

# Introduction to Nature Based Solutions

Lecture for the 88th UNEP/UNESCO/BMUV International Short Course on Nature-based Solutions to emerging water challenges

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(CIPSEM) - **23.10.2023**



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- NBS Basic definition and understanding, evolution of the NBS concept
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- Evaluation of NBS and their effectiveness
- Best practices and learning effects as well as barriers and opportunities
- Application-related deep dive and illustrative examples

Summary, open discussion with Q&A, Feedback, wrap-up / end

There will be interactive elements and group work throughout the day

# Welcome and Warm-up

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 Mentimeter

## Instructions

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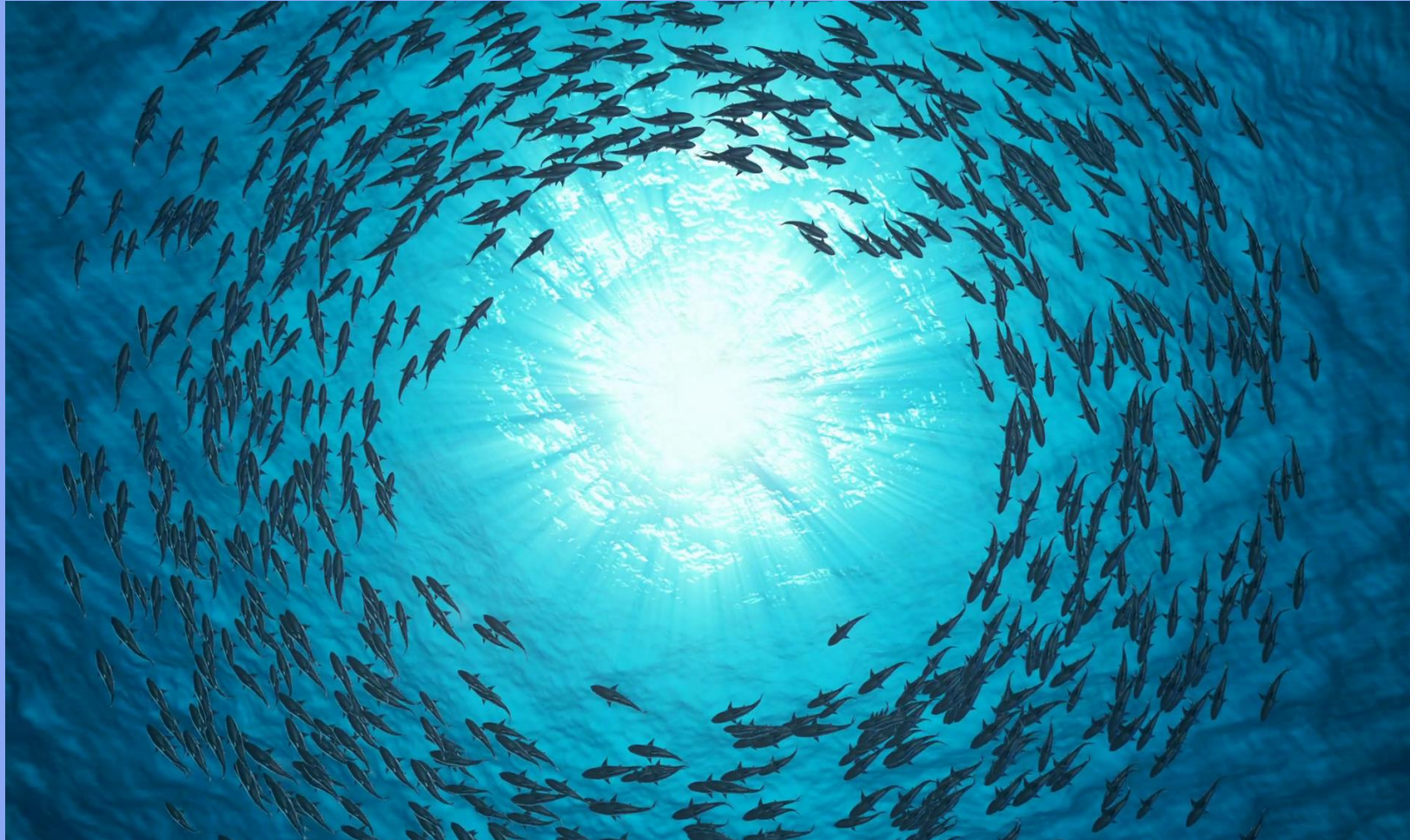
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# Tour de Table



# **Block I:** Introduction to nature-based solutions

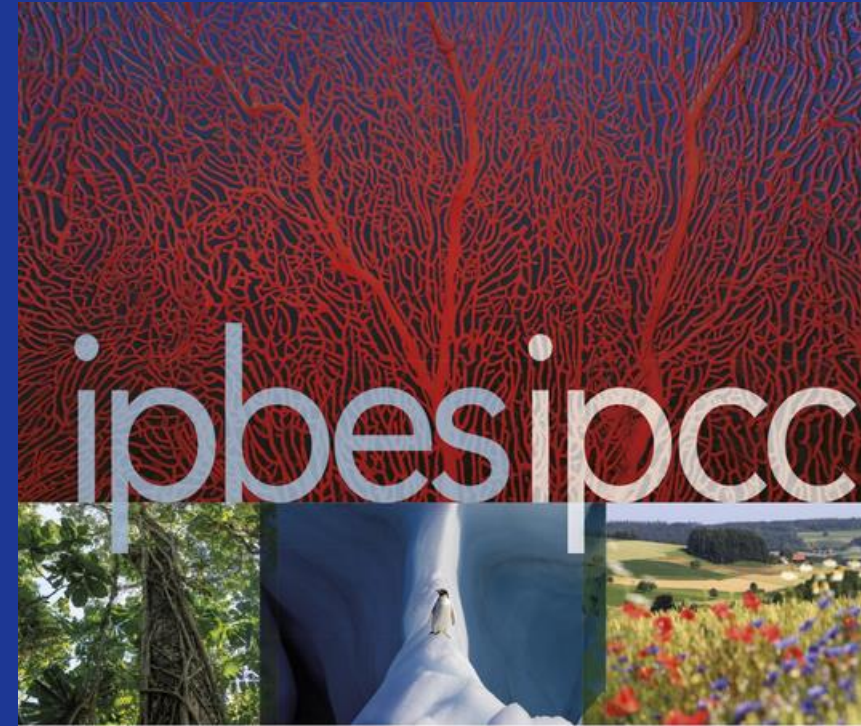


# Background and context

## Part I

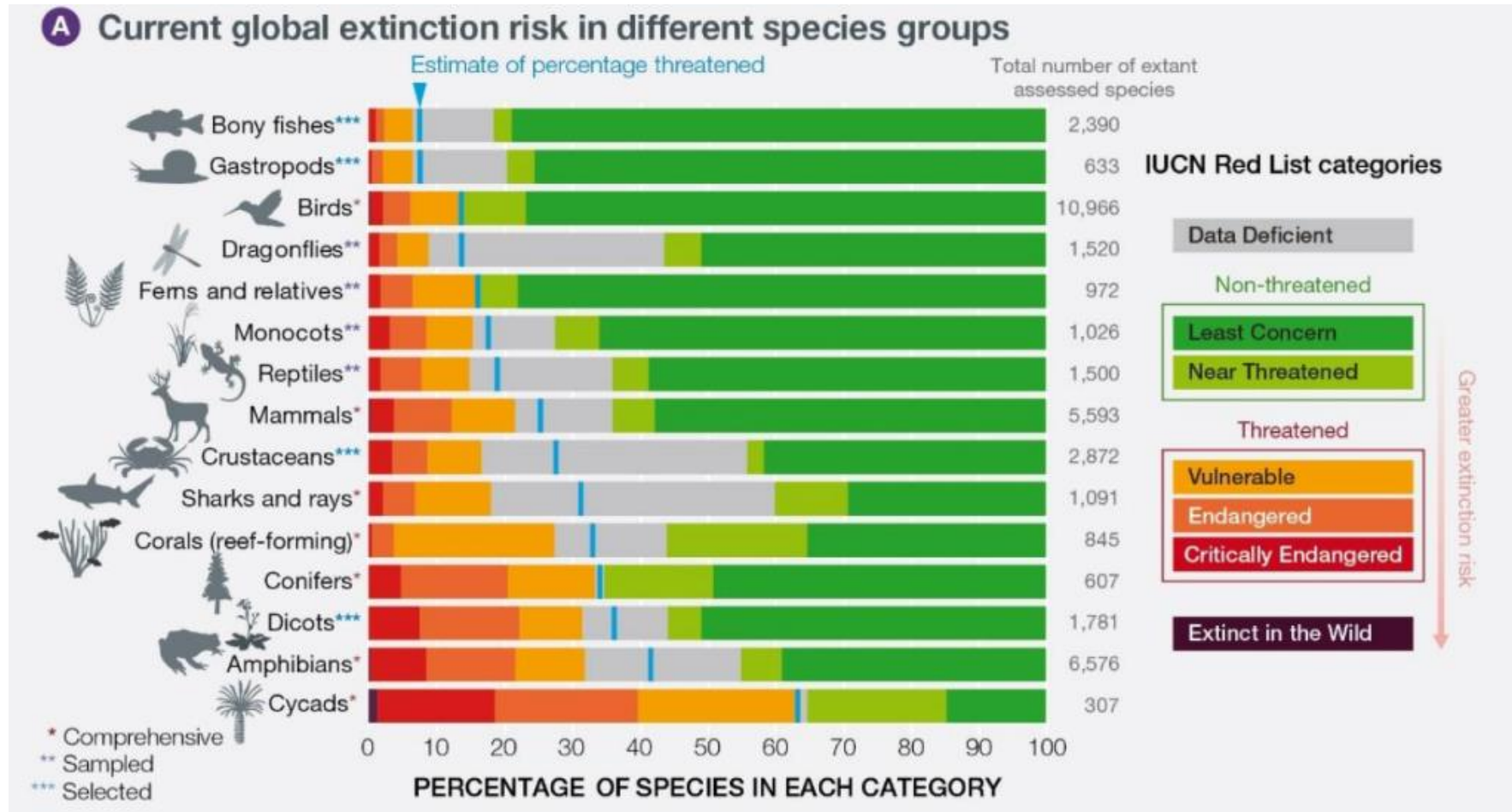
**“Conserving nature and  
adapting to climate  
change are two sides of  
the same coin”**

**Inger Andersen,  
Executive Director of the United  
Nations Environment Programme**



*Image: IPBES & IPCC*

# Global biodiversity at risk

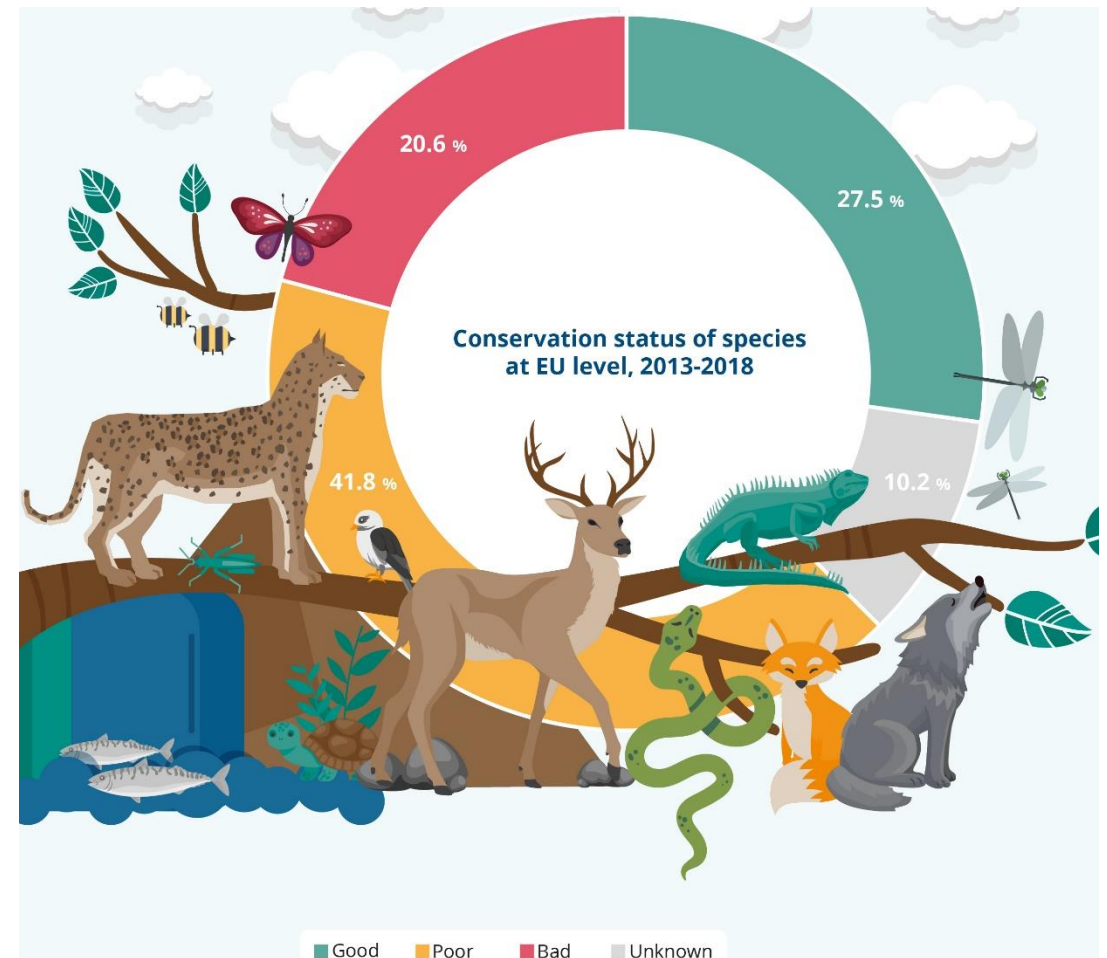
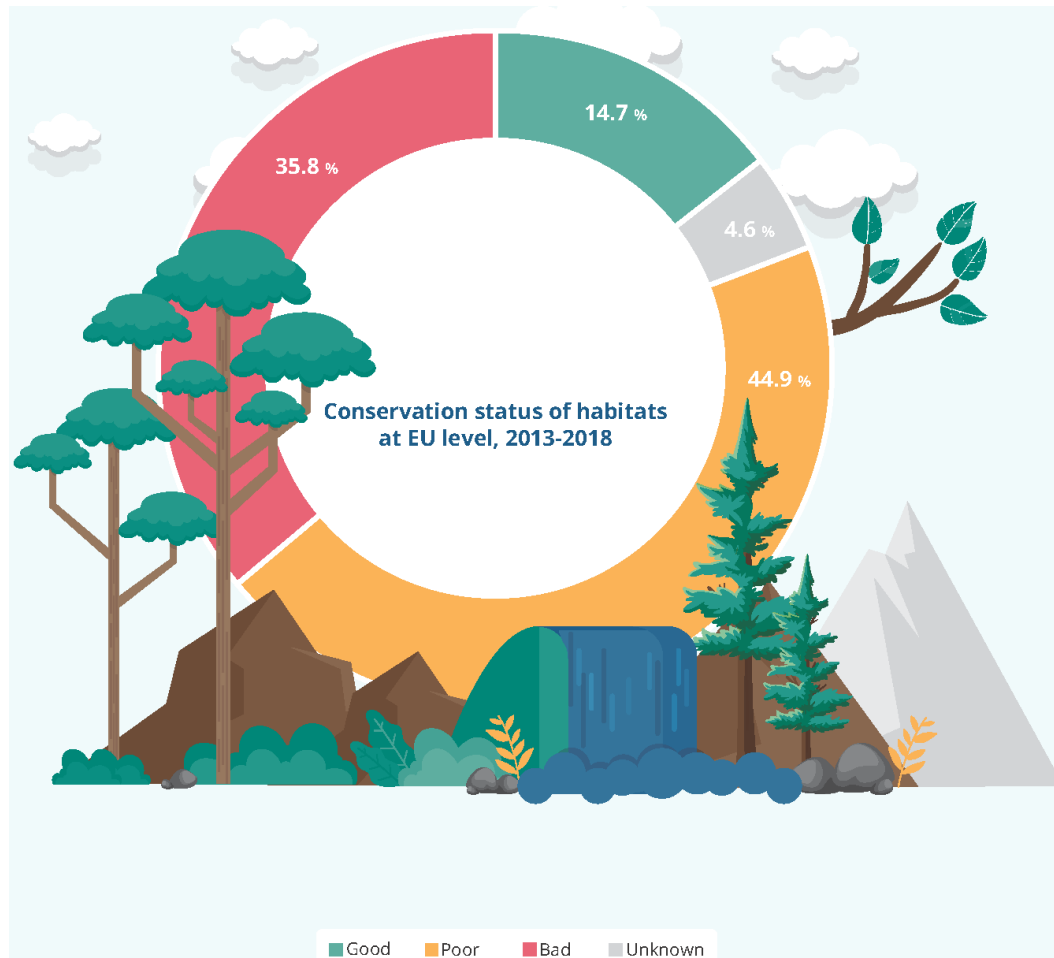


