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

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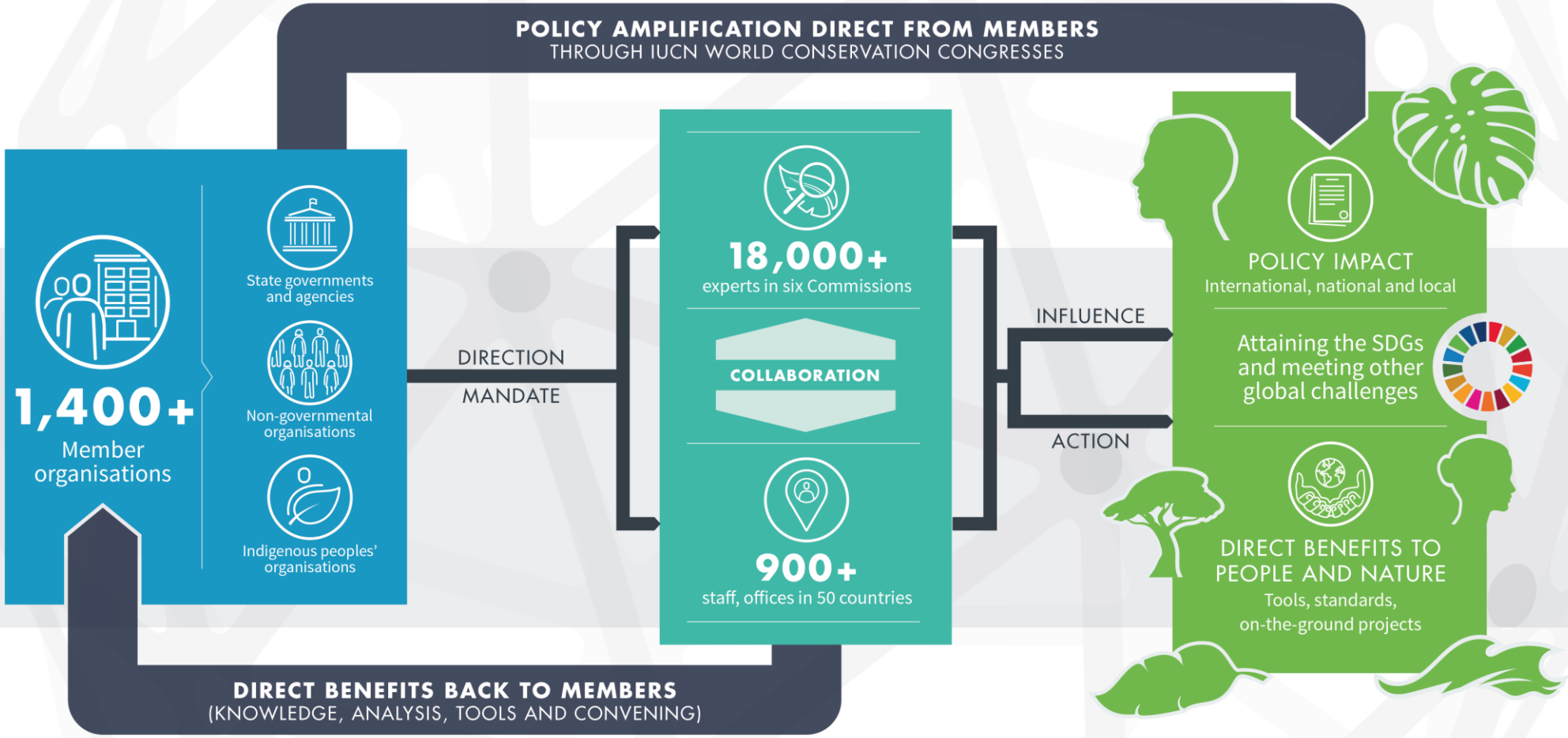
Biodiversity Assessment and Knowledge, IUCN European Regional Office Brussels

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)

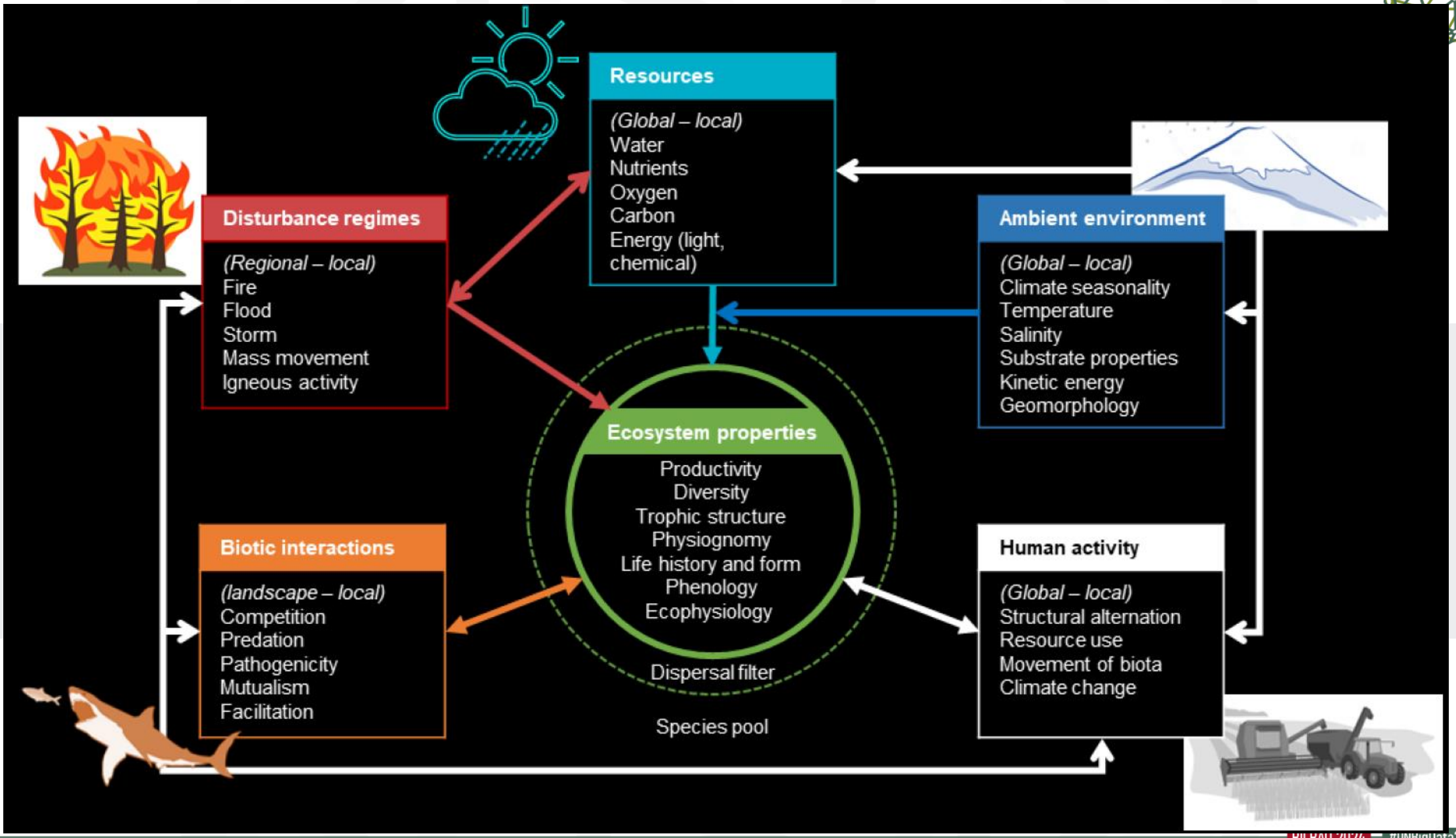
Motivations for a global ecosystem typology

