



8th International  
Conference on  
**BIG DATA**  
& Data Science for Official Statistics

**BILBAO 2024**

Informing Climate Change and  
Sustainable Development Policies  
with Integrated Data

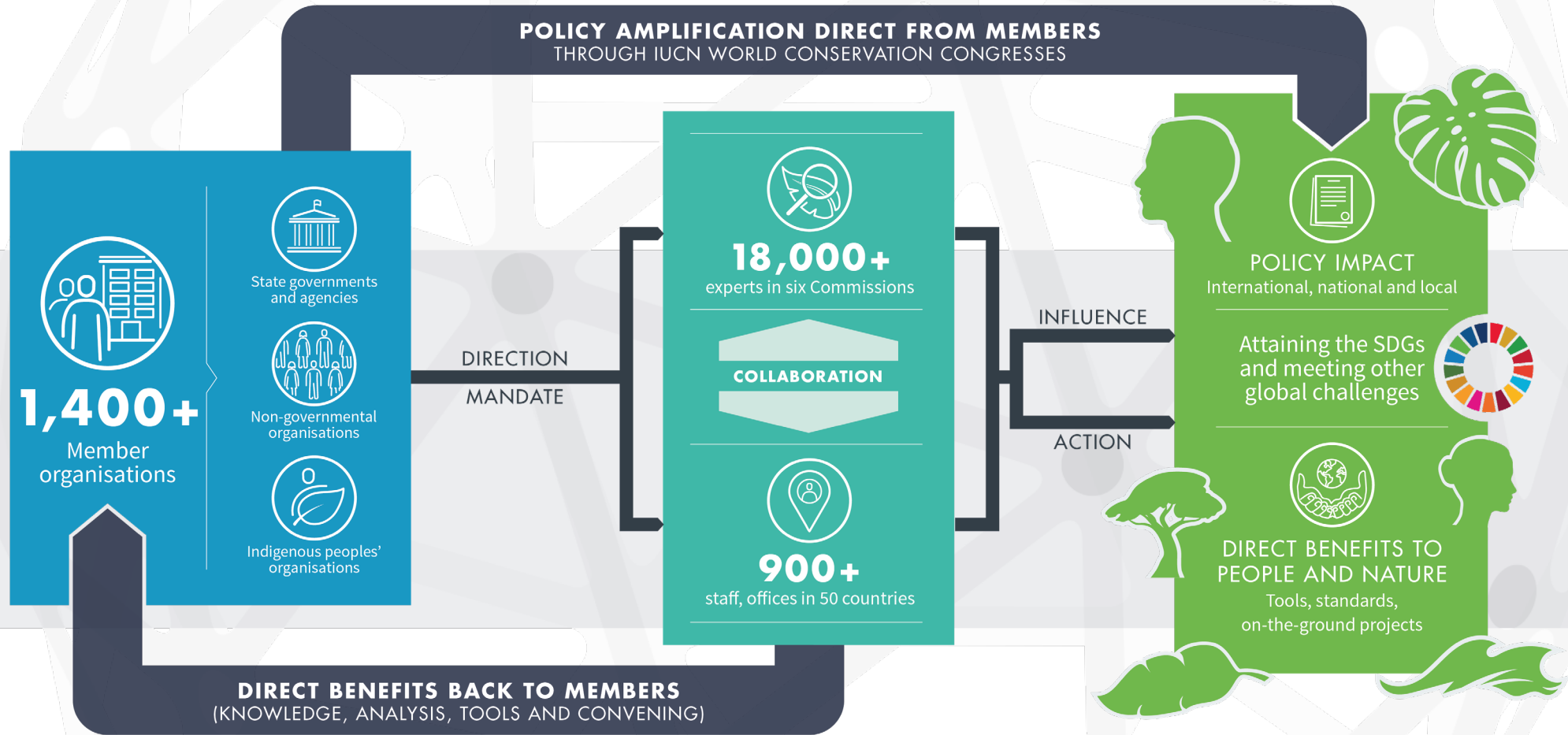
**BILBAO. SPAIN** | **10-14 JUNE 2024** | **#UNBigData2024**

# The importance of IUCN Global Ecosystem Typology for ecosystem accounting and the Red List of Ecosystems

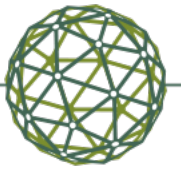
**Konstantin Gospodinov**, European Biodiversity Conservation Coordinator  
Biodiversity Assessment and Knowledge, IUCN European Regional Office Brussels



# The world's largest environmental network



**INTERNATIONAL UNION FOR CONSERVATION OF NATURE**

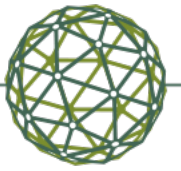


# IUCN Global Ecosystem Typology (GET)

*The need for a new ecosystem framework*

## **Review of existing typologies:**

- Most existing global ecological classifications have biogeographical or biophysical foundations cf. ecosystem processes/functions
- Many national classifications are suitable but are inconsistent across borders