© IPBES, 2019



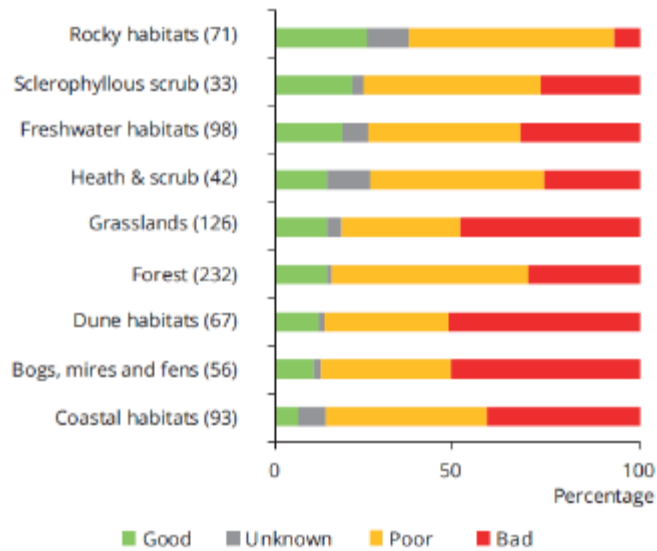
# EU State of Nature

State of Nature in the EU report 2020: “Europe’s nature is experiencing a serious and continuing decline.”

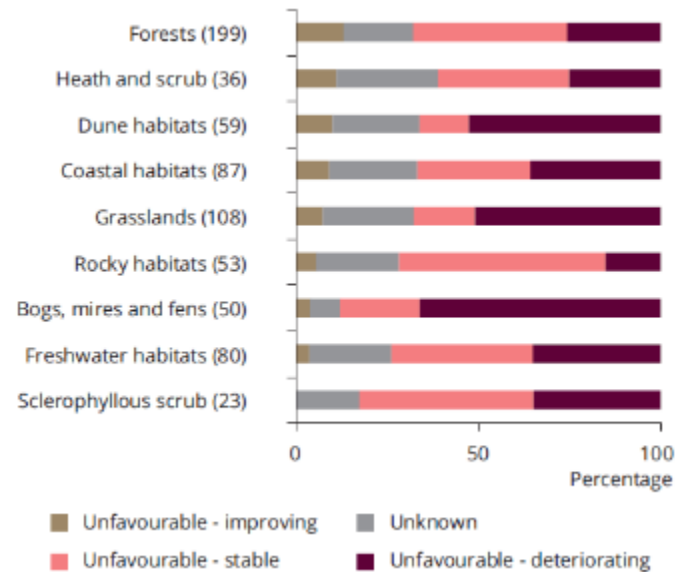


# Status and trends for habitats

Conservation status per habitat group at the EU level



Conservation status trends for habitats not in good status per habitat group at EU level



**Note:** The number of assessments per group is indicated in parentheses. The total number of assessments is 818.

**Source:** Article 17 Member States' reports and EU assessments.

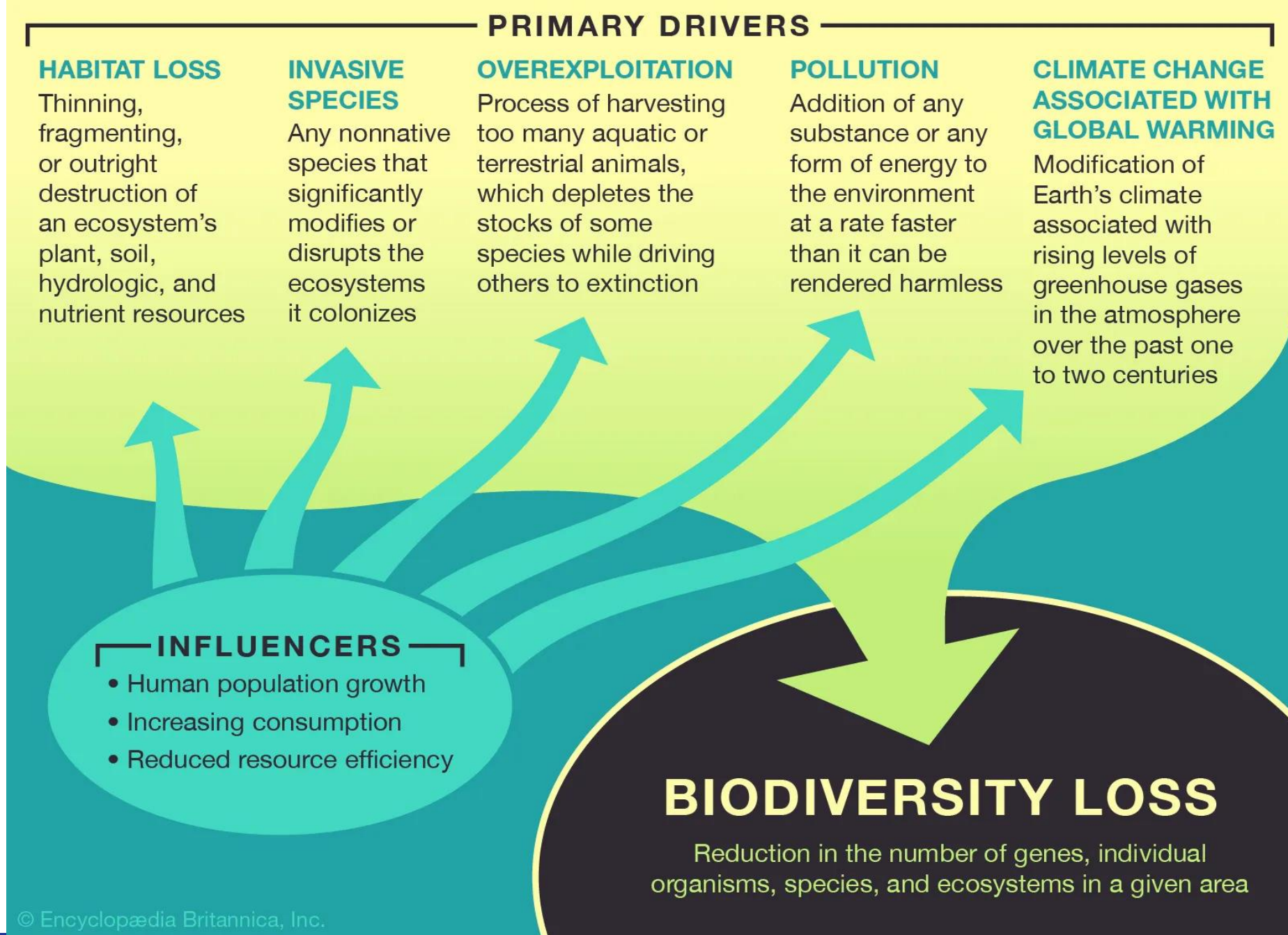
**Note:** Conservation status trends are based on EU habitat assessments. The number of assessments is indicated in parentheses. The total number of assessments is 698.

**Source:** Article 17 Member States' reports and assessments.





# Drivers of Loss



# Main pressures in the EU

With **21 %**, **agriculture** is the most frequently reported pressure for habitats and species. Abandonment of grasslands and intensification is particularly impacting pollinator species, farmland birds and semi-natural habitats

**Urbanisation and leisure activities** account for **13 %** of all reported pressures, representing 48 % of all marine pressures.

**Invasive alien species** such as the False Indigo-bush, particularly affect dunes and sclerophyllous scrubs as well as species such as breeding seabirds.

**Forestry** activities represent **11 %** of all pressures, particularly affecting forest habitats, and woodland species.

**Climate change** is reported as a rising threat, particularly due to ongoing changes in the temperature and the decrease of precipitation.

Almost **50 %** of all pressures related to **pollution** can be attributed to air, water and soil pollution caused by agriculture.

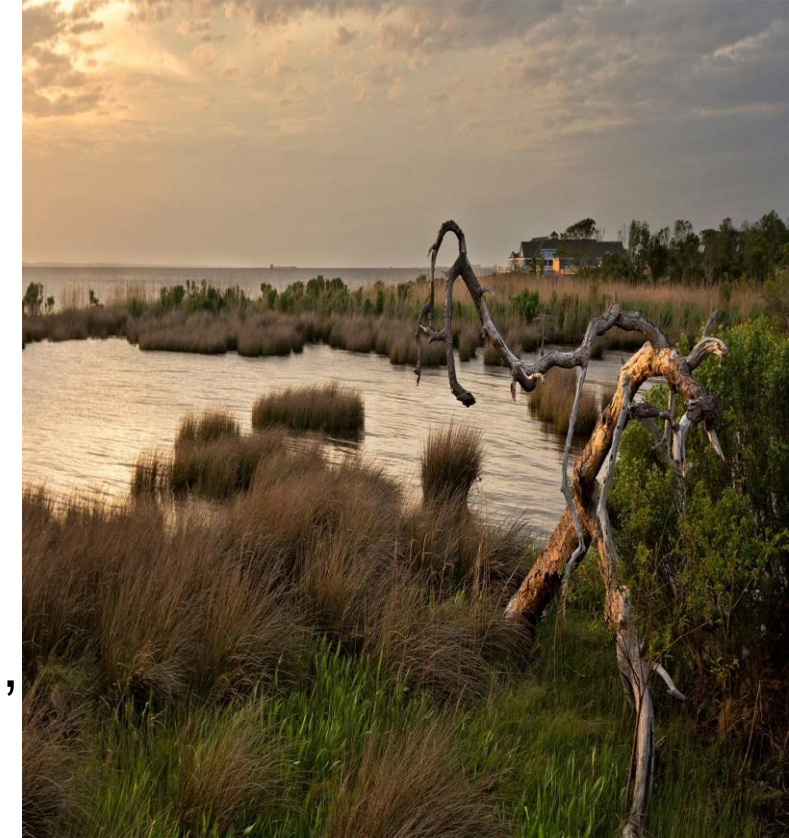
The **modification on water regimes**, physical alterations of water bodies and removal of sediments predominantly affect freshwater habitats and fish.

**18 %** of all pressures for **birds** stem from the exploitation of species, mainly relating to **illegal killing and hunting**. In Europe, the annual hunting bag amounts to at least 52 million birds.