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


Resources
(Global – local)
Water
Nutrients
Oxygen
Carbon
Energy (light, chemical)
Disturbance regimes
(Regional – local)
Fire
Flood
Storm
Mass movement
Igneous activity
Ambient environment
(Global – local)
Climate seasonality
Temperature
Salinity
Substrate properties
Kinetic energy
Geomorphology
Ecosystem properties
Productivity
Diversity
Trophic structure
Physiognomy
Life history and form
Phenology
Ecophysiology
Dispersal filter
Species pool
Biotic interactions
(landscape – local)
Competition
Predation
Pathogenicity
Mutualism
Facilitation
Human activity
(Global – local)
Structural alternation
Resource use
Movement of biota
Climate change

IUCN Global Ecosystem Typology (GET)

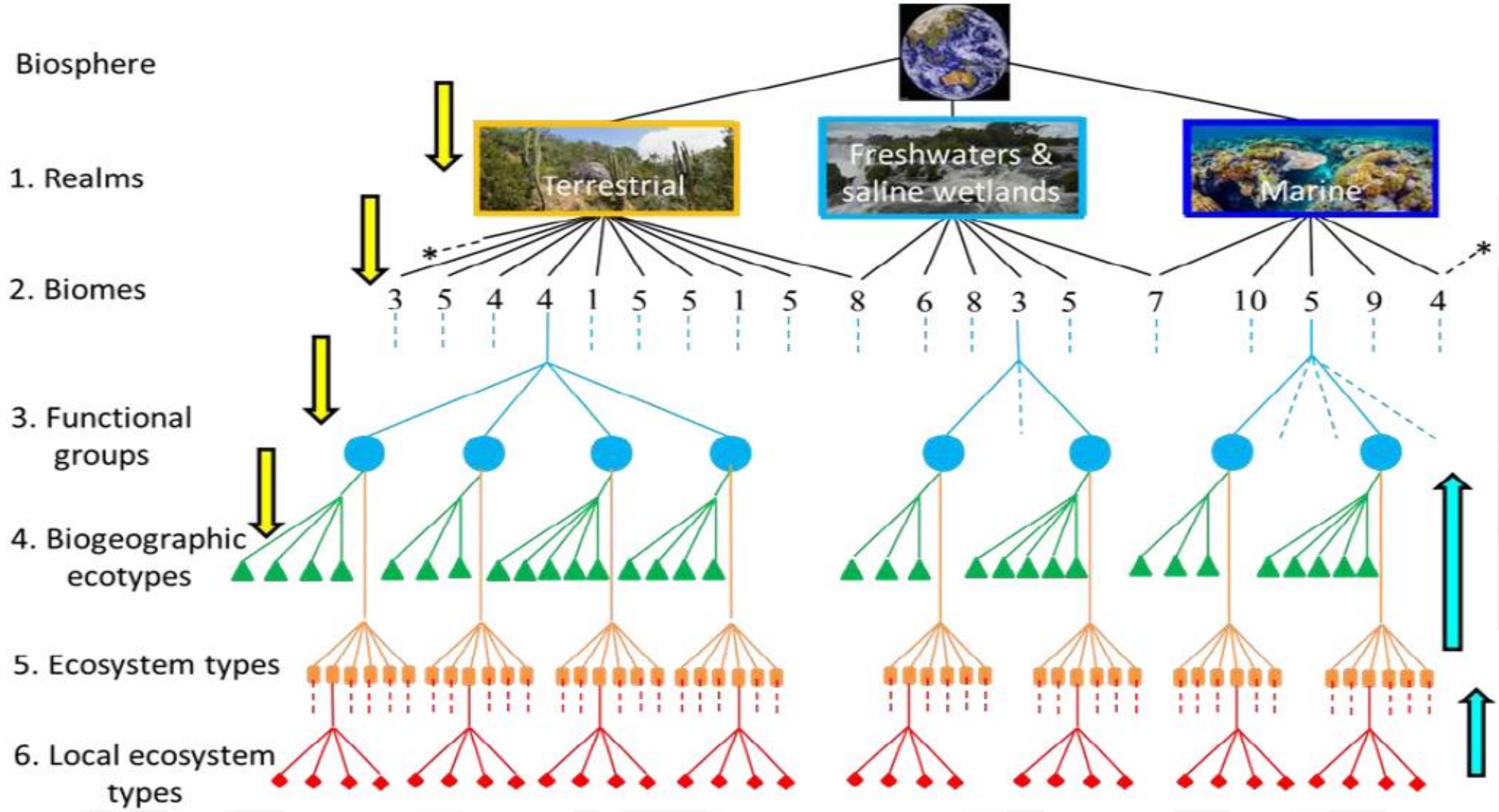
- A conceptual framework NOT a map product
- A scalable structure (nested/hierarchical):
  - 10 realms, 25 biomes, 110 ecosystem functional groups (EFGs)
  - ecosystem types nested within EFGs
- Represent ecosystem functions & variation in biota
- Conceptual consistency throughout the whole biosphere
- 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)