# IUCN Global Ecosystem Typology (GET)

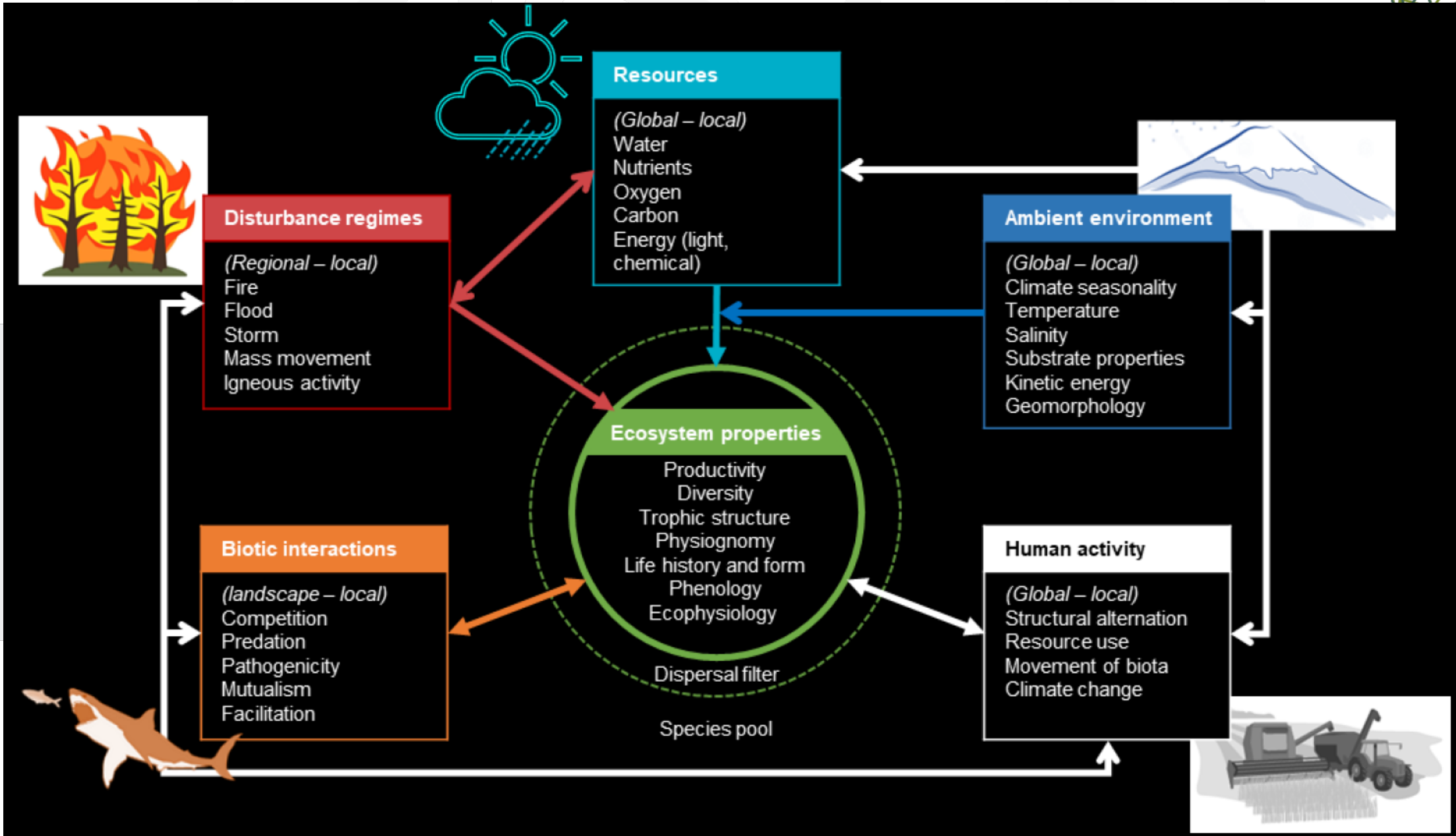
## *Motivations for a global ecosystem typology*

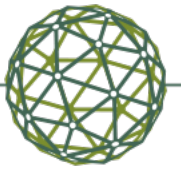
### **Enable generalisations to inform ecosystem management**

- grouping ecosystems that share similar functional properties, threats, drivers & indicators
- incorporating both function & biota
- comprehensive throughout the biosphere
- Scalable – global /national/local

### **Facilitate translation across existing typologies**

- many & greatly varied typologies: scope & concept
- leverage past investments and current usage
- common terminology & comparative framework
- parsimony & documentation

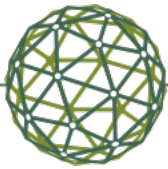




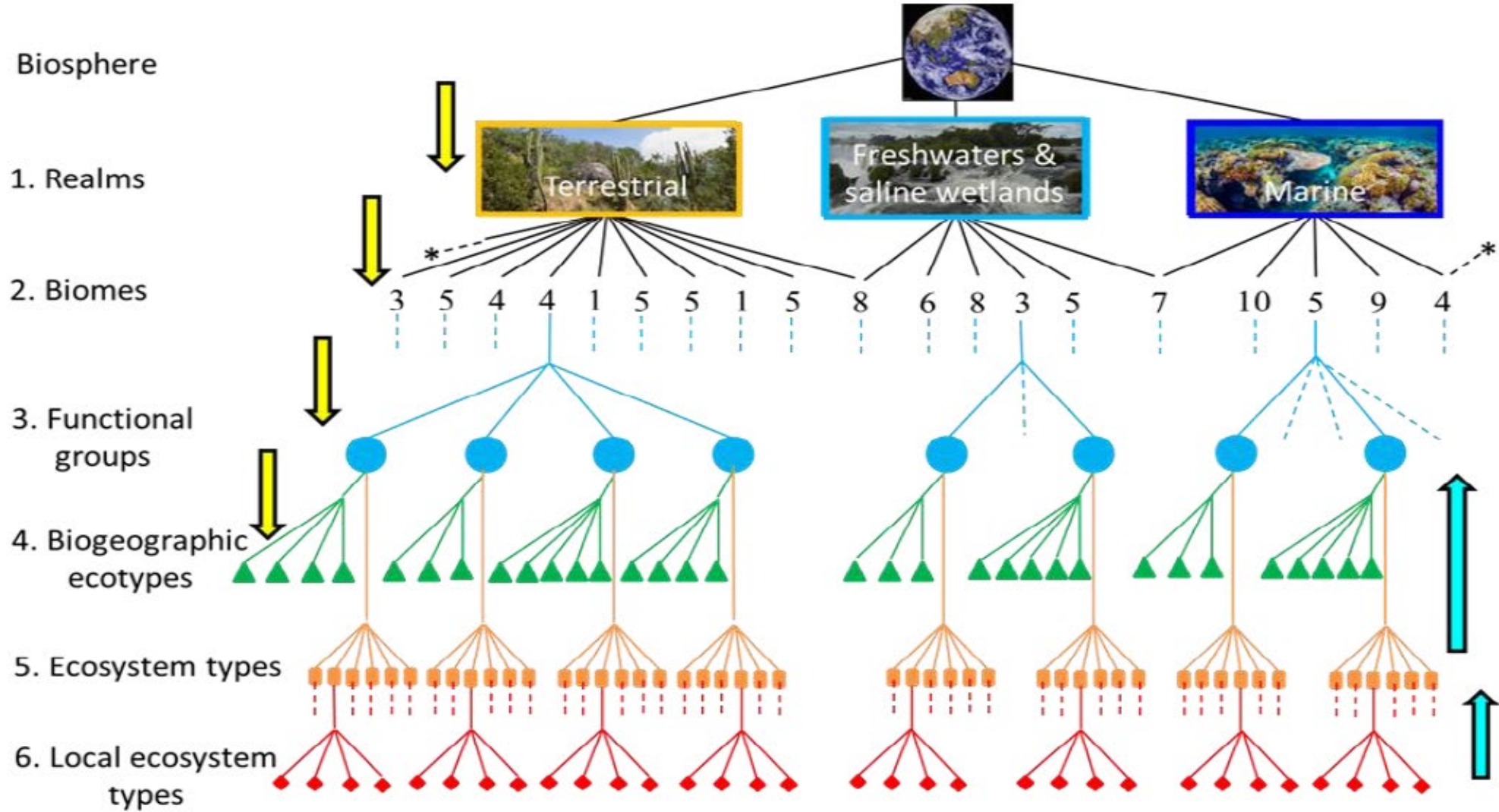
# IUCN Global Ecosystem Typology (GET)