## Example: Saltmarshes

- ▶ **Loss:** 50% of salt marshes worldwide have been either degraded or lost due to human activities
- ▶ **Services:** coastal protection, water purification, carbon sequestration, raw materials & food, maintenance of fisheries, biodiverse habitat, tourism, recreation, education & research



**Table 2 | Carbon burial and soil stocks in vegetated coastal ecosystems.**

Ecosystem	Local C burial rate (g C m <sup>-2</sup> yr <sup>-1</sup> )	Local C stock in soil (Mg C ha <sup>-1</sup> )	Global C burial rate (Tg C yr <sup>-1</sup> )	Global C stock in soil (Pg C)
Salt marshes	218±24 <sup>5</sup>	162 (259) <sup>65</sup>	4.8-87.3 <sup>5</sup>	0.4-6.5
Mangroves	163 <sup>35</sup>	255 <sup>64</sup> (683.4) <sup>38</sup>	22.5-24.9 <sup>35</sup>	9.4-10.4
Seagrasses	138±38 <sup>5</sup>	139.7 (372) <sup>39</sup>	48.0-112 <sup>5</sup>	4.2-8.4 <sup>39</sup>

Mean and, when available, standard error of the mean (±s.e.m.) of organic carbon (C) burial and stock within the top 1 m of soil. Maximum local C stock is provided in brackets. Global C stocks are estimated from local C stocks and ecosystem extension (Table 1) unless indicated. Superscript numbers indicate the reference sources of data.



# The Biosphere provides life support systems upon which prosperity and development ultimately rest

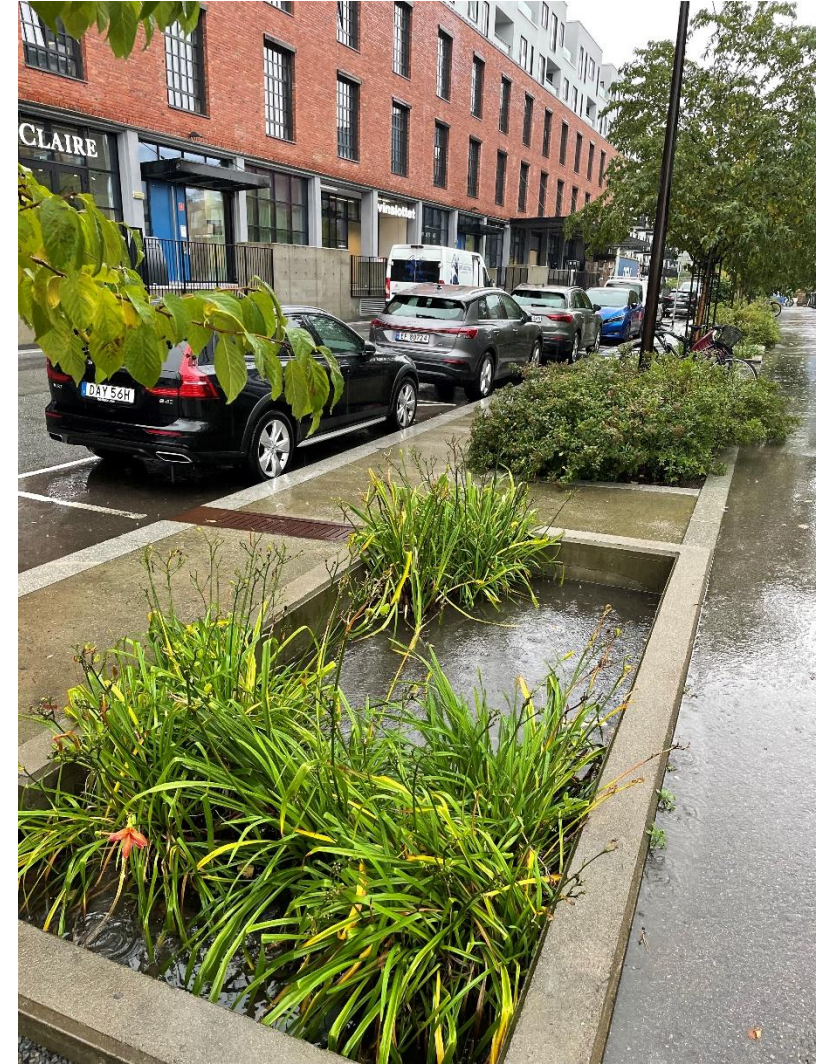


Source: Stockholm Resilience Centre

# Freshwaters

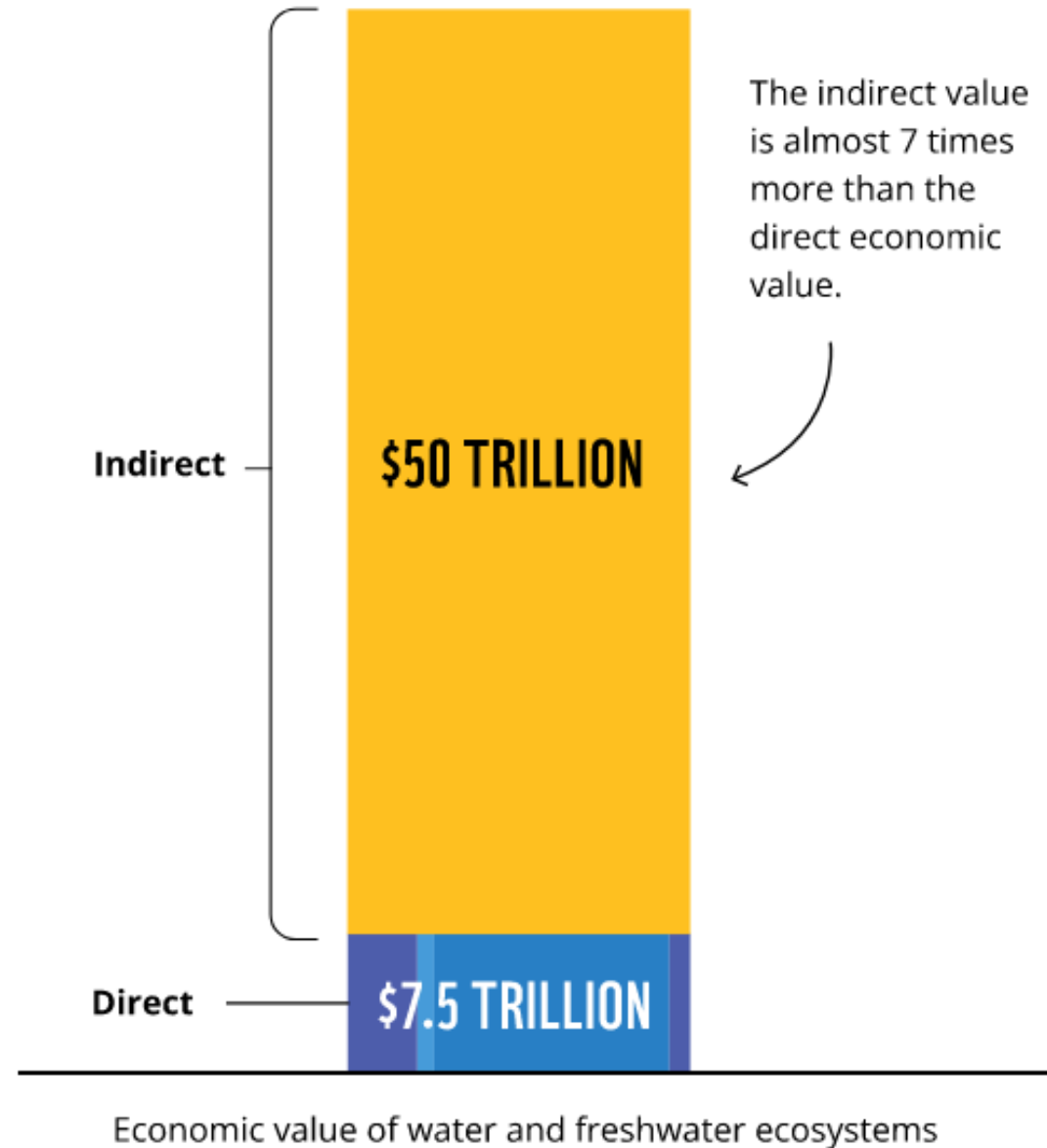
## Sentinels for truly transformative change

- Water 'flows' through all sectors --> integrative element
- Aquatic systems as sinks → Sentinels for activities on land



*Image: B. Kupilas*

## Economic values of freshwaters



# Freshwaters

## Sentinels for truly transformative change

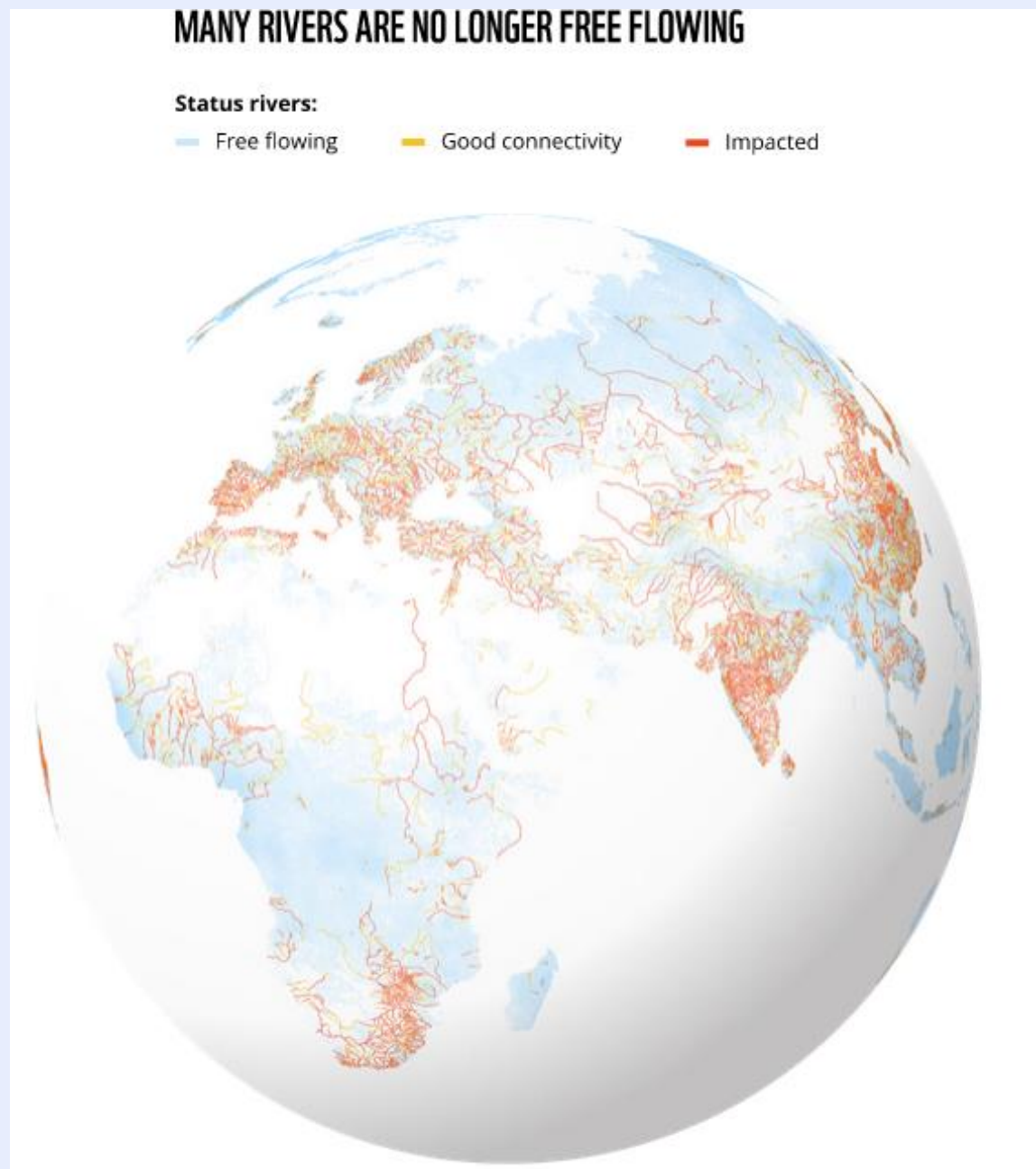
- Water 'flows' through all sectors integrative element
- Aquatic systems as sinks → Sentinels for activities on land