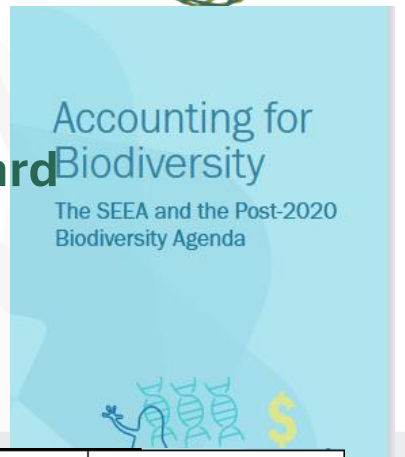


Providing a common 'language' for ecosystem dialogue & action across multiple domains

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

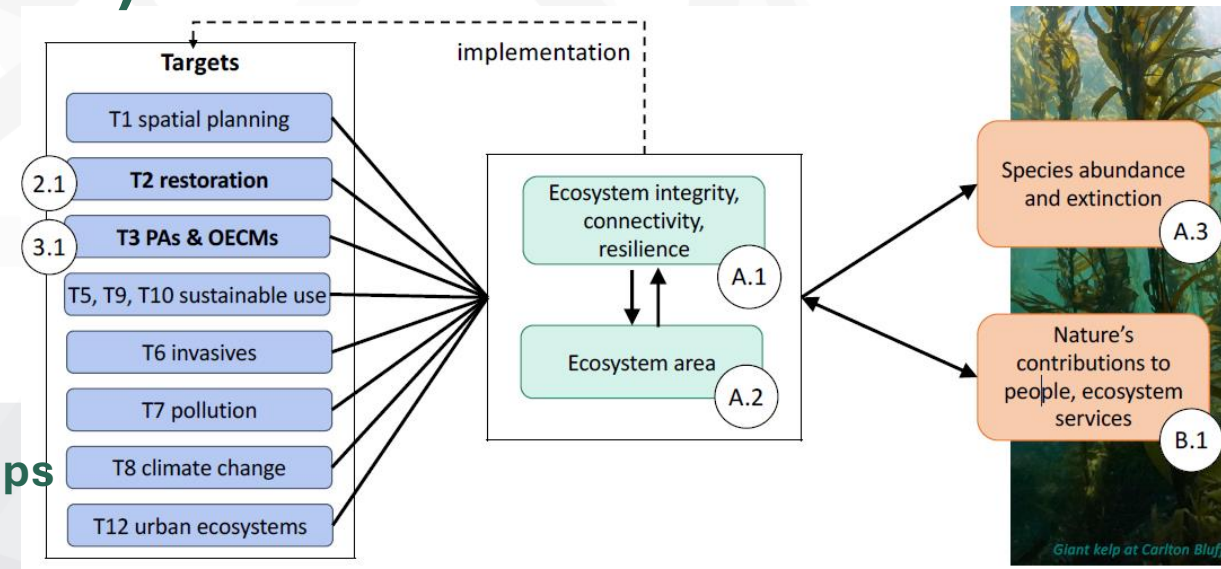
SEEA-EA Standard recommends

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

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

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

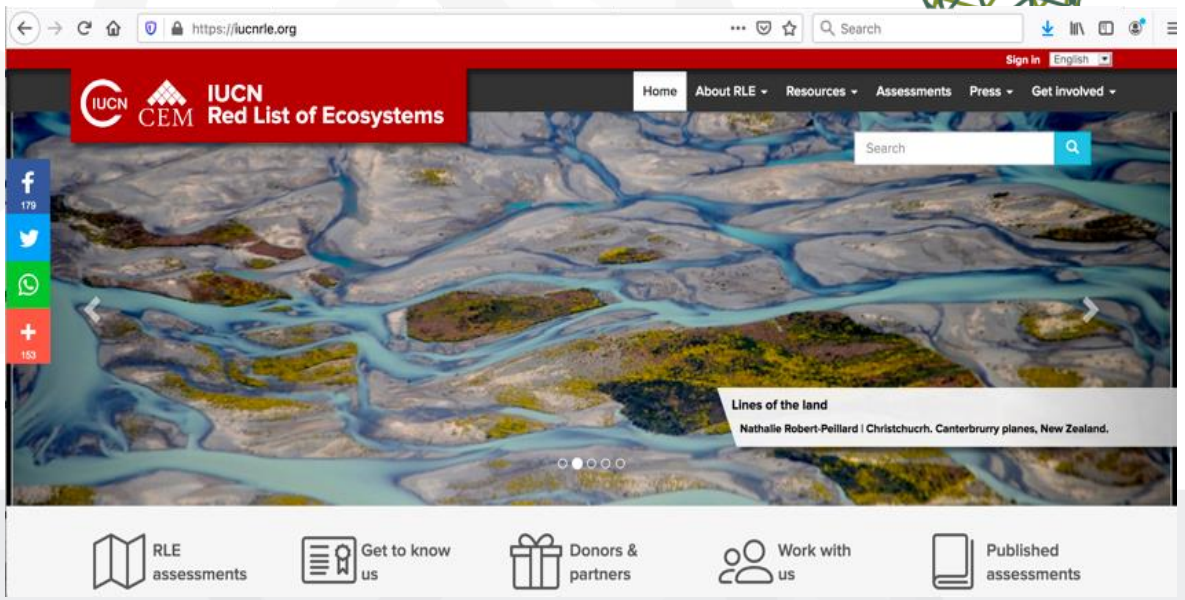
Risk: the probability of an adverse outcome over a specified time frame.
The adverse outcome is the ecosystem collapse

Priority: setting precedence to certain actions.
Risk can inform priority decisions