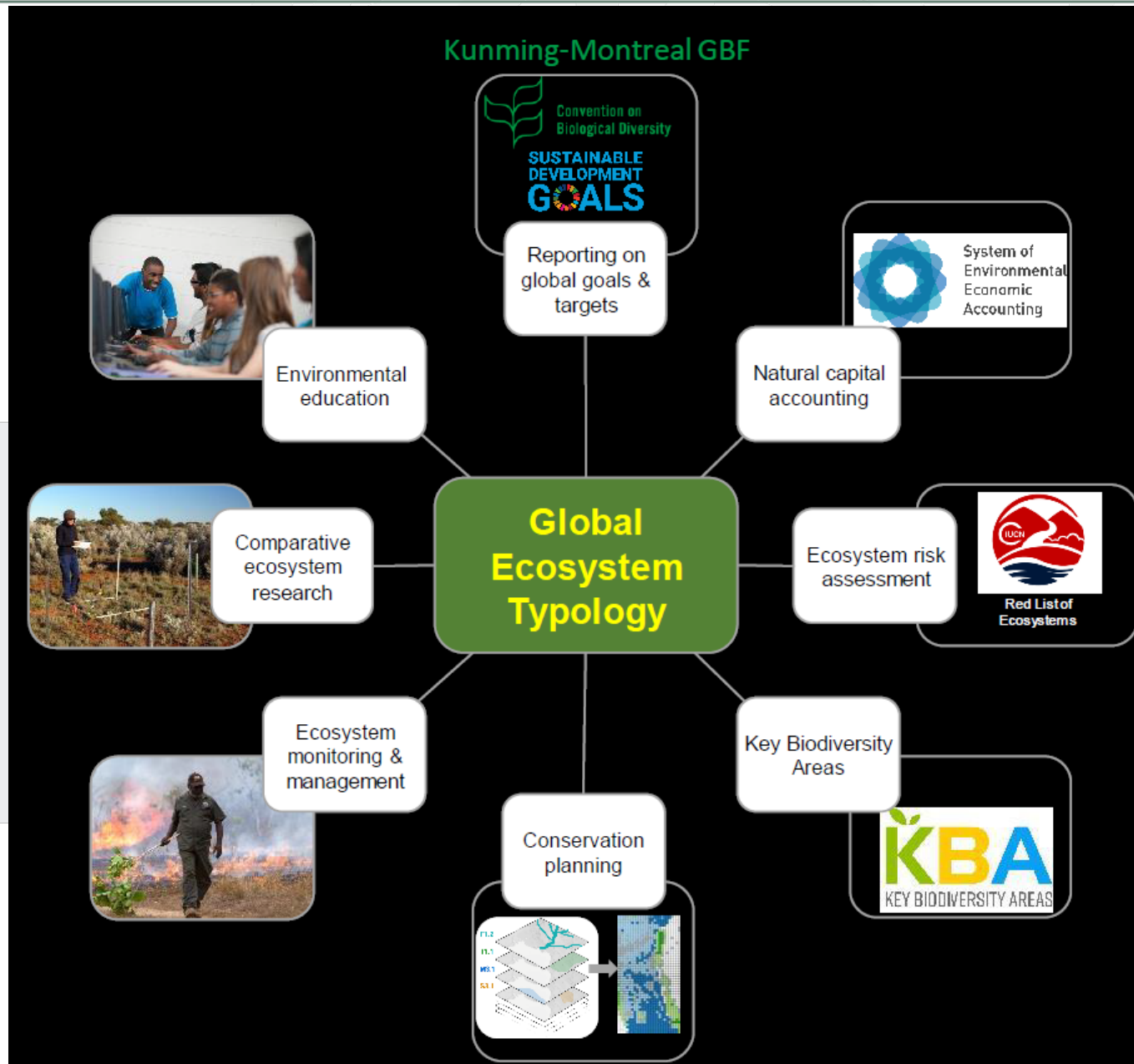
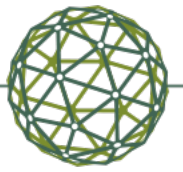
- A conceptual framework NOT a map product
- A scalable structure (nested/hierarchical):
  - 10 realms, 25 biomes, 110 ecosystem functional groups (EFGs)
  - ecosystem types nested within EFGs
- Represent ecosystem functions & variation in biota
- Conceptual consistency throughout the whole biosphere
- Spatially explicit (mappable units): some EFGs are well mapped but others not
- Represents functional similarities among ecosystems (upper levels 1-3) *A key innovation of the GET aimed at policy & management applications*
- Recognises different compositional expressions of functionally similar ecosystems (lower levels 4-6 )
- Incorporates subnational & national classifications (Level 6)