## Connect Land and Sea within river catchments





## Loss of free flowing rivers

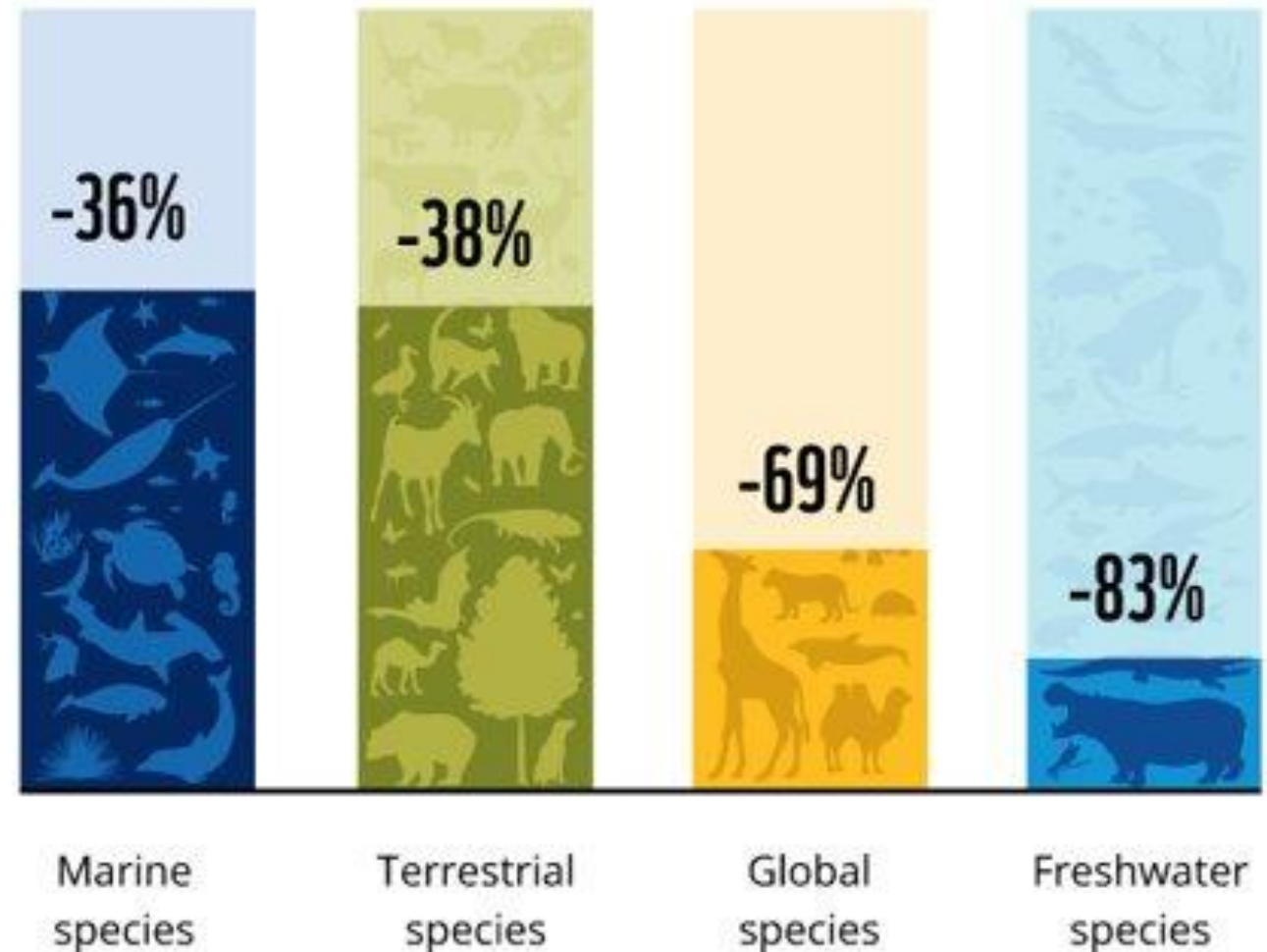




## Freshwater biodiversity with steepest decline

### BIODIVERSITY TODAY

Freshwater species decline is the most acute



**“[..]. We need to remember that water doesn't come from a tap – it comes from nature. Water for all depends on healthy freshwater ecosystems, which are also the foundation of food security, biodiversity hotspots and the best buffer and insurance against intensifying climate impacts. Reversing the loss of freshwater ecosystems will pave the way to a more resilient, nature-positive and sustainable future for all.”**

**Stuart Orr,  
WWF Global Freshwater Lead**



*Image: WWF*

# Further reading



## HIGH COST OF CHEAP WATER:

THE TRUE VALUE OF WATER AND  
FRESHWATER ECOSYSTEMS TO  
PEOPLE AND PLANET

# **Introduction and common understanding of Nature Based Solutions**

## **Part II**

# Understanding of NBS

- ▶ Inspired by, supported by or copied from nature
- ▶ Maintaining and enhancing natural capital as basis
- ▶ Can address a variety of societal challenges
- ▶ Potential to be cost-effective, resource- and energy-sufficient and resilient to change
- ▶ Potential to contribute to green growth, future-proofing society, fostering citizens well-being and human health and providing business opportunities



# What are Nature-based solutions (NBS)?

**NBS are:** *‘actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits.’*

- UNEA-5 resolution (2022)
- Based on IUCN definition (2016), which was cited by IPCC and IPBES and in 2000+ peer reviewed articles in recent years



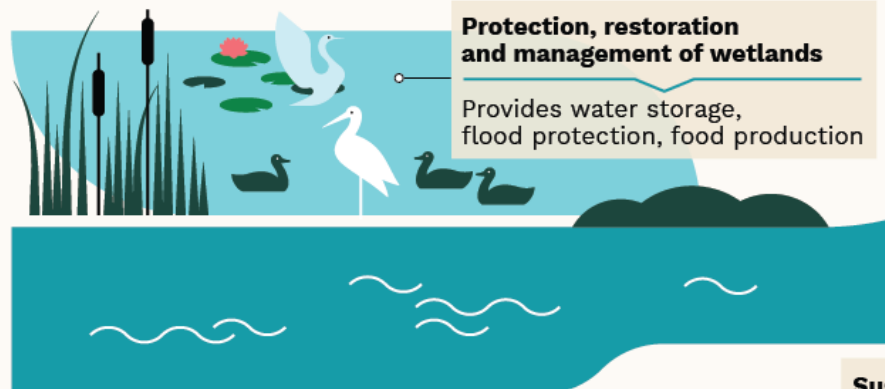
# Examples of NbS application:



**Protection or restoration of coastal ecosystems**  
Brings community resilience, disaster risk reduction, economic development



**Protection, restoration and sustainable use of forest landscapes**  
Secures water supply, erosion control and risk reduction



**Protection, restoration and management of wetlands**  
Provides water storage, flood protection, food production



**Providing space for rivers to naturally flow**  
Enables flood protection, water security



**Urban green and blue spaces**  
Empowers climate regulation, better human health, social development, green jobs



**Sustainable management of agroforestry systems**  
Offers food security, water regulation, economic and social development



**Urban green and blue spaces**  
Empowers climate regulation, better human health, social development, green jobs

## NbS have prime potential to help address global challenges such as:



climate change



economic and social development



human health



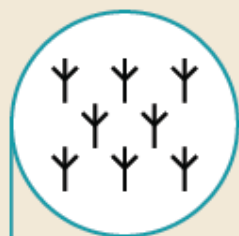
food and water security



disaster risk reduction



ecosystem degradation



biodiversity loss

## NbS can provide long-term environmental, societal and economic benefits:



adaptation to climate change



green jobs



community resilience



health benefits



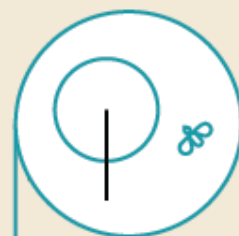
healthy and accessible food



clean air and water



disaster risk reduction



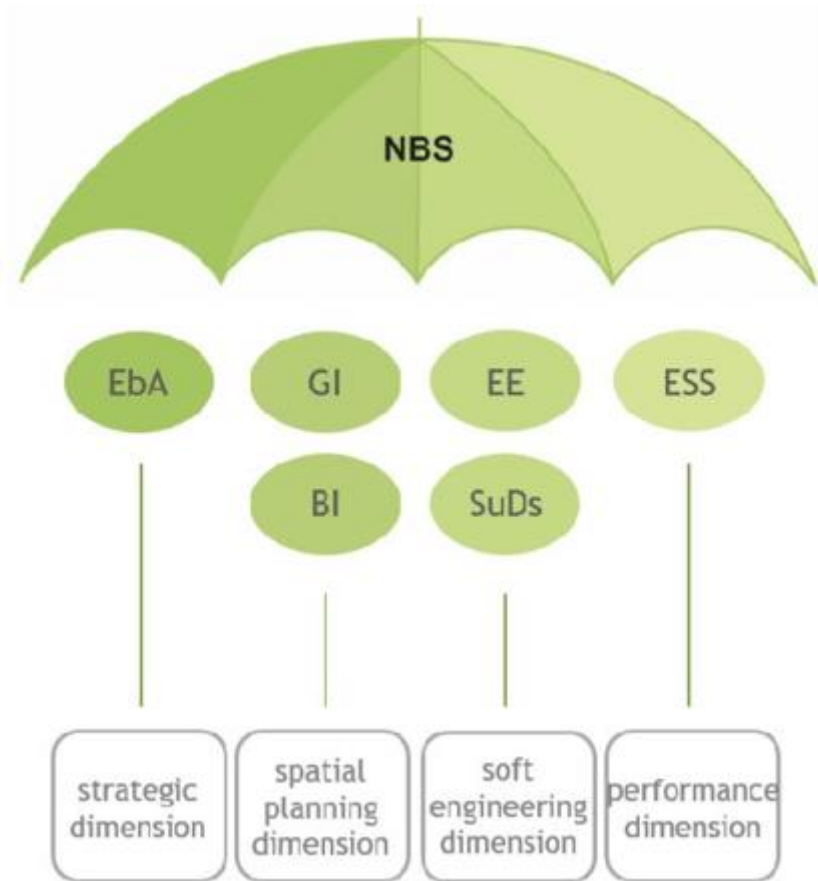
ecosystem integrity



biodiversity net gain



# NBS as an umbrella concept



- EbA → Ecosystem-based adaptation
- GI → Green infrastructure
- BI → Blue infrastructure
- EE → Ecological engineering
- SuDs → Sustainable urban drainage systems
- ESS → Ecosystem services

# NbS concepts

- ER** Ecological Restoration
- EE** Ecological Engineering
- FLR** Forest Landscape Restoration
- GI** Green Infrastructure
- NI** Natural Infrastructure
- EbMgt** Ecosystem-based Management

- EbA** Ecosystem-based Adaptation
- EbM** Ecosystem-based Mitigation
- Eco-DRR** Ecosystem-based Disaster Risk Reduction
- CAS** Climate Adaptation Services
- AbC** Area-based Conservation

Table 4. Categories and examples of NbS approaches

Category of NbS approaches	Examples
Ecosystem restoration approaches	Ecological restoration Ecological engineering Forest landscape restoration
Issue-specific ecosystem-related approaches	Ecosystem-based adaptation Ecosystem-based mitigation Climate adaptation services Ecosystem-based disaster risk reduction
Infrastructure-related approaches	Natural infrastructure Green infrastructure
Ecosystem-based management approaches	Integrated coastal zone management Integrated water resources management
Ecosystem protection approaches	Area-based conservation approaches including protected area management



# Timeline of the publications relevant for the NBS concept



## Why NBS?

**NBS** are ways to adapt to climate change, for example heavy rainfall and flooding, by mimicking or **restoring** natural features along rivers. At the same time they safeguard biodiversity.



”

**The conservation and protection of ecosystems that act as carbon sinks are among the cheapest, safest and easiest solutions to reduce greenhouse gas emissions and promote adaptation to climate change.”**

**Jones et al., 2012**

# Natural Infrastructure for Water Management

Investing in nature for multiple objectives



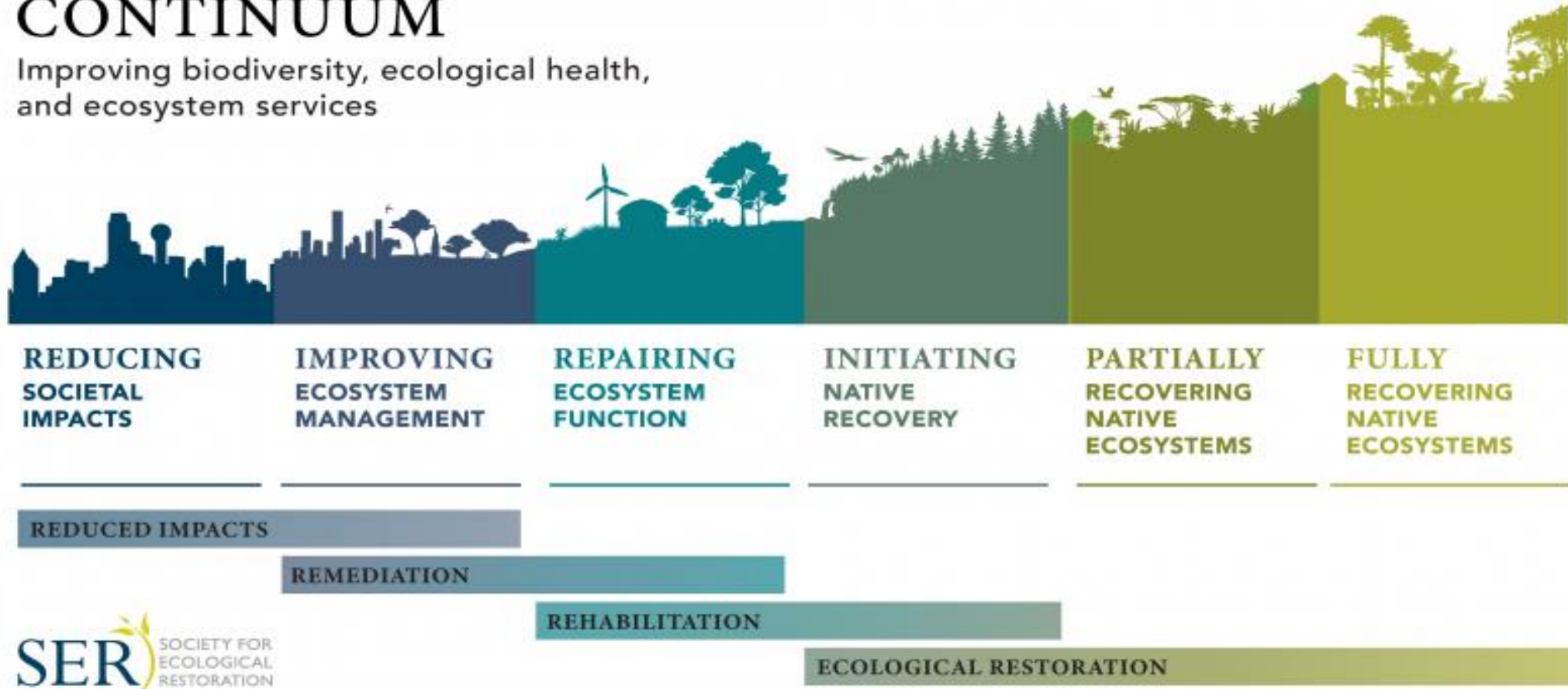
© IUCN Water



# Restoration as NBS - Spectrum of human intervention

## THE RESTORATIVE CONTINUUM

Improving biodiversity, ecological health, and ecosystem services



# TEN PRINCIPLES THAT UNDERPIN ECOSYSTEM RESTORATION



**GLOBAL  
CONTRIBUTION**



**BROAD  
ENGAGEMENT**



**MANY TYPES  
OF ACTIVITIES**



**BENEFITS TO  
NATURE AND PEOPLE**



**ADDRESSES CAUSES  
OF DEGRADATION**



**KNOWLEDGE  
INTEGRATION**



**MEASURABLE  
GOALS**



**LOCAL AND LAND/  
SEASCAPE CONTEXTS**



**MONITORING  
AND MANAGEMENT**



**POLICY  
INTEGRATION**

## Defining restoration

” the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed

Society of Ecological Restoration (2002)

From  
passive to  
active  
restoration

Ounanian et al. 2018

# Ecological restoration

”

**aims to recover biodiversity and ecosystem functioning, health, and integrity, both for humans and for other living organisms**

Clewell & Aronson (2012)



© ecokohtao.com



## Group work:

*Have you been working with NBS projects before? What was the type of project, what the aim, what your role. Who was involved?*

# Global and EU policy frameworks

## Part III

# Policy Framework



# NbS and climate policy

## **2019 UN Climate Action Summit:**

- Key political moment for NbS.
- NbS coalition formed with 70 governments, private sector, civil society, and international organizations.
- Launch of the "NbS for Climate Manifesto" supported by almost 200 global initiatives.