RED LIST OF ECOSYSTEMS

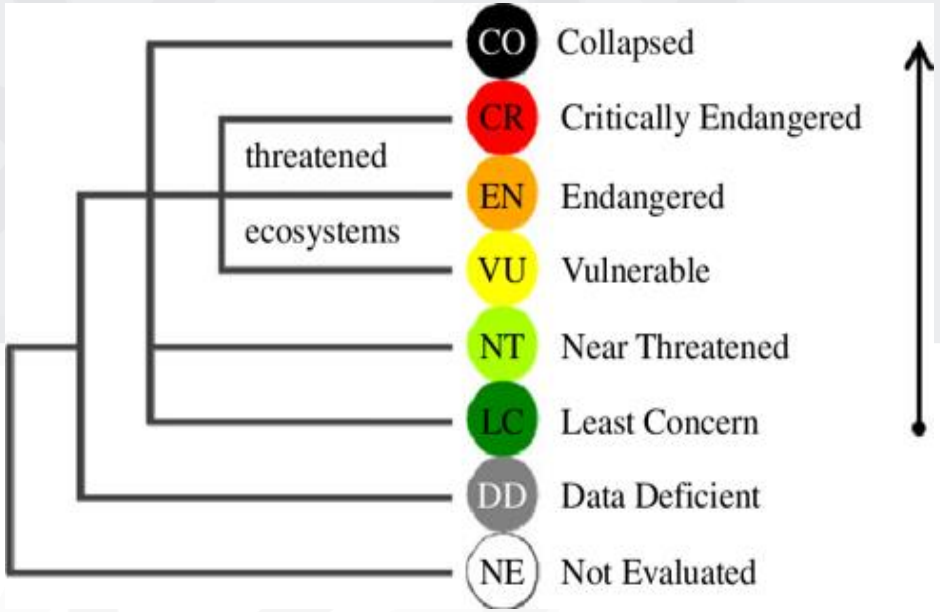
A Red List of Ecosystem assessment does not "set" priorities but informs about priorities

IUCN Red List of Ecosystems



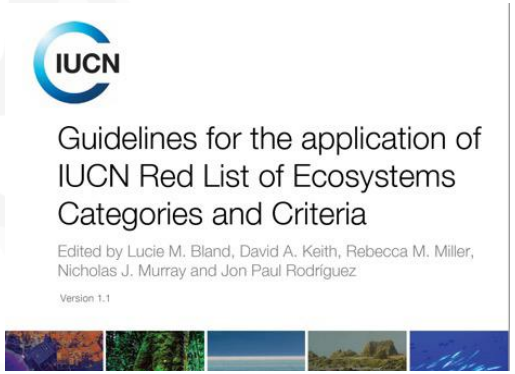
The IUCN Red List of Ecosystems identifies ecosystems most at risk of collapse based on:

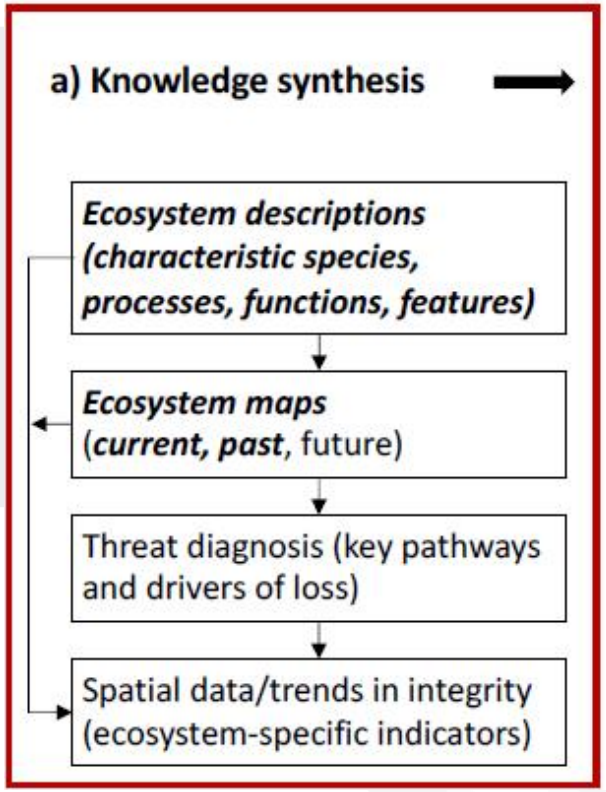
- Geographic distribution
- Changes in distribution
- Environmental degradation
- Disruption of biotic processes or interactions