# IUCN Global Ecosystem Typology (GET)



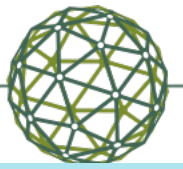


*Providing a common 'language' for ecosystem dialogue & action across multiple domains*

### Framework for global synthesis of national maps

- Preserves integrity of national data (Level 6)
- Enables consistent global reporting across national borders
- **Reduces cross-national incompatibilities.**
  - a. Attribution of national units to common global groups (Level 3)
  - b. Methods in active development & trial





# IUCN Global Ecosystem Typology (GET)

## UN System for Environmental Accounts – Ecosystem Accounts (UN SEEA-EA) Standard

- Reporting on change in ecosystem assets (extent, condition, services & values)
- Requires consistent classification of assets across studies & nations



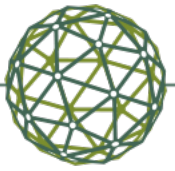
### GET adopted

- Reference classification for ecosystem assets in EA
- UN Family of Statical Classifications

### SEEA-EA Standard recommends

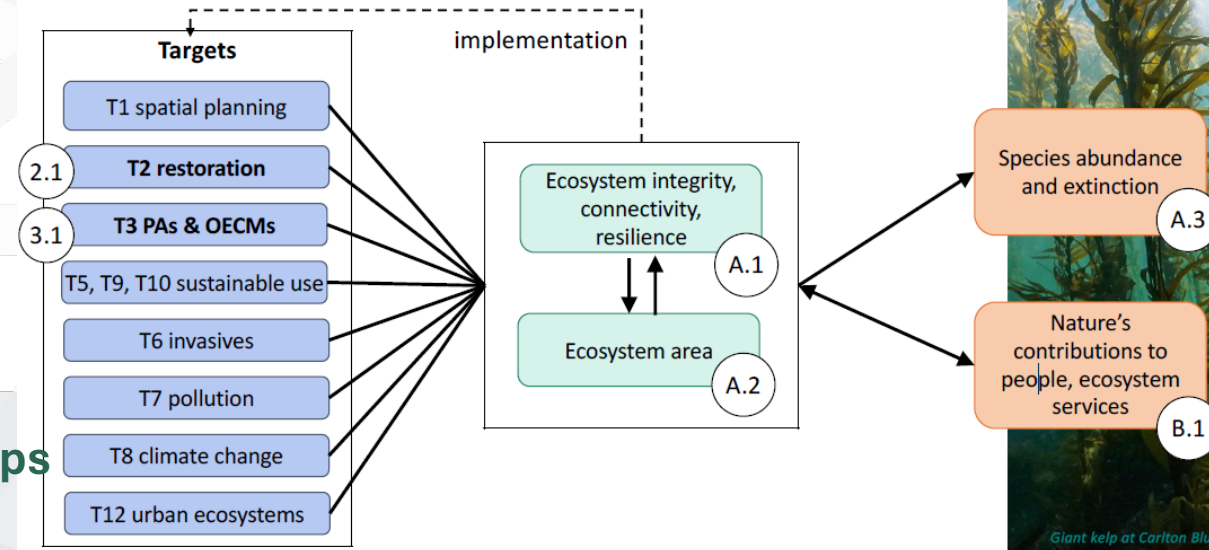
- National reporting at Level 6
- Scaling up to Level 3 Ecosystem Functional Groups for international reporting

Ecosystem Functional Group (EFG)	Year 1	Year 2
<b>T1.1 Trop-subtrop lowland rainforests</b>		
state 1	8000	7000
state 2	5000	4000
state 3	5000	4000
<b>Total</b>	<b>18000</b>	<b>15000</b>
<b>T4.2 Pyric tussock savannas</b>		
state 1	15000	10000
state 2	15000	20000
<b>Total</b>	<b>30000</b>	<b>30000</b>
<b>T7.3 Plantations</b>		
state 1	0	3000
state 2	1000	1000
<b>Total</b>	<b>1000</b>	<b>4000</b>
<b>Grand total</b>	<b>49000</b>	<b>49000</b>

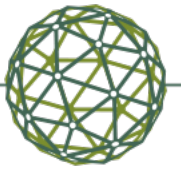


# IUCN Global Ecosystem Typology (GET)

## Reporting on global targets – K-MGBF



- **Parties need national ecosystem classifications and maps**
  - This is currently the biggest gap
  - Requires investing in foundational spatial data on ecosystems at the national level
- **Global Ecosystem Typology can help close this gap:**
  - Countries with ecosystem classifications and maps – align with global standard
  - Countries with data that is spread across ministries/sectors – synthesize and identify gaps
  - Countries with no data – a starting point as a framework for new national classifications and maps (Myanmar, Malaysia, Maldives)
- **Developing support guidelines, tools, people and data to support countries**
  - Global datasets: GEO Global Ecosystems Atlas initiative