## **UNFCCC COP26, 2021:**

- Glasgow Leaders' Declaration: Over 100 leaders, representing 90% of global forest area, pledge to halt and reverse forest loss and land degradation by 2030.

## **UNFCCC COP27, 2022:**

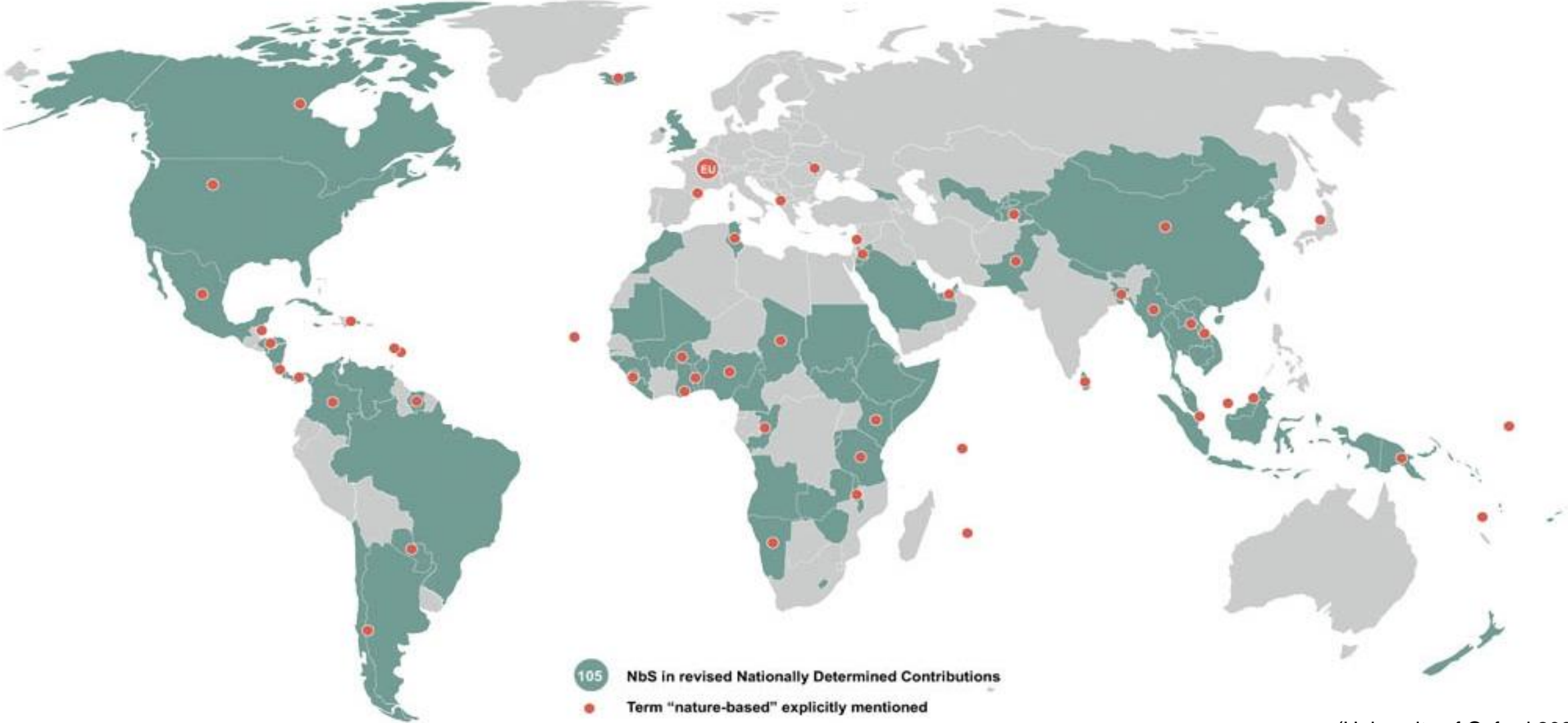
- Inclusion of nature-based solutions in the COP27 decision text

## **UNFCCC COP28 Expectations:**

- Further strengthening of NbS anticipated.



# NBS and Climate



# The new Global Biodiversity Framework (GBF)



- ▶ At the 15th Conference of the Parties to the Convention on Biological Diversity (**CBD COP15**) in Montreal in December 2022, the new GBF was adopted with 4 long-term targets by 2050 (Goals A-D) and 23 action-oriented targets by 2030 (Targets 1-23).
- ▶ The target on ecosystem restoration is found under **Goal A Target 2**:
  - **By 2030, at least 30%** of degraded ecosystems should undergo restoration actions, including to improve their ecological functions and connectivity. This includes marine and coastal systems.
  - The specification of 30% of degraded area represents a **doubling** of the 15% target of the previous Aichi Target 15, which was not achieved.
  - It remains to be seen whether the Parties will succeed this time in translating the GBF targets into **national targets and successfully implementing systematic monitoring and adaptive management** through mainstreaming in all sectors

## NBS in the spotlight



**TARGET 8:** "Minimize the impact of climate change and ocean acidification on biodiversity and increase its resilience through mitigation, adaptation, and disaster risk reduction actions, including through **nature-based solutions** and/or ecosystem-based approaches, while minimizing negative and fostering positive impacts of climate action on biodiversity."

**TARGET 11:** "Restore, maintain and enhance nature's contributions to people, including ecosystem functions and services, such as the regulation of air, water and climate, soil health, pollination and reduction of disease risk, as well as protection from natural hazards and disasters, through **nature-based solutions** and/or ecosystem-based approaches for the benefit of all people and nature."

# The UN Decade for Ecosystem Restoration

**Aim:** To prevent, halt, and reverse the degradation of ecosystems worldwide.

**Approach:** By driving political and societal support that foster large-scale restoration practices, the Decade aims to enhance ecosystem resilience, improve biodiversity, and create a healthier environment.

- ▶ **Initiatives:** Bonn Challenge and its regional initiatives AFR100 (Africa) and Initiative 20x20 (Central and South America)
- ▶ Promoting "green" **jobs, partnerships and cooperation** at all levels from international to local to achieve ambitious restoration targets



UNITED NATIONS DECADE ON  
**ECOSYSTEM  
RESTORATION**  
2021-2030

**#GenerationRestoration**



# The BBNJ-Agreement

**Historic global agreement** for the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (years in the making).

**Formal Adoption:** The treaty comes into force post ratification by 60 states and a 120-day waiting period.

**Objective:** The primary aim of the BBNJ Agreement is the conservation and sustainable use of marine biodiversity in areas beyond national jurisdiction (ABNJ), crucial for the sustained health of marine ecosystems.

## Key Terms (Article 1):

- ▶ **Area-based Management Tool:** Tool for managing a geographically defined marine area to achieve conservation and sustainable use objectives.
- ▶ **Marine Protected Area (MPA):** Marine area managed for specific long-term biodiversity conservation objectives. May allow sustainable use if consistent with conservation objectives.

**Potential for Restoration:** Global mandate for passive restoration efforts aimed at rehabilitating marine ecosystems and maintaining biodiversity: landmark in the global effort to safeguard at least 30% of the world's oceans through the establishment of extensive MPAs.

## Challenges:

- ▶ Fisheries regulated under international law and managed by Regional Fisheries Management Organizations (RFMOs) are exempt from some provisions. BBNJ mandates collaboration with RFMOs where MPAs may impact or overlap with their operations.
- ▶ High Seas Dual Perspective remains: Balancing the high seas as global commons shared by all humans vs. freedom of the high seas.

# EU Nature Directives

## Two main pieces of EU nature conservation legislation

- ▶ **Birds Directive** (1979, amended 2009): protects all wild birds, their eggs, nests, and habitats within the EU
- ▶ **Habitats Directive** (1992): maintaining or restoring natural habitat types and certain plants and animals (other than birds) at a favorable conservation status - *1,000 animals and plant species and about 230 types of habitats*



© Josef Timar, REDISCOVER Nature/EEA

# EU Biodiversity Strategy to 2020

- ▶ **Initiated in 2011**, framed to halt biodiversity loss and ecosystem service degradation by 2020, securing biodiversity conservation, enhancing green infrastructure, and restoring at least 15% of degraded ecosystems.

## Key achievements:

- ▶ **Natura 2000 Network expansion:** Significant expansion achieved, contributing to habitat conservation and protection of endangered species.
- ▶ **Comprehensive mapping and assessment** of the state of ecosystems and their services in the EU were completed to direct conservation efforts effectively (MAES)
- ▶ **Green Infrastructure & Ecosystem Restoration:** Initiatives to integrate GI and restoration projects were developed and implemented.

# EU Biodiversity Strategy to 2020 – key shortcomings

- ▶ **Unmet Targets:** Several targets, including those related to agricultural sustainability, overfishing, restoring many species and habitats to a good conservation status by 2020, etc. not (fully) achieved, highlighting gaps in policy enforcement and commitment

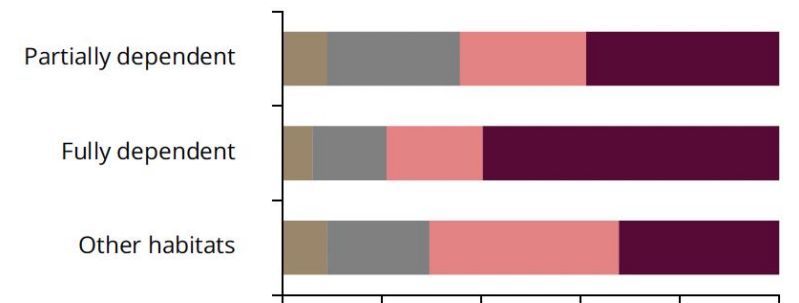
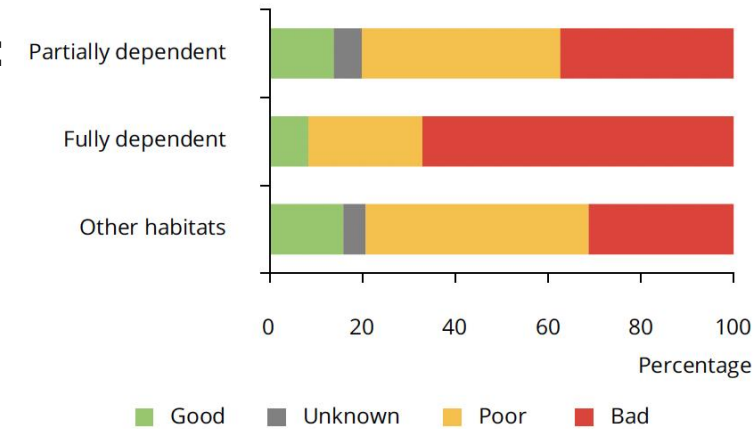
Progress towards **target 1** (% of assessments)



Progress towards **target 3:**

Conservation status of agricultural habitats (partially and fully dependent on agricultural management)

Trend in conservation status of agricultural habitats



© EEA, 2021



”

Our assessment shows that safeguarding the health and resilience of Europe's nature, and people's well-being, requires fundamental changes to the way we produce and consume food, manage and use forests, and build cities. These efforts need to be coupled with better implementation and enforcement of conservation policies, a focus on nature restoration, as well as increasingly ambitious climate action, especially in the transport and energy sector.

Hans Bruyninckx, EEA Executive Director



# EU Biodiversity Strategy for 2030

*“Bringing nature back into our lives”*

- ▶ **Objective:** put Europe’s biodiversity on the path to recovery by 2030, for the benefit of people, climate and the planet.