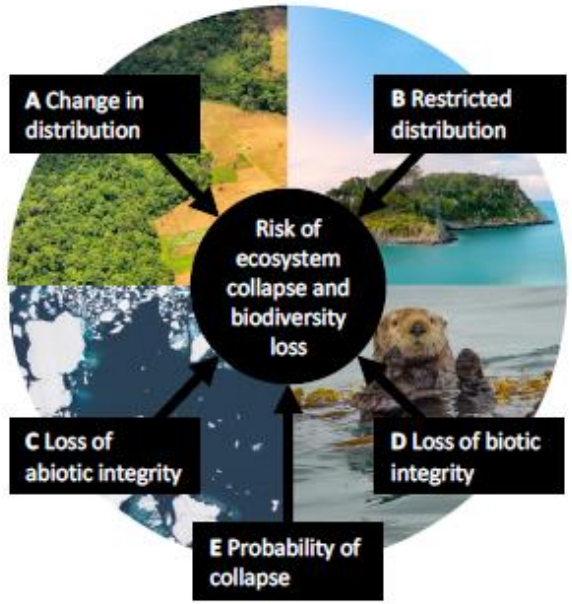


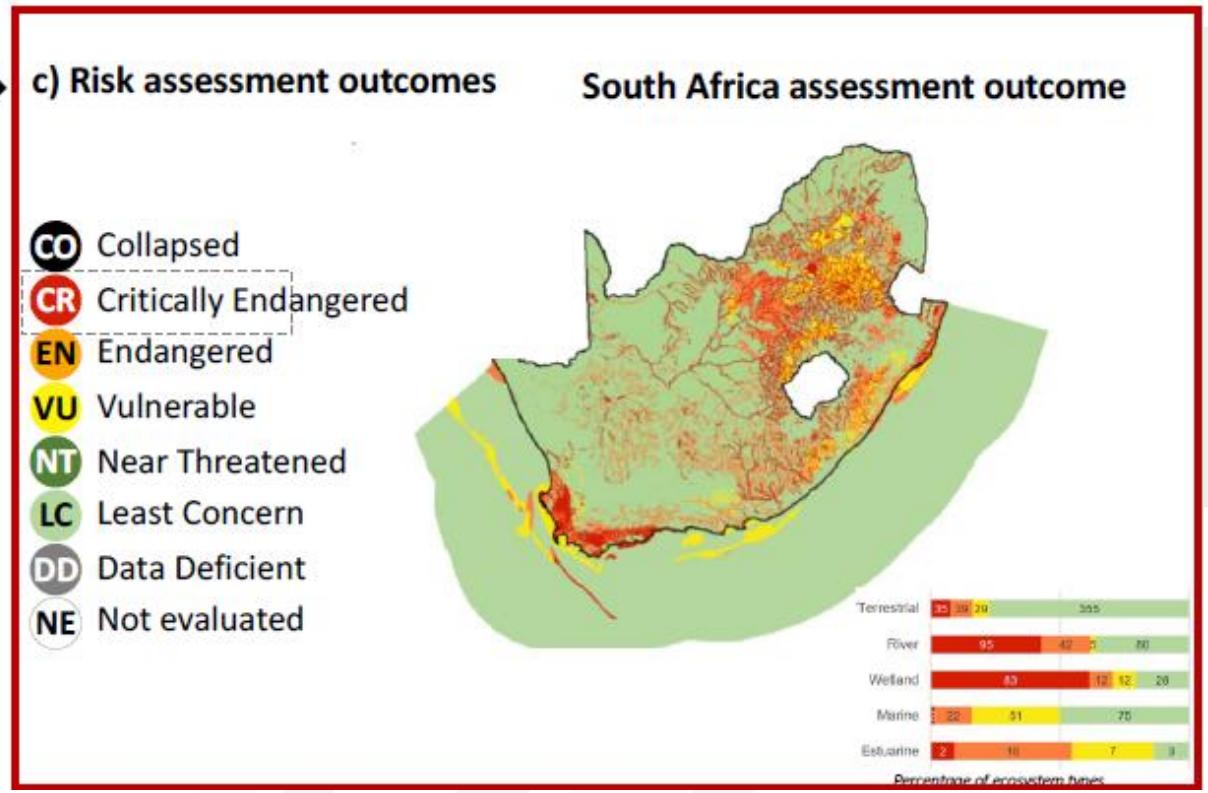
IUCN Red List of Ecosystems

- 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)