# IUCN Red List of Ecosystems

It is a *global standard* for assessing the ecosystems' **risk** of **collapse**

Risk vs. Priority

**Risk:** the probability of an adverse outcome over a specified time frame.

*The adverse outcome is the ecosystem collapse*

**Priority:** setting precedence to certain actions.

*Risk can inform priority decisions*

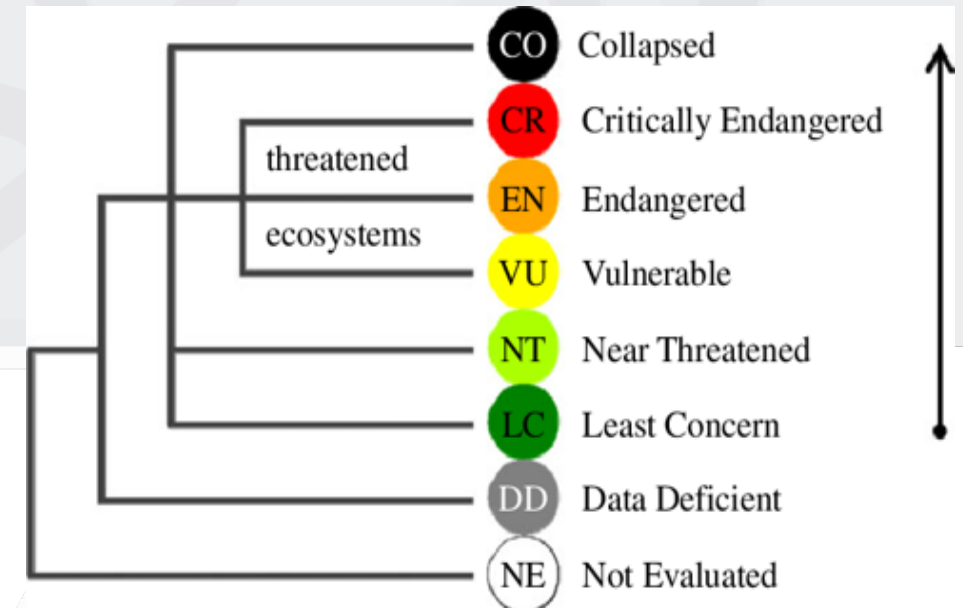
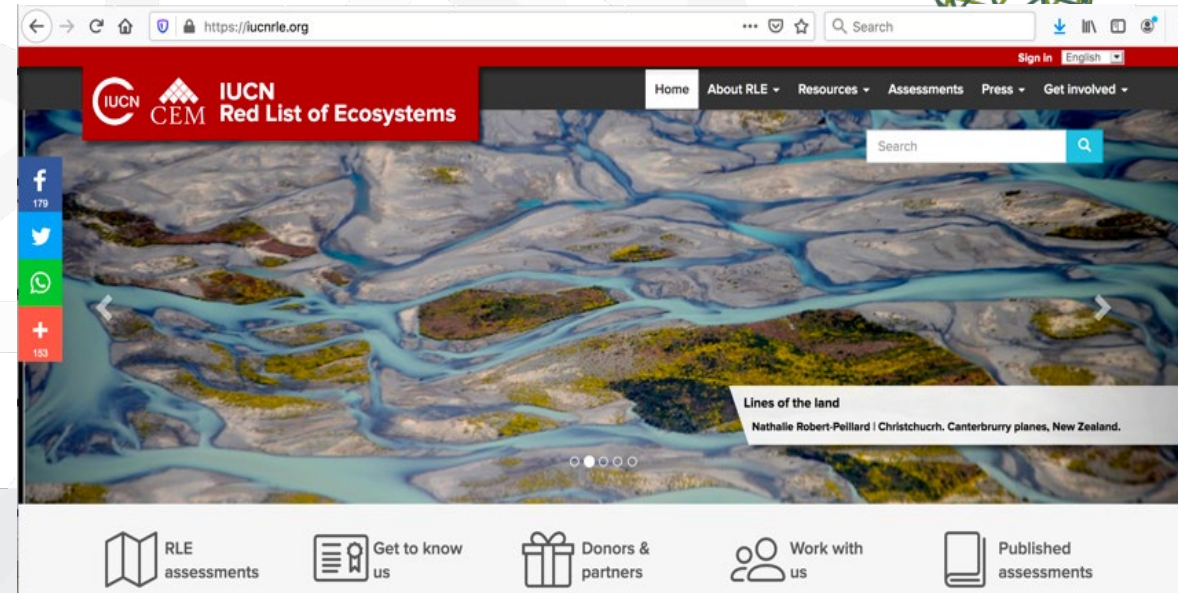


*A Red List of Ecosystem assessment does not “set” priorities but informs about priorities*

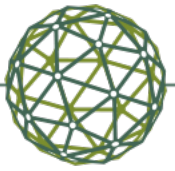
# IUCN Red List of Ecosystems

The IUCN Red List of Ecosystems identifies ecosystems most at risk of collapse based on:

- Geographic distribution
- Changes in distribution
- Environmental degradation
- Disruption of biotic processes or interactions







# IUCN Red List of Ecosystems

- Global standard for ecosystem risk assessment
- Adopted by IUCN in 2014
- Relative risk of ecosystem collapse
- Assessed against past, ongoing and projected future change (including under climate change)



Guidelines for the application of IUCN Red List of Ecosystems Categories and Criteria

Edited by Lucie M. Bland, David A. Keith, Rebecca M. Miller, Nicholas J. Murray and Jon Paul Rodriguez

Version 1.1



## a) Knowledge synthesis

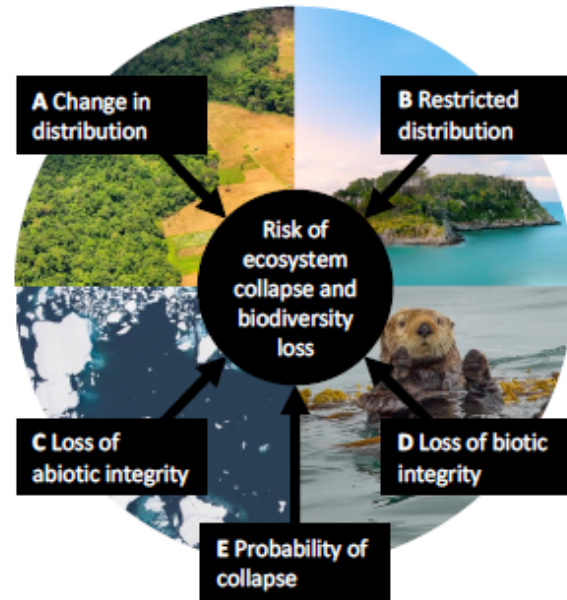
*Ecosystem descriptions (characteristic species, processes, functions, features)*

*Ecosystem maps (current, past, future)*

Threat diagnosis (key pathways and drivers of loss)

Spatial data/trends in integrity (ecosystem-specific indicators)