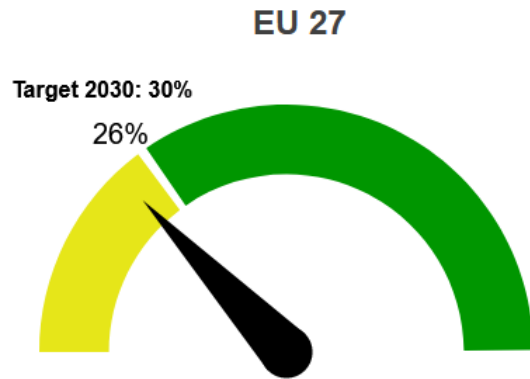
## Targets:



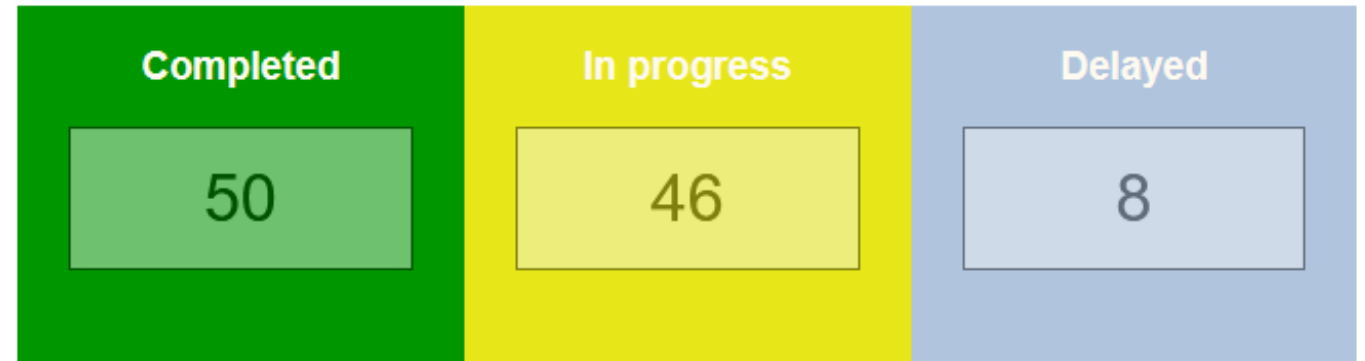
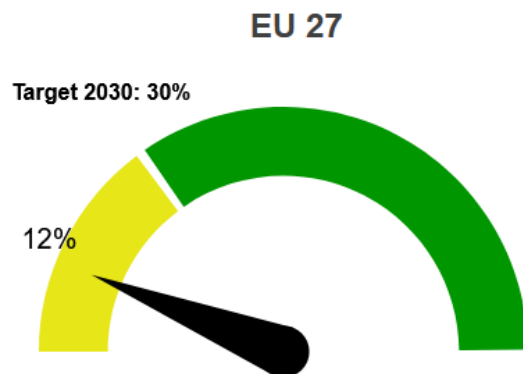
© EU, 2020

# ▶ Tracking Targets and Actions

Indicator: 1.1.1 - Terrestrial protected area coverage



Indicator: 1.1.1 - Marine protected area coverage



## Examples:

- ▶ EC Criteria and guidance for protected areas designations

## Examples:

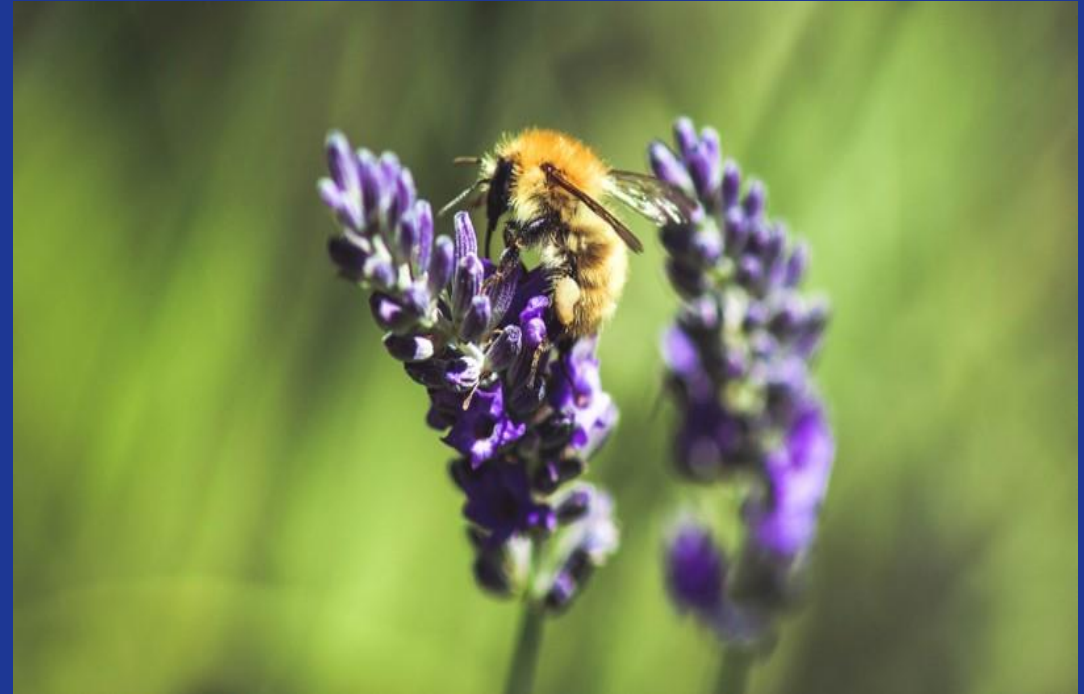
- ▶ Completion of N2000 designation

## Examples:

- ▶ Integrated Nutrient Management Action Plan

**The EU BDS2030 as part  
of the EU Green Deal is:  
„a sign of political  
maturity“**

**Humberto Delgado  
Rosa**





# EU Biodiversity Strategy for 2030

## What's new?

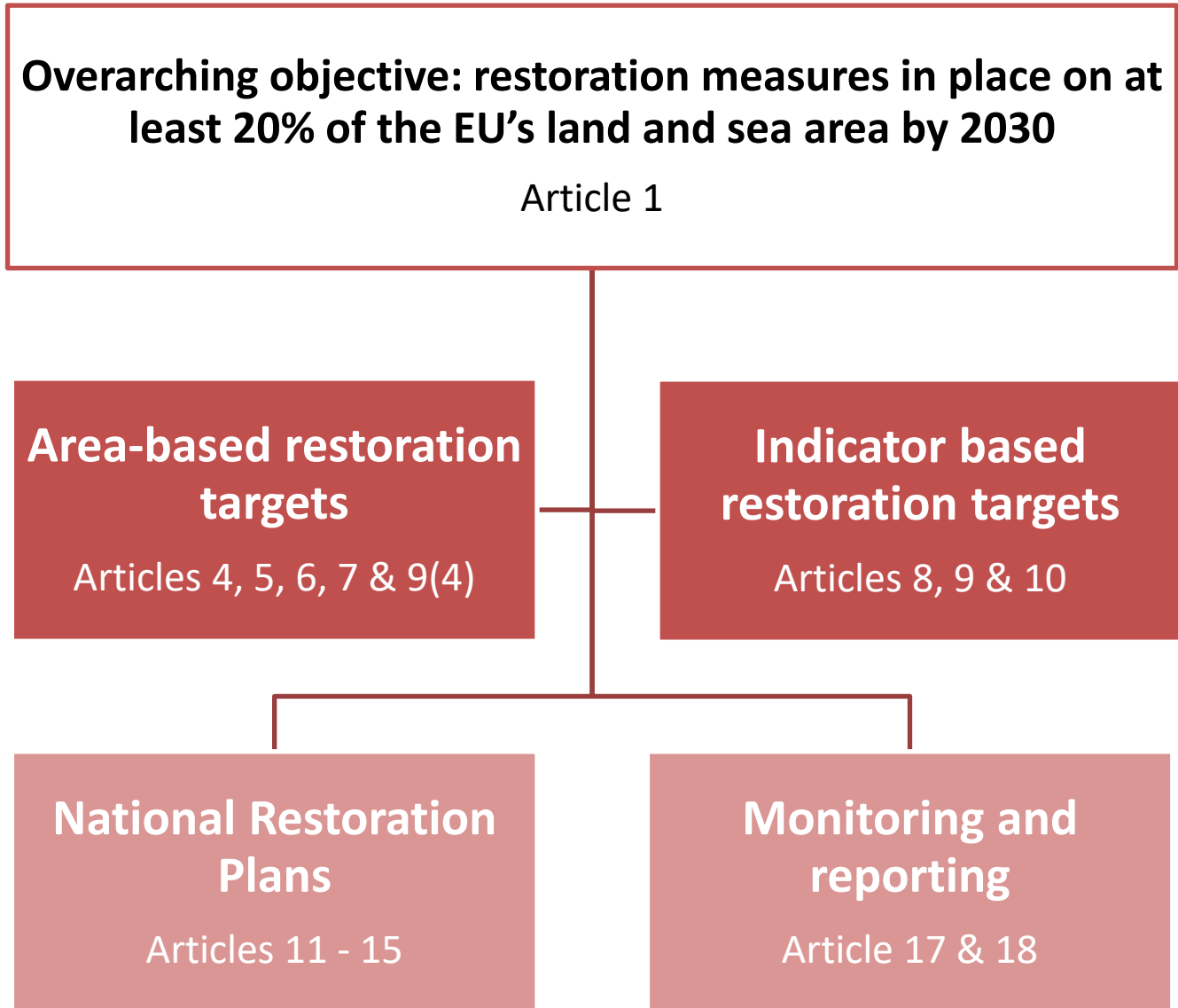
- ▶ **Binding nature restoration targets** (previously: largely voluntary, focus more on maintenance)
- ▶ **Transformative change** across all sectors of the (sustainable) economy (also: Taxonomy Regulation) with a new strengthened governance framework
- ▶ **More funding/investment:** At least EUR 20 billion/year will be unlocked for biodiversity through various sources, including EU funds, national and private funding to meet the needs of the strategy
- ▶ **Climate-biodiversity nexus:** Focus on **Nature-based Solutions**
- ▶ **Business and biodiversity:** larger focus on the private sector
- ▶ **Better know-how:** New Knowledge Centre for Biodiversity providing data, information and analyses in support of the strategy

# The EU Nature Restoration Law

- ▶ **Key Provisions:** This ambitious framework aims to restore "at least 20% of the EU's land and sea areas by 2030 and all ecosystems in need of restoration by 2050" (Article 1)
- ▶ **Restoration of ecosystems:** put in place restoration measures for the habitats of species protected by the Habitats and Birds Directives, as well as several other habitats/species
- ▶ **Approval and Next Steps:** The EU Parliament voted in favor of the NRL on July 12, 2023. The final form will be negotiated in a trilogue procedure between the Parliament, Council, and Commission.
- ▶ **Monitoring Progress:** The NRL calls for measuring and monitoring these binding targets, with evaluations set for 2030 and 2040.

# Content of the NRL proposal

first official draft of the  
European Commission  
(status June 2022)



# Content of the NRL proposal

## Area-based restoration targets



### Article 4

- Restoration of terrestrial, coastal and freshwater ecosystem



### Article 5

- Restoration of marine ecosystems



### Article 6

- Restoration of urban ecosystems



### Article 7

- Restoration of the natural connectivity of rivers and natural functions of the related floodplains



### Article 9(4)

- Restoration of agricultural ecosystems – drained peatlands under agricultural use

Source: IEEP



# Content of the NRL proposal

## Indicator-based restoration targets



### Article 8

- **Restoration of pollinator populations**
  - Reverse the decline of pollinator populations by 2030 and achieve thereafter an increasing trend



### Article 9

- **Restoration of agricultural ecosystems**
  - Grassland butterfly index; Stock of organic carbon in cropland mineral soils; Share of agricultural land with high-diversity landscape features until 2030
  - Common farmland bird index



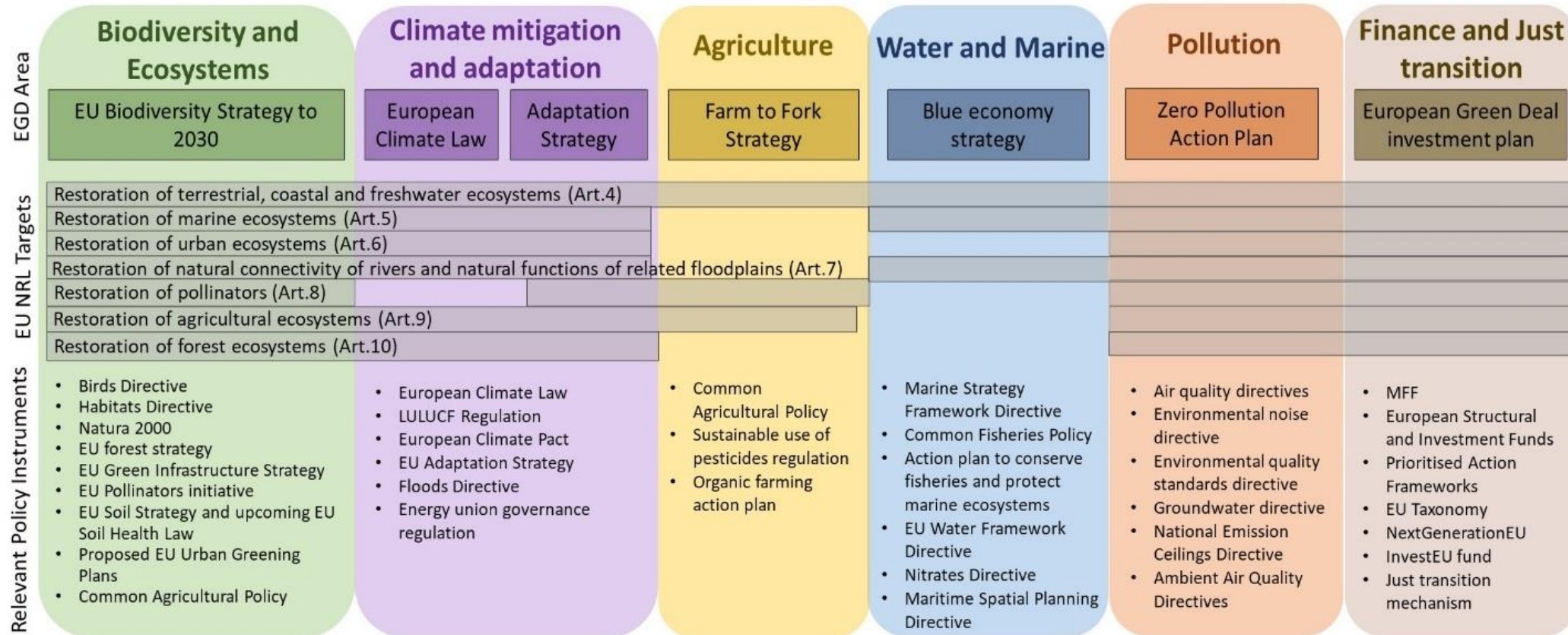
### Article 10

- **Restoration of forest ecosystems**
  - Deadwood; share of forests with uneven-aged structure; forest connectivity; common forest bird index; stock of soil organic carbon in forest land

Source: IEEP

# Content of the NRL proposal

## Contribution of the NRL to other EU environmental policies



Abbreviations: **EGD**: EU Green Deal, **NRL**: Nature Restoration Law, **MFF**: Multiannual Financial Framework

Source: IEEP

# Policy recommendations

**Aligning global agendas:** Align the Post-2020 Global Biodiversity Framework (GBF) with the UNFCCC and SDGs.

**NbS can build bridges** between biodiversity and climate: The use of the NbS concept across Conventions, a common language and common definitions (including in NDCs and NBSAPs) can strengthen the joint implementation of the Rio Conventions.