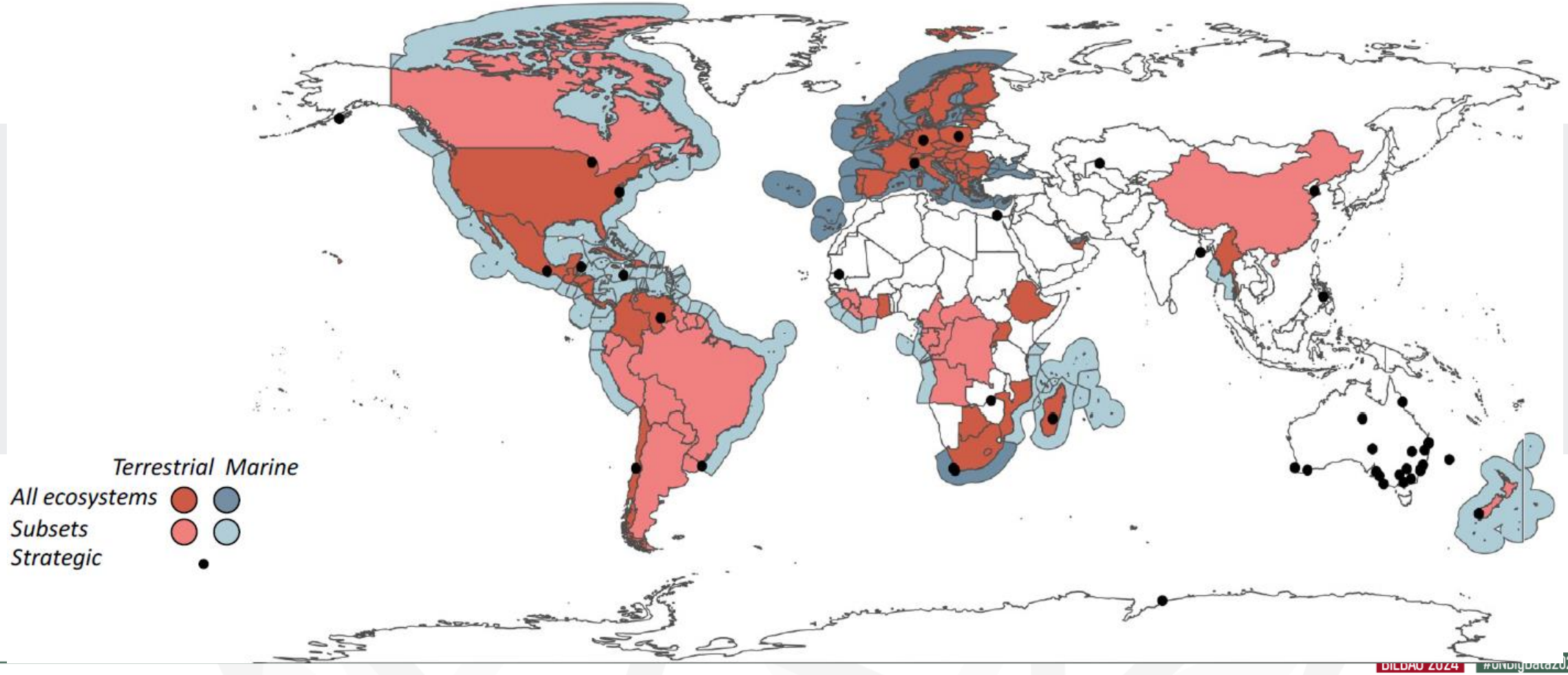


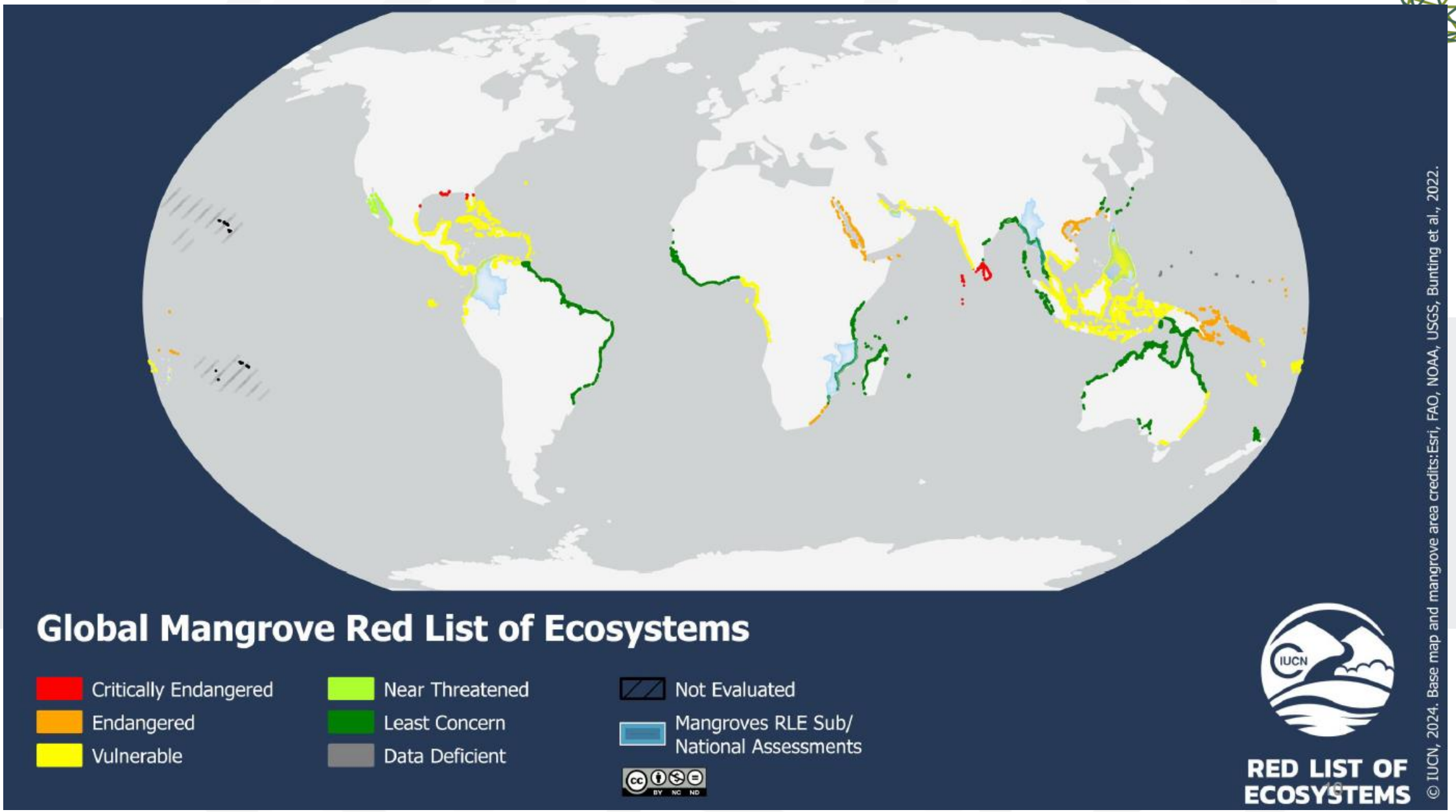


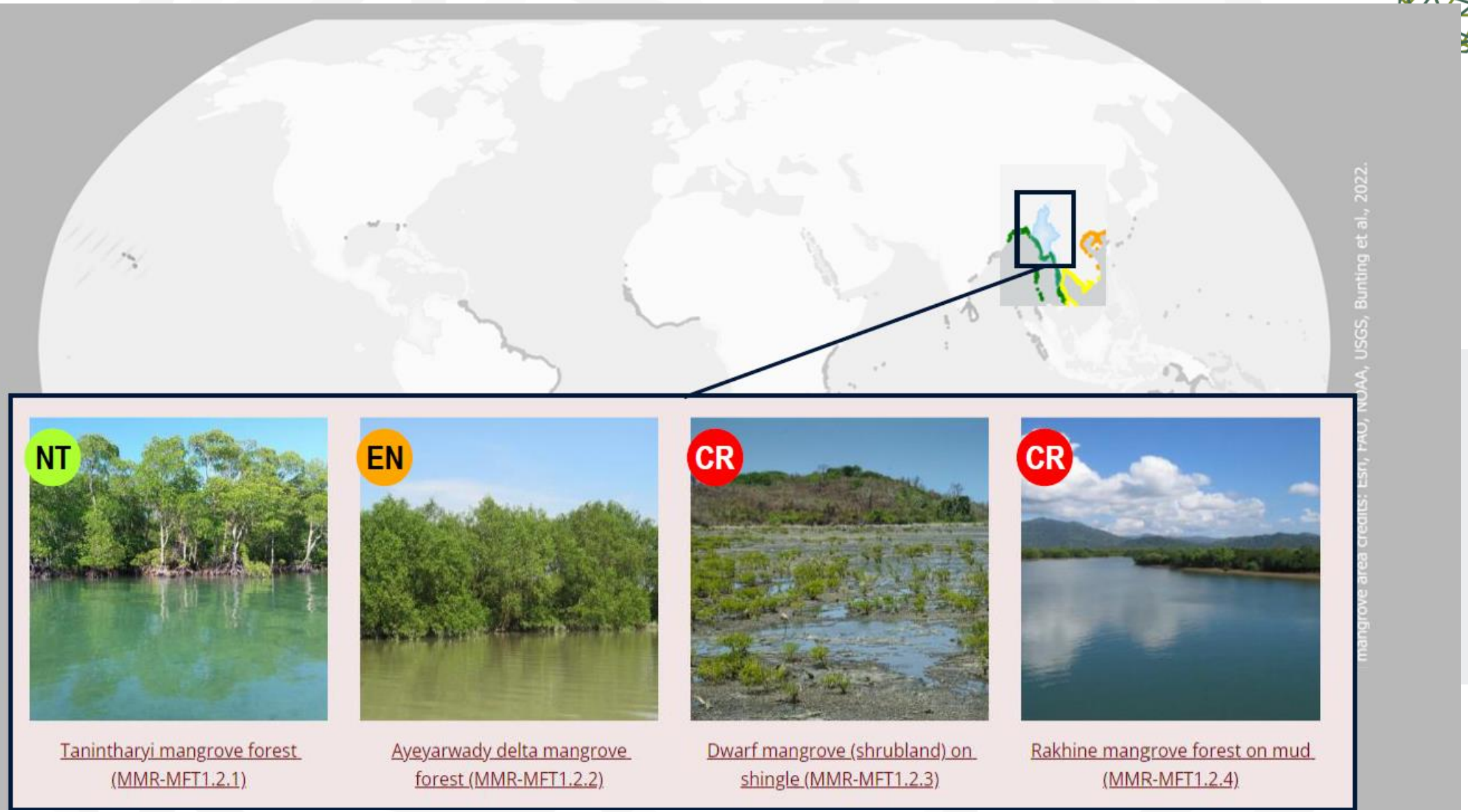


IUCN Red List of Ecosystems - spatial coverage

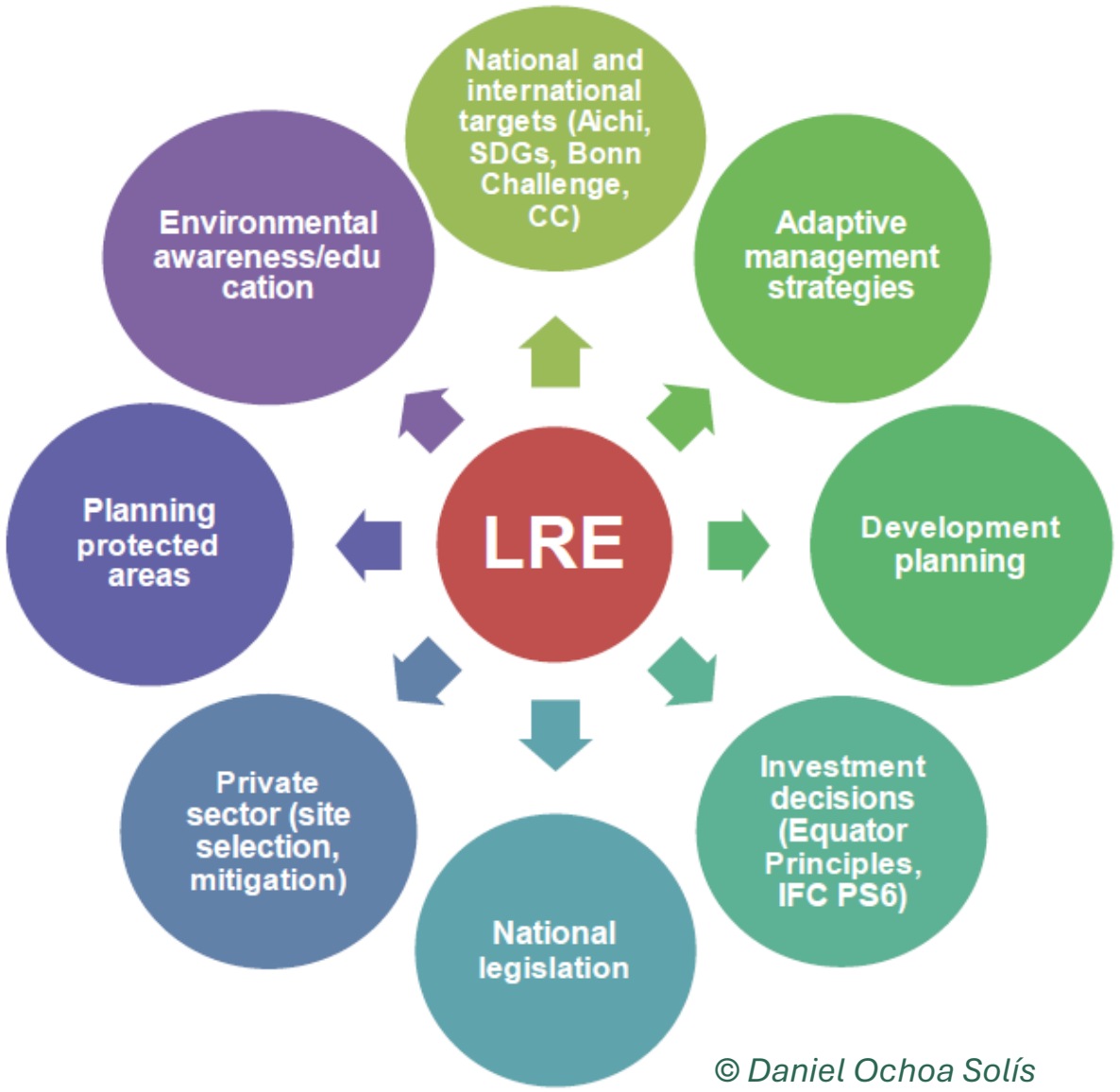
- *>4000 ecosystems assessed in 110 countries and 24 territories*
- *Wall-to-wall terrestrial ecosystems in >60 countries (red), >40 for all freshwater, >30 for all marine*
- *Investment needed for white & pink areas, reassessment of red*




Global Mangrove Red List of Ecosystems
Critically Endangered
Endangered
Vulnerable
Near Threatened
Least Concern
Data Deficient
Not Evaluated
Mangroves RLE Sub/
National Assessments
IUCN
RED LIST OF