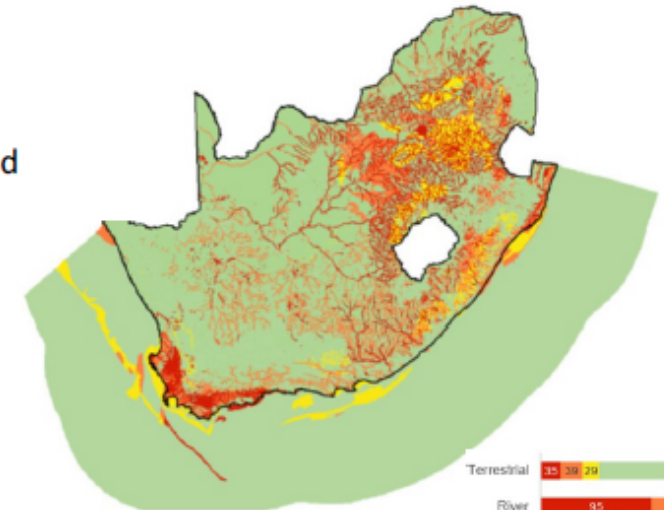
## b) Assessment against criteria



## c) Risk assessment outcomes

- CO** Collapsed
- CR** Critically Endangered
- EN** Endangered
- VU** Vulnerable
- NT** Near Threatened
- LC** Least Concern
- DD** Data Deficient
- NE** Not evaluated

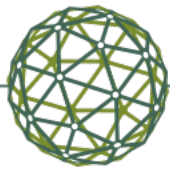
## South Africa assessment outcome



Ecosystem Type	CO	CR	EN	VU	NT	LC	DD	NE
Terrestrial	35	39	24			305		
River		95		42	5	60		
Wetland		93		12	12	28		
Marine		22		51		75		
Estuarine		2		10		7		3