**Mainstream NbS** into a wide range of activities (e.g. construction/infrastructure), sectors (e.g. the private sector) and policies. This also includes further consolidating the mainstreaming of biodiversity in development cooperation. The complex interrelations between the two crises need to be communicated clearly to a wide audience.

# Policy recommendations II

## Mainstream NbS in financing instruments

- **Financing instruments** should be designed and restructured to always take both climate change mitigation and biodiversity conservation into account.
- For example, it could be made **compulsory for all funding applications and project proposals** to include a strategy for using the eight criteria of the IUCN NbS standard) or at least to draft a zero-harm strategy.
- **integrating NbS in all relevant sectors:** Public-private partnerships, concessions, nature conservation agreements, standards, or public procurement law could play an important role in

# Policy recommendations III

## Use NbS as planning tool

- Using the NbS concept for planning and implementation of interventions such as restoration can **strengthen transdisciplinary approaches and participatory methods** which bring together stakeholders from policy, academia, civil society, and the private sector. Thus, NbS can help overcome conflicts and trade-offs.
- **Existing concepts** like ecosystem services could provide a useful common basis for evaluating the impacts of different measures. The knowledge gained in this way should be used to select the most suitable NbS strategy for each local situation (e.g., insurance, sustainable innovation, etc.).
- The **planning process** should always also address the underlying drivers of ecosystem degradation.
- **Institutionalizing Best Practices** that show how evidence- and criteria-based planning helps resolve conflicting goals



# Policy recommendations IV

## **Acknowledge existing weaknesses of the concept and continue working towards its improvement:**

Critics of the NbS concept fear that it is misused for greenwashing and is applied with insufficient involvement of local actors, or even violates their (property) rights. For NbS with a focus on natural climate protection, challenges persist in securing the storage of emissions in the long-term and in avoiding carbon leakage effects.

The **development of clear guidelines, standards, safeguards**, and participation and grievance mechanisms can minimize risks and contribute to implementation success.

**Promote NbS research:** Research can contribute to extending the scope of NbS and restoration approaches by developing science-based guidelines and decision tools to support decision-makers and other stakeholders in planning and implementation. A comprehensive understanding is needed of how integrated, cross-disciplinary governance approaches can be implemented successfully and on how an effective redesign of the socio-ecological system is interlocked with the current economic system.

# Case study collections

Table 1. Overview of European NBS case study collections (status March 2022)

Project name	Link to NBS case study collection / NBS databases	Geographic coverage	Total cases collected	Cases in Nordic countries
Oppla	<a href="https://oppla.eu/case-study-finder">https://oppla.eu/case-study-finder</a>	global	327	Ca. 17
Network Nature	<a href="https://networknature.eu/network-nature-case-study-finder">https://networknature.eu/network-nature-case-study-finder</a>	global	396	Ca. 16
Urban Nature Atlas (Naturvation project)	<a href="https://una.city/">https://una.city/</a>	global, focus on cities	1105	71
Natural Water Retention Measures	<a href="http://nwrn.eu/list-of-all-case-studies">http://nwrn.eu/list-of-all-case-studies</a>	mainly Europe, focus on water	372	7
Nature-based solutions Initiative	<a href="https://casestudies.naturebasedsolutionsinitiative.org/">https://casestudies.naturebasedsolutionsinitiative.org/</a>	global	110	0

**Block II: Diving into the  
impact, benefits and  
challenges of NbS**

**Meta-overview: Evaluation of NBS and  
their effectiveness  
(methods/tools/standards)**

# Evaluating NBS interventions

## Methods & tools for evaluating NBS

- ▶ Remote Sensing: Satellite imagery to monitor land cover changes, health of ecosystems, and changes in ecosystem services.
- ▶ GIS (Geographic Information Systems): Spatial analysis of NBS impacts and effectiveness.
- ▶ Hydrological Modeling: Assess the water-related benefits of NBS like flood mitigation and improved water quality.
- ▶ Cost-Benefit Analysis: Compare the economic benefits of NBS to their costs.

## Challenges in evaluating NBS

- ▶ Data Availability: Limited data on long-term impacts of NBS.
- ▶ Complexity of Natural Systems: Dynamic interactions within ecosystems can make it challenging to attribute outcomes solely to NBS.
- ▶ Stakeholder Perspectives: Different stakeholders may have different criteria for what constitutes a successful NBS.
- ▶ Scalability: What works in one context or scale might not work in another.



# Scaling up NbS

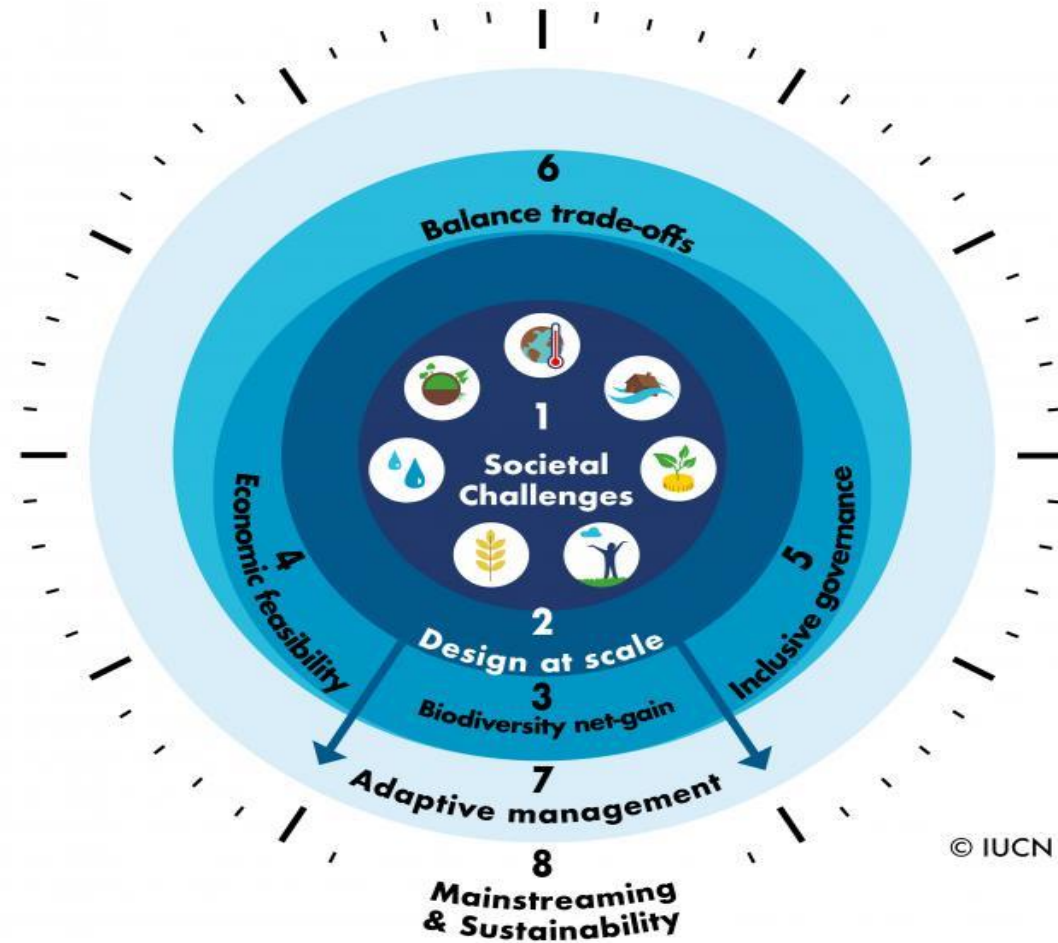
## Standards for NBS evaluation

- Biodiversity Metrics: Evaluate the impact of NBS on local biodiversity and ecological health.
- Carbon Sequestration Standards: Measure the carbon storage and sequestration potential of NBS.
- IUCN Global Standard for NbS
- Society for Ecological Restoration's (SER) standards for the practice of ecological restoration & tools for tracking intervention progress / Evaluating ecological restoration success
- FAO 10 Principles that underpin ecosystem restoration
- UNEP and FAO Restoration Lighthouse Projects

## Key provisions:

- Allocation of funding and capacity building
- Mainstream NbS into a wide range of activities, sectors (e.g., the private sector) and policies

# The global standard

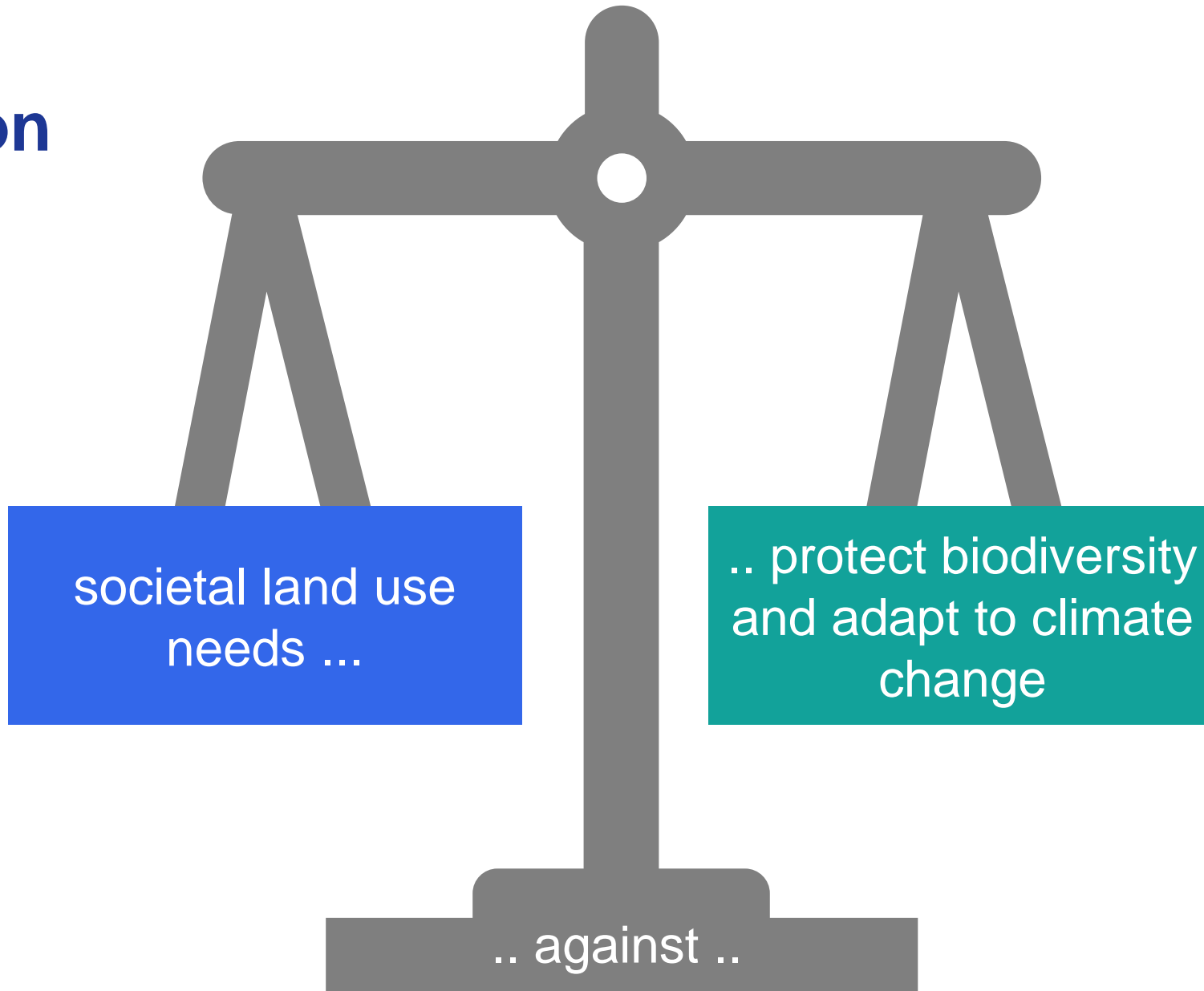


# Established best practice for NbS implementation



# Application-related deep dive and illustrative examples

# Co-creation





# NBS for improving well-being in urban areas

- ▶ Integrating NBS into urban design and planning
- ▶ Access to green spaces and good quality landscape, enhance neighborhood spaces
- ▶ Effects: health, well being, social cohesion, crime and community support
- ▶ Need for demonstration projects
- ▶ Resonate with urban publics; citizen empowerment and citizen-driven innovation are key
- ▶ Explore new forms of stakeholder participation in urban design and planning



# Monitoring systemic impacts of freshwater and wetland restoration actions



*Deliverable D1.2:*  
New framework for monitoring systemic impacts of freshwater and wetland restoration actions



The MERLIN project (<https://project-merlin.eu>) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036337.

[www.project-merlin.eu](http://www.project-merlin.eu)

# MERLIN

# Urban Governance Atlas (UGA)

A collection of more than **250 policy instruments** supporting nature-based solutions and ecosystem restoration

EN ES

## Welcome to the Urban Governance Atlas

A collection of more than 250 good practice policy instruments supporting nature-based solutions and ecosystem restoration.