ECOSYSTEMS
© IUCN, 2024. Base map and mangrove area credits:Esri, FAO, NOAA, USGS, Bunting et al., 2022.


mangrove area credits: Esri, FAO, NOAA, USGS, Bunting et al., 2022.
NT
EN
CR
CR
Tanintharyi mangrove forest (MMR-MFT1.2.1)
Ayeyarwady delta mangrove forest (MMR-MFT1.2.2)
Dwarf mangrove (shrubland) on shingle (MMR-MFT1.2.3)
Rakhine mangrove forest on mud (MMR-MFT1.2.4)

IUCN Red List of Ecosystems - uses and applications



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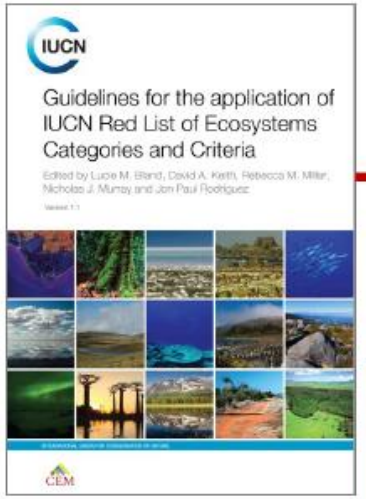
The Red List of Ecosystems is a tool to improve decision-making and actions for conservation, restoration and sustainable management.