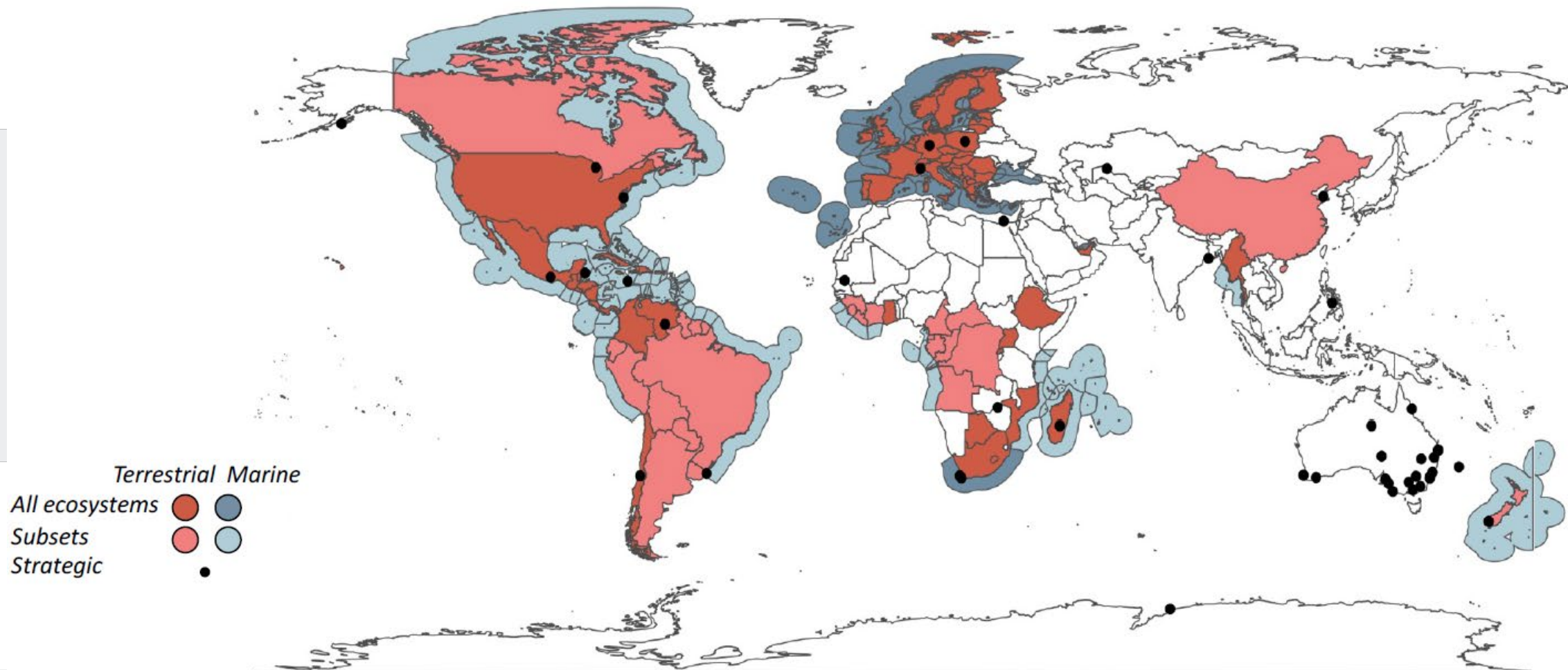
Percentage of ecosystem types

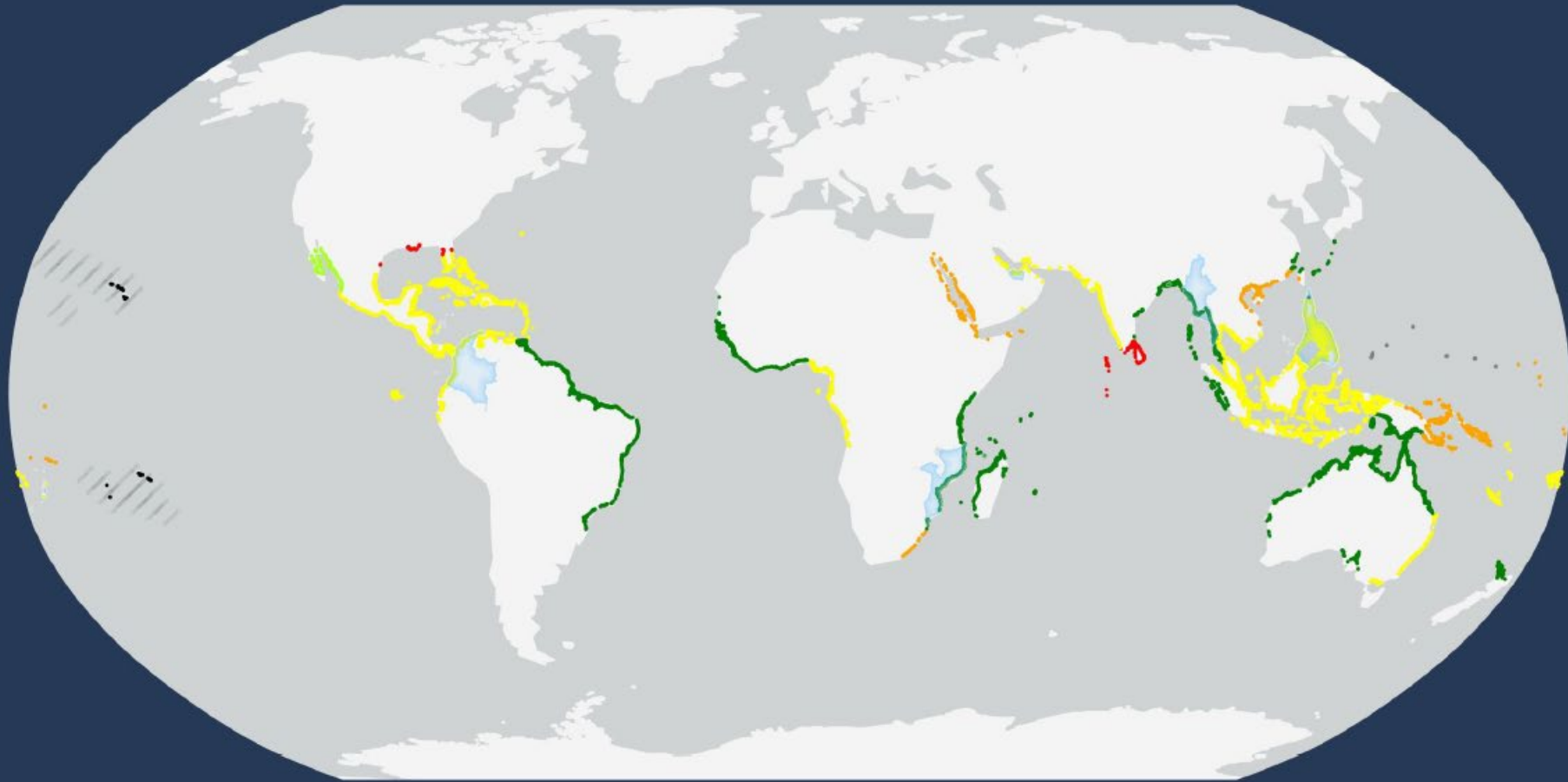




# IUCN Red List of Ecosystems - spatial coverage

- >4000 ecosystems assessed in 110 countries and 24 territories
- Wall-to-wall terrestrial ecosystems in >60 countries (red), >40 for all freshwater, >30 for all marine
- Investment needed for white & pink areas, reassessment of red





# Global Mangrove Red List of Ecosystems

- |                       |                 |  |
|-----------------------|-----------------|--|
| Critically Endangered | Near Threatened | Not Evaluated                              |
| Endangered            | Least Concern   | Mangroves RLE Sub/<br>National Assessments |
| Vulnerable            | Data Deficient  |  |



**RED LIST OF ECOSYSTEMS**

© IUCN, 2024. Base map and mangrove area credits: Esri, FAO, NOAA, USGS, Bunting et al., 2022.



**NT**



Tanintharyi mangrove forest  
(MMR-MFT1.2.1)

**EN**



Ayeyarwady delta mangrove forest  
(MMR-MFT1.2.2)

**CR**



Dwarf mangrove (shrubland) on shingle  
(MMR-MFT1.2.3)

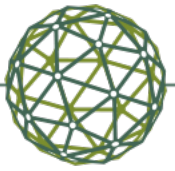
**CR**



Rakhine mangrove forest on mud  
(MMR-MFT1.2.4)

mangrove area credits: Esri, FAO, NOAA, USGS, Bunting et al., 2022.





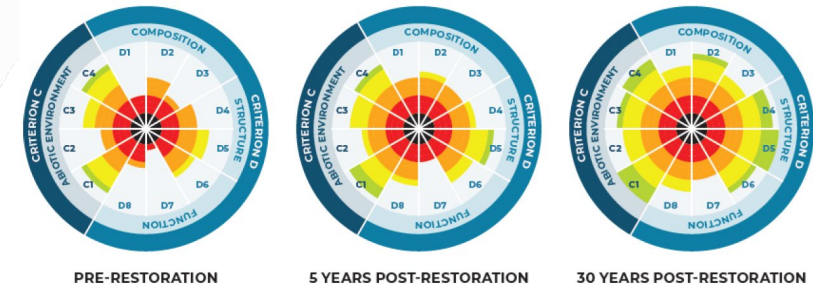
# IUCN Red List of Ecosystems - uses and applications

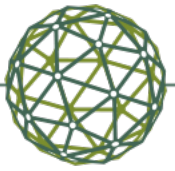
The Red List of Ecosystems is a tool to improve decision-making and actions for conservation, restoration and sustainable management.

For example, by monitoring the state of ecosystems, it is possible to identify ongoing threats to ecosystems and measure the positive impacts of conservation measures.