[Download our guidance on how to enter a policy instrument](#)

Enter search terms

Country City

REGION -Any- TARGETED URBAN AREA -Any-

TYPE OF INSTRUMENT INITIATING BODY

CHALLENGES ADDRESSED

RESET ALL APPLY

Displaying 1 - 250 of 250

Aims to:

- Foster **ecologically coherent, inclusive planning** for urban ecosystem restoration and green space planning
- **Inspire global action** through good practice instruments, including lessons learned
- Represent **diverse contexts** (institutional/geographic) – bottom up & top down



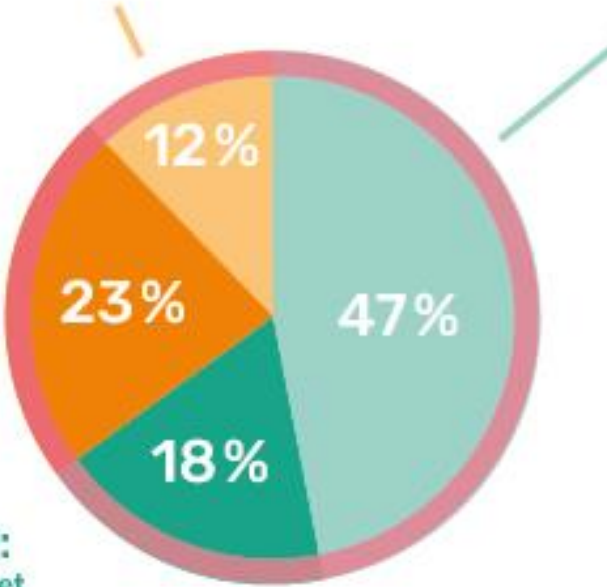
# Showcasing 4 types of policy instruments



**Knowledge, communication and innovation:**  
 try to influence behavior by disseminating information to actors or involving actors in critical processes in innovative ways to inspire voluntary behavioral changes – overall: 12% of all instruments

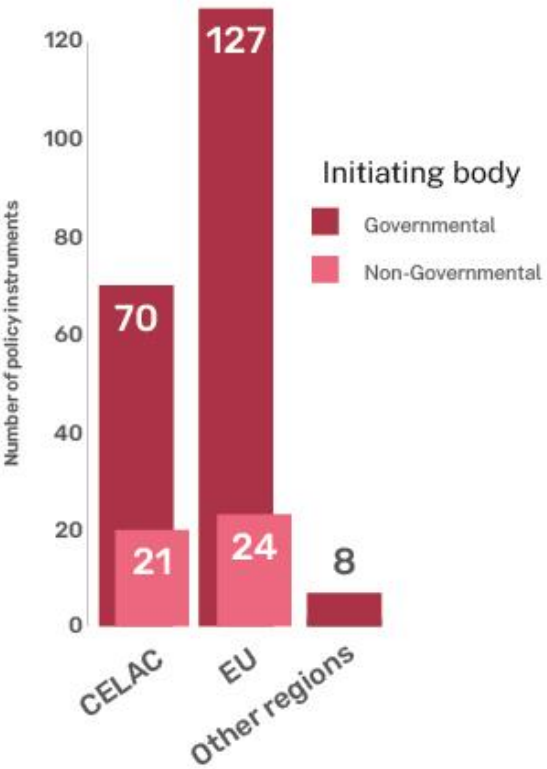


**Agreement-based or cooperative:**  
 instruments in which the government and/or involved actors jointly and on a voluntary basis decide to behave in a certain way – overall: 23% of all instruments

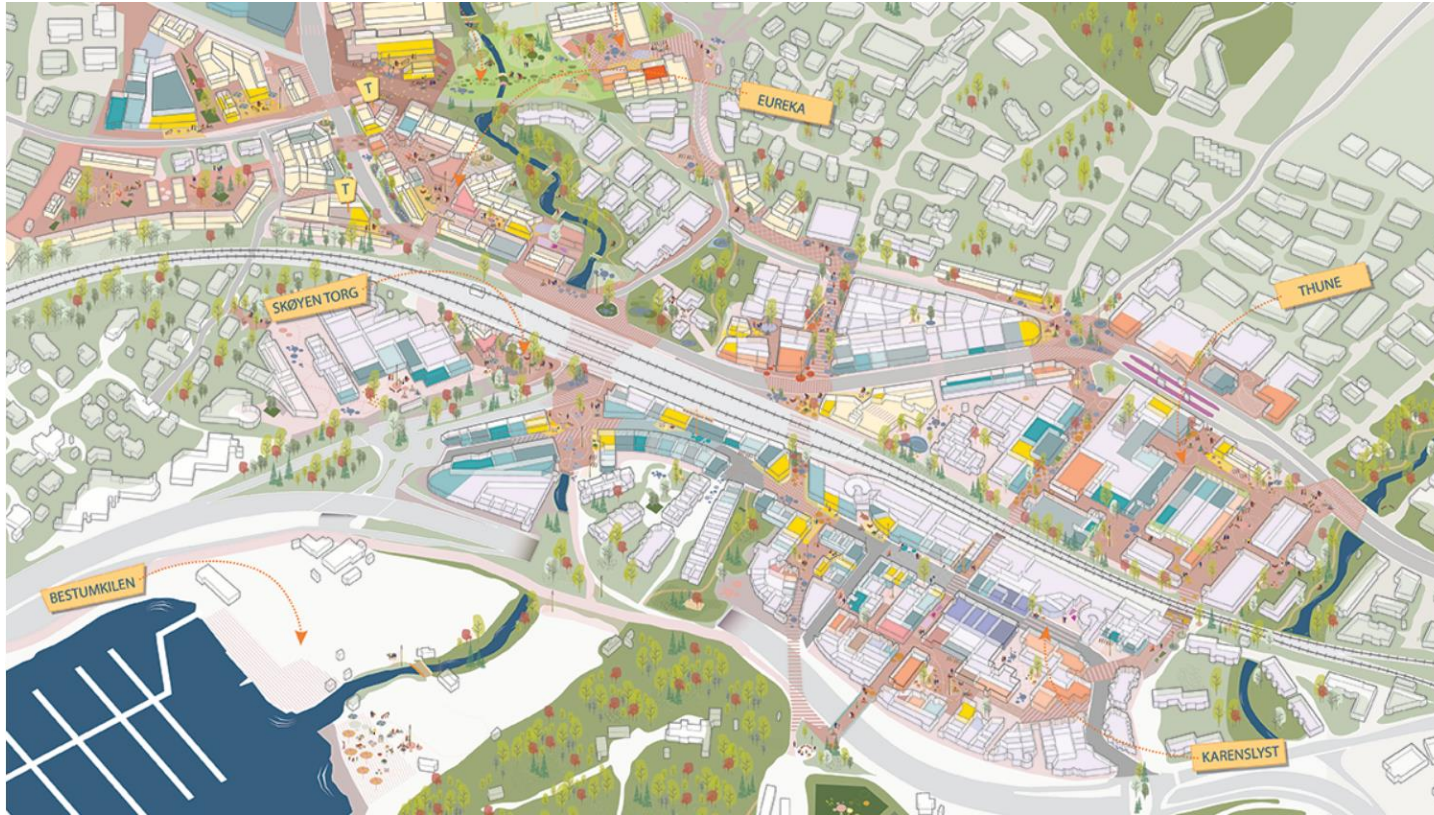


**Economic and fiscal:**  
 instruments that influence market mechanisms through for instance disincentives, incentives, payments, subsidies, financing mechanisms and market-based instruments – overall: 18% of all instruments

Global distribution and initiating body



# Green-blue infrastructures



The **CROSSLINK** project studied the benefits of riparian buffers in human impacted landscapes

- What are the outcomes of woody riparian buffers for:  
Biodiversity?  
Ecosystem functioning & services?  
Ecological connectivity?
- How can we optimise a network of riparian buffers to maximise benefits and minimise trade-offs with human uses and needs?



# The SABICAS project works with Nature-based solutions (NbS)

Kantsoner | Riparian buffer



Flomsletter | Floodplain



Våtmark | Wetland



SABICAS will provide knowledge **which types and properties of NbS are most effective** in achieving the goals, and will create a tool that can help in the future management of Norwegian rivers.



”

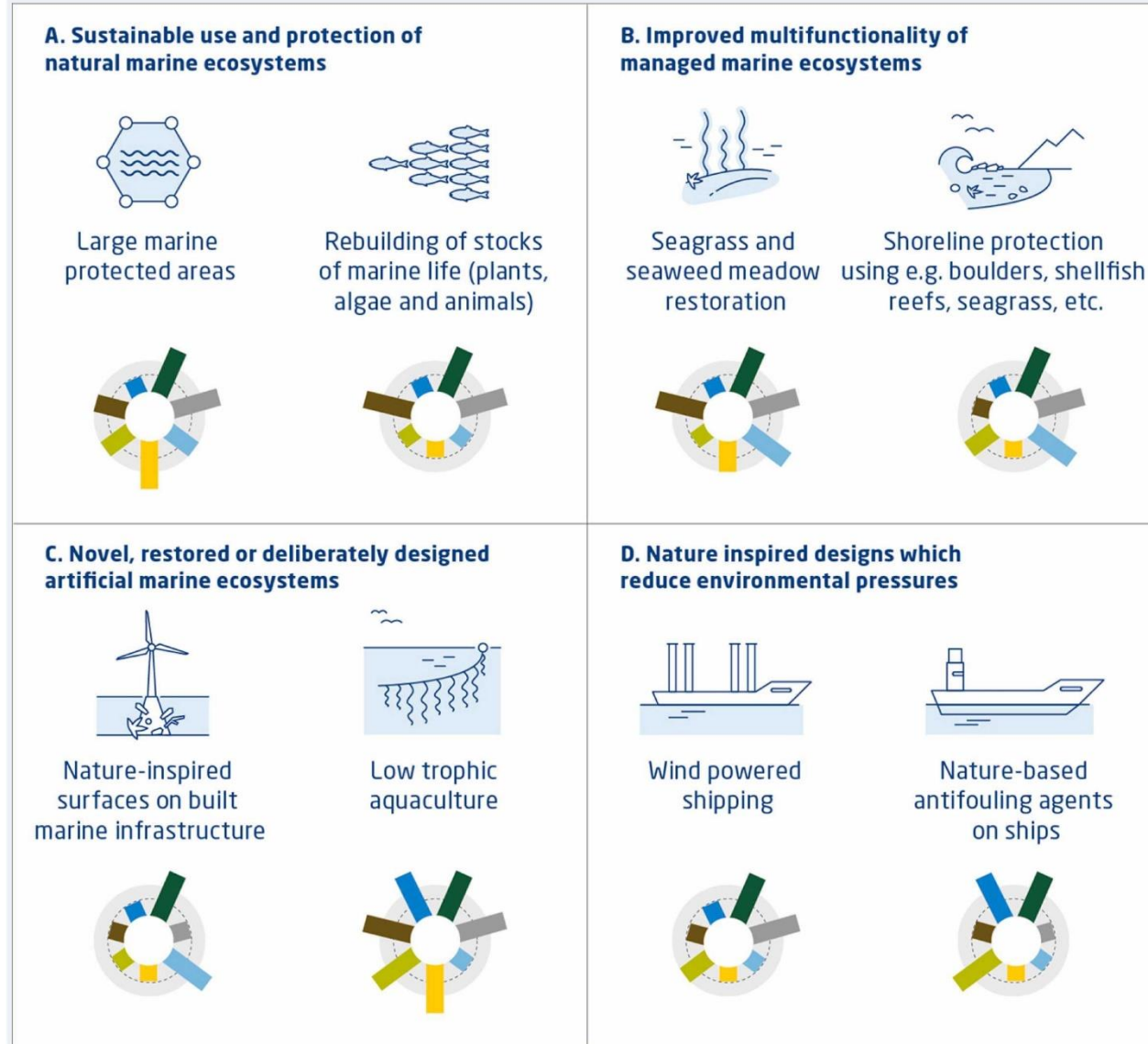
“Nature-based solutions in coastal and marine ecosystems (coastal and marine NbS) are actions to protect, sustainably manage and restore coastal and marine ecosystems in ways that address societal challenges effectively and adaptively. Coastal and marine NbS are based on the ability of coastal and marine ecosystems to sequester CO<sub>2</sub> (i.e., blue carbon ecosystems), and/or their ability to foster adaptation and resilience of communities and ecosystems, by acting as buffers against climate change impacts while improving livelihoods.”

The Ocean and Climate Platform, 2021





# Types of Marine Nature-Based Solutions



## Societal challenges

1.  Climate change mitigation and adaption
2.  Disaster risk reduction
3.  Economic and social development
4.  Human health
5.  Food security
6.  Water security
7.  Environmental degradation and biodiversity loss



Types of nature-based solutions modified from Eggermont et al. (2015) with marine examples. Histograms are not based on quantitative analyses, but only illustrates what categories of IUCN's major societal challenges, each example is likely to address based on the literature review.

## Group work:

- *Identify a real-world challenge (e.g., urban heat islands, loss of biodiversity, flooding) and design a conceptual NbS intervention.*
- *Then draft a brief action plan or strategy for incorporating NbS into their professional environment.*
- *Brainstorm potential incentives or strategies a government can implement to enhance NbS adoption in local communities*

# Remaining challenges

- ▶ NBS are already widely implemented in cities throughout Europe and beyond, but often lack a coordinated (and standardized) approach
- ▶ Pressure on biodiversity is continuing to increase (including from new & emerging threats and illegal activities)
- ▶ Financial investment in NbS needs to be scaled up enormously (order of magnitude)
- ▶ Socioecological Complexity (conflicting interest, managing trade-offs, finding synergies etc.)
- ▶ To explore the full potential of NBS to address societal challenges and contribute to sustainable urban transformation, the cumulative impact of NBS needs to be operationalized
- ▶ Urban: (Small and medium-sized) cities lack access to resources and knowledge to support them in implementing NBS alongside and instead of “traditional grey infrastructure solutions“



## What to do next?

- ▶ **Adapt NBS to local conditions and needs** (from society and city perspectives) Foster an integrated NBS planning, which embraces urban and peri-urban areas
- ▶ Foster an **integrated NBS planning**, which embraces urban and peri-urban areas
- ▶ **Build on and embed NBS within existing natural area networks** (such as green and blue infrastructure) to foster increased connectedness
- ▶ Explore and deploy **new governance approaches** from the local to regional scales
- ▶ **Shift mindsets** from silo thinking towards more integrated decision-making and planning

## Further reading



**Summary and reflection**

**Open discussion with Q&A**

**Feedback**

**Wrap-up**

# Thanks! Any more Questions?

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