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.

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

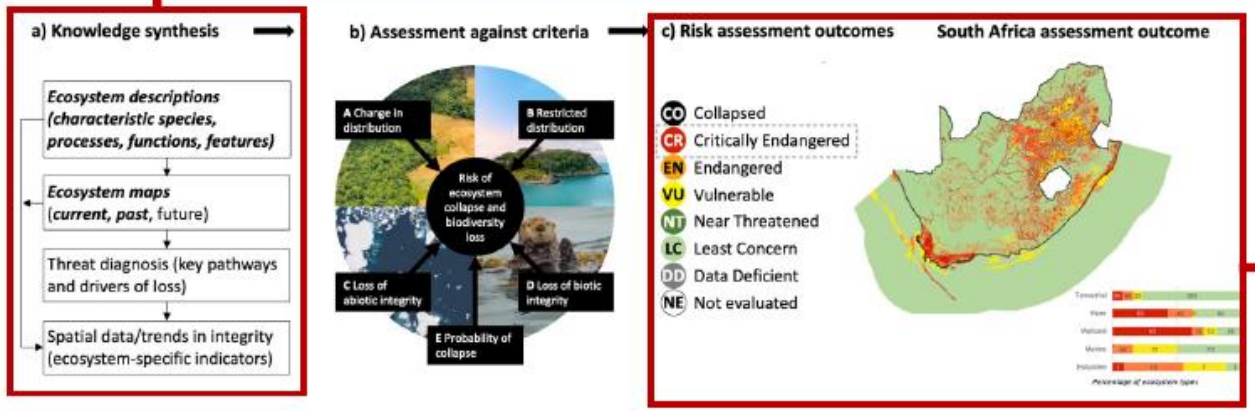
Risk assessment outcomes

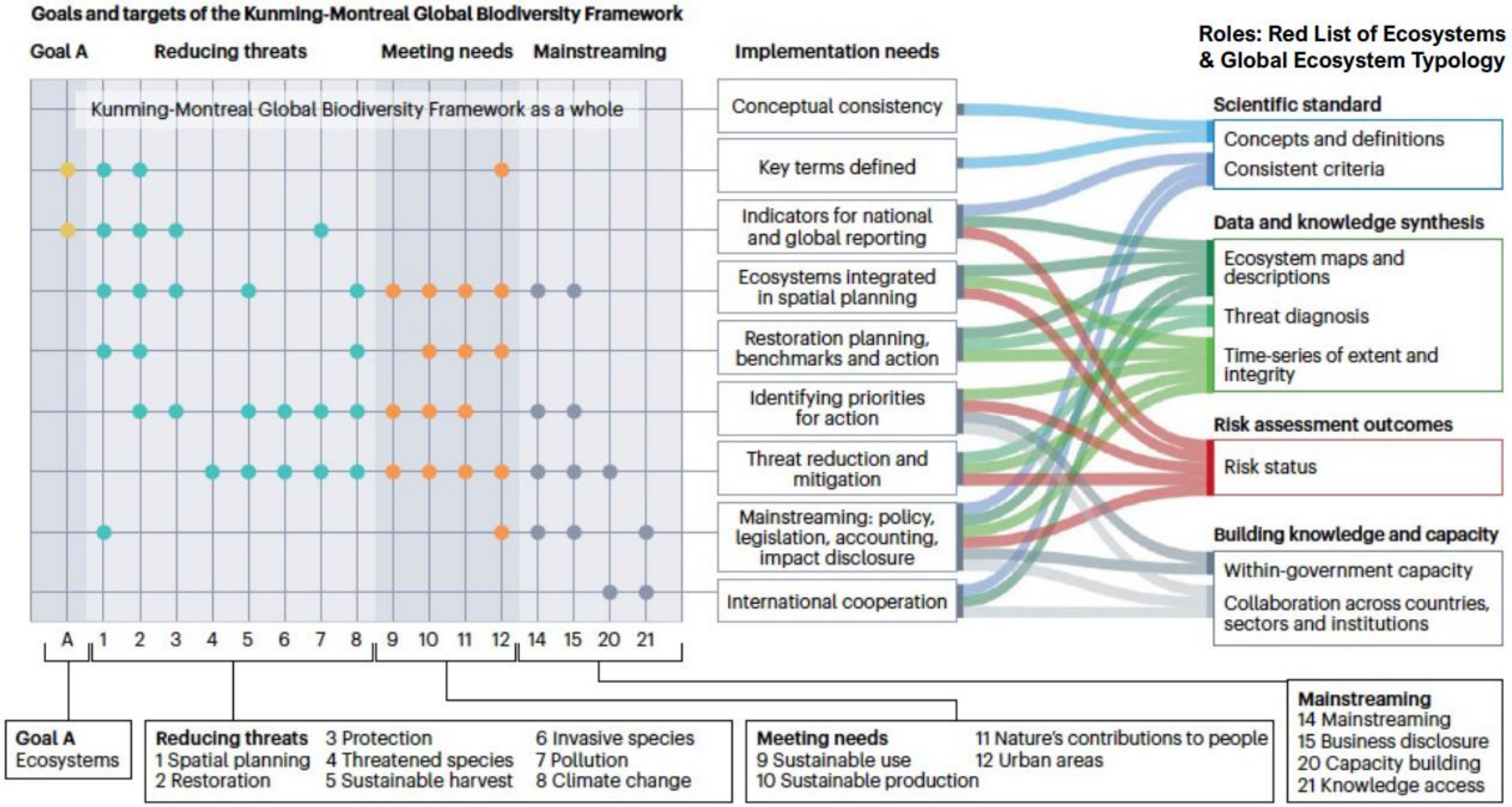
Risk status

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
Kunming-Montreal Global Biodiversity Framework as a whole
A 1 2 3 4 5 6 7 8 9 10 11 12 14 15 20 21
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!