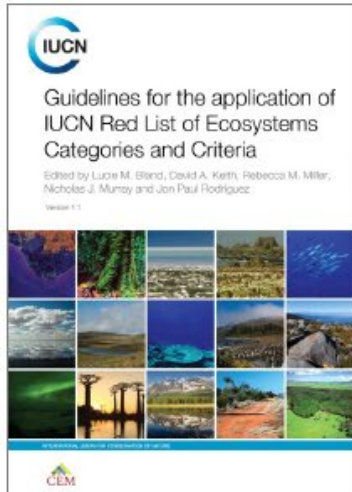


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# IUCN Red List of Ecosystems - roles



## Roles of the Red List of Ecosystems

### Scientific standard

Concepts and definitions  
Consistent criteria

### Data and knowledge synthesis

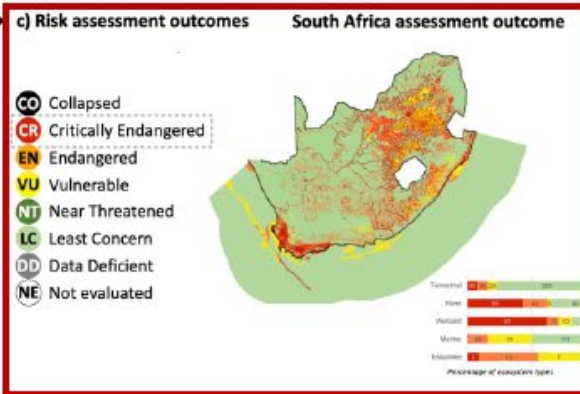
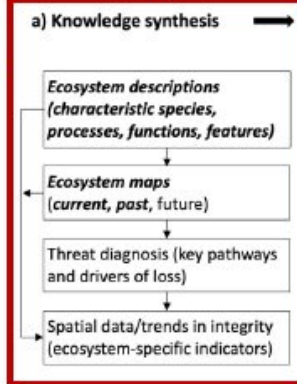
Ecosystem maps and descriptions  
Threat diagnosis  
Time-series of extent and integrity

### Risk assessment outcomes

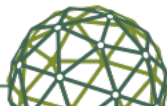
Risk status

### Building knowledge and capacity

Within-government capacity  
Collaboration across countries, sectors and institutions

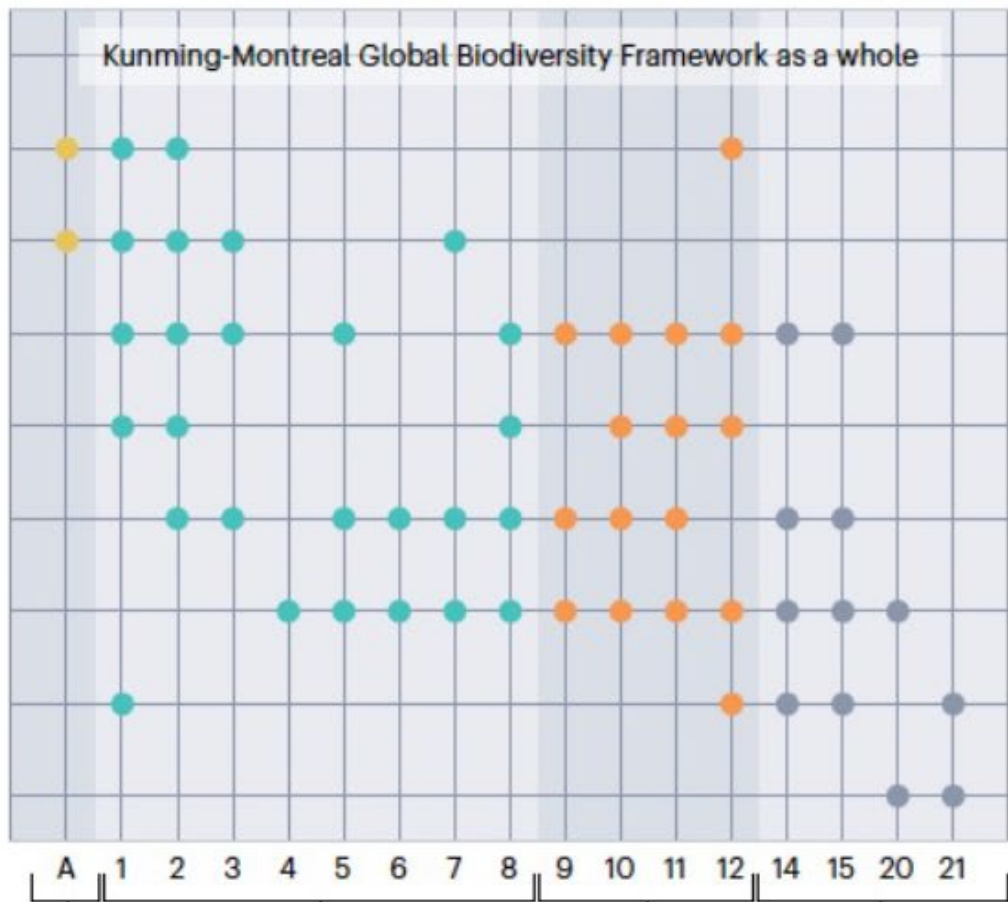






## Goals and targets of the Kunming-Montreal Global Biodiversity Framework

Goal A      Reducing threats      Meeting needs      Mainstreaming



Implementation needs

- Conceptual consistency
- Key terms defined
- Indicators for national and global reporting
- Ecosystems integrated in spatial planning
- Restoration planning, benchmarks and action
- Identifying priorities for action
- Threat reduction and mitigation
- Mainstreaming: policy, legislation, accounting, impact disclosure
- International cooperation

Roles: Red List of Ecosystems & Global Ecosystem Typology

Scientific standard

- Concepts and definitions
- Consistent criteria

Data and knowledge synthesis

- Ecosystem maps and descriptions
- Threat diagnosis
- Time-series of extent and integrity

Risk assessment outcomes

- Risk status

Building knowledge and capacity

- Within-government capacity
- Collaboration across countries, sectors and institutions

**Goal A**  
Ecosystems

**Reducing threats**  
 1 Spatial planning  
 2 Restoration  
 3 Protection  
 4 Threatened species  
 5 Sustainable harvest  
 6 Invasive species  
 7 Pollution  
 8 Climate change

**Meeting needs**  
 9 Sustainable use  
 10 Sustainable production  
 11 Nature's contributions to people  
 12 Urban areas

**Mainstreaming**  
 14 Mainstreaming  
 15 Business disclosure  
 20 Capacity building  
 21 Knowledge access



# Data needs for the Red List of Species and Key Biodiversity Areas initiatives

Thank you!