist but not regularly inundated or peaty (see TF1.1). Most nutrient capital is sequestered in vegetation or cycled through the dynamic litter layer, critical for retaining nutrients that would otherwise be leached or lost to runoff. In some coastal regions outside equatorial latitudes (mostly >10° and excluding extensive forests in continental America and Africa), decadal regimes of tropical storms drive cycles of canopy destruction and renewal.

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.

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

Main references

Realm
T Terrestrial

Biome
T1 Tropical-subtropical forests biome

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