

AQUACROSS Case Studies

Introductory presentations

10-11/10/2018

The AQUACROSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642317.

Trade-offs in integrated ecosystem-based management in the North Sea aimed at achieving Biodiversity Strategy targets

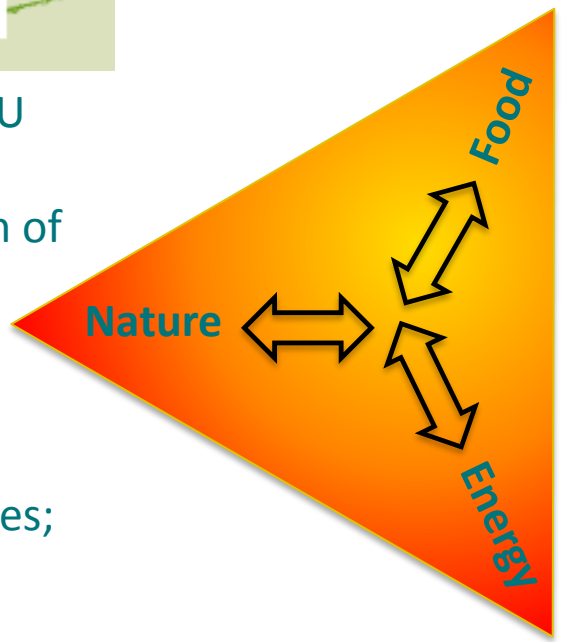
Gerjan Piet, WMR

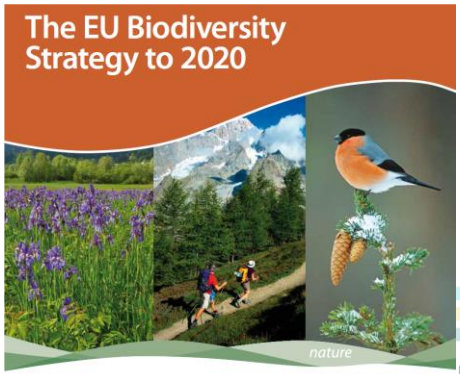
The AQUACROSS project has received funding from the European Union's Horizon2020 for Research, Technological Development and Demonstration under Grant Agreement Number 642317.

EBM in the North Sea: Trade-offs

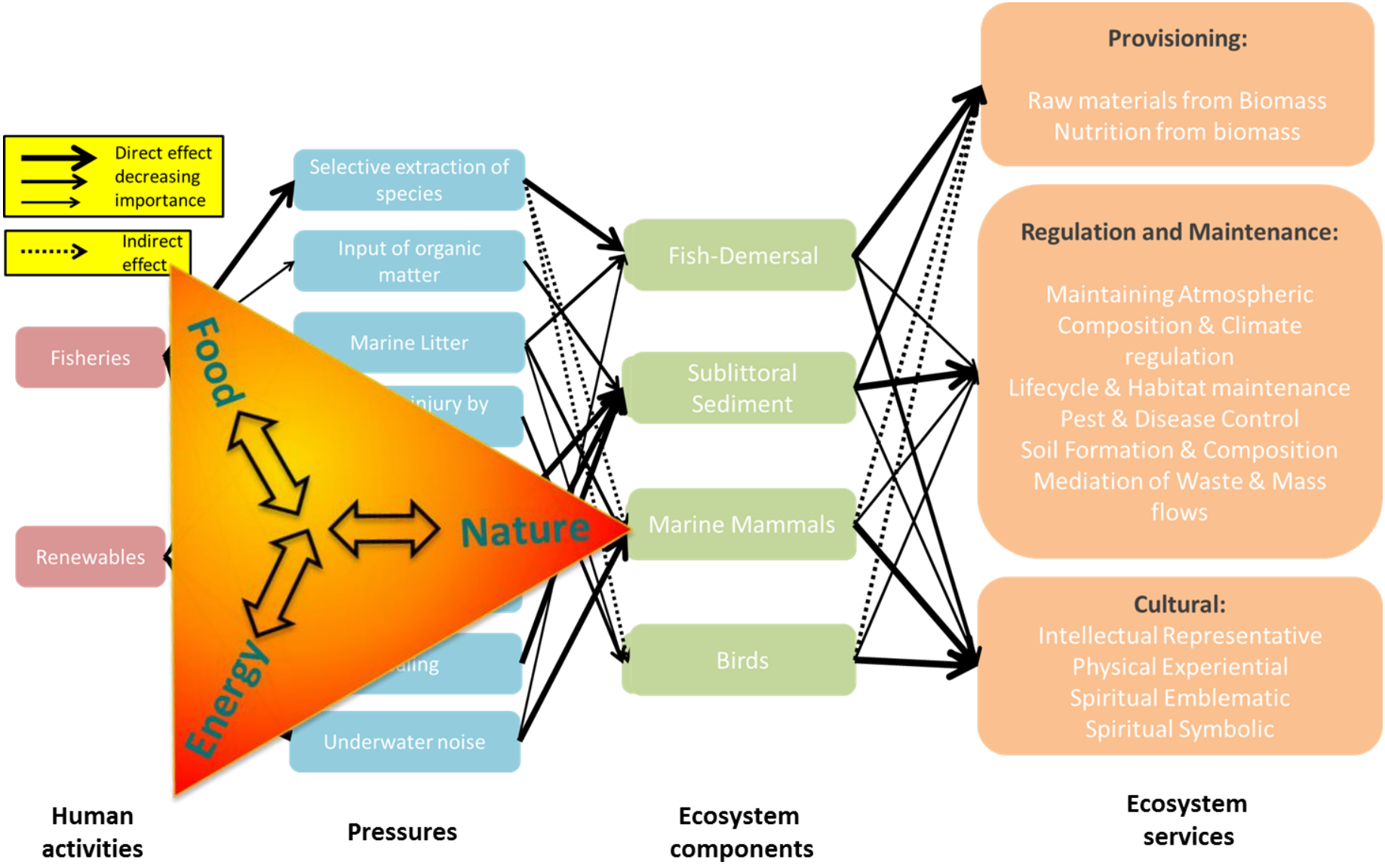
2050 VISION

1. The full implementation of the EU nature legislation;
2. Better protection and restoration of ecosystems and the services they provide, and greater use of green infrastructure;
4. Better management of EU fish stocks and more sustainable fisheries;
6. A greater EU contribution to averting global biodiversity loss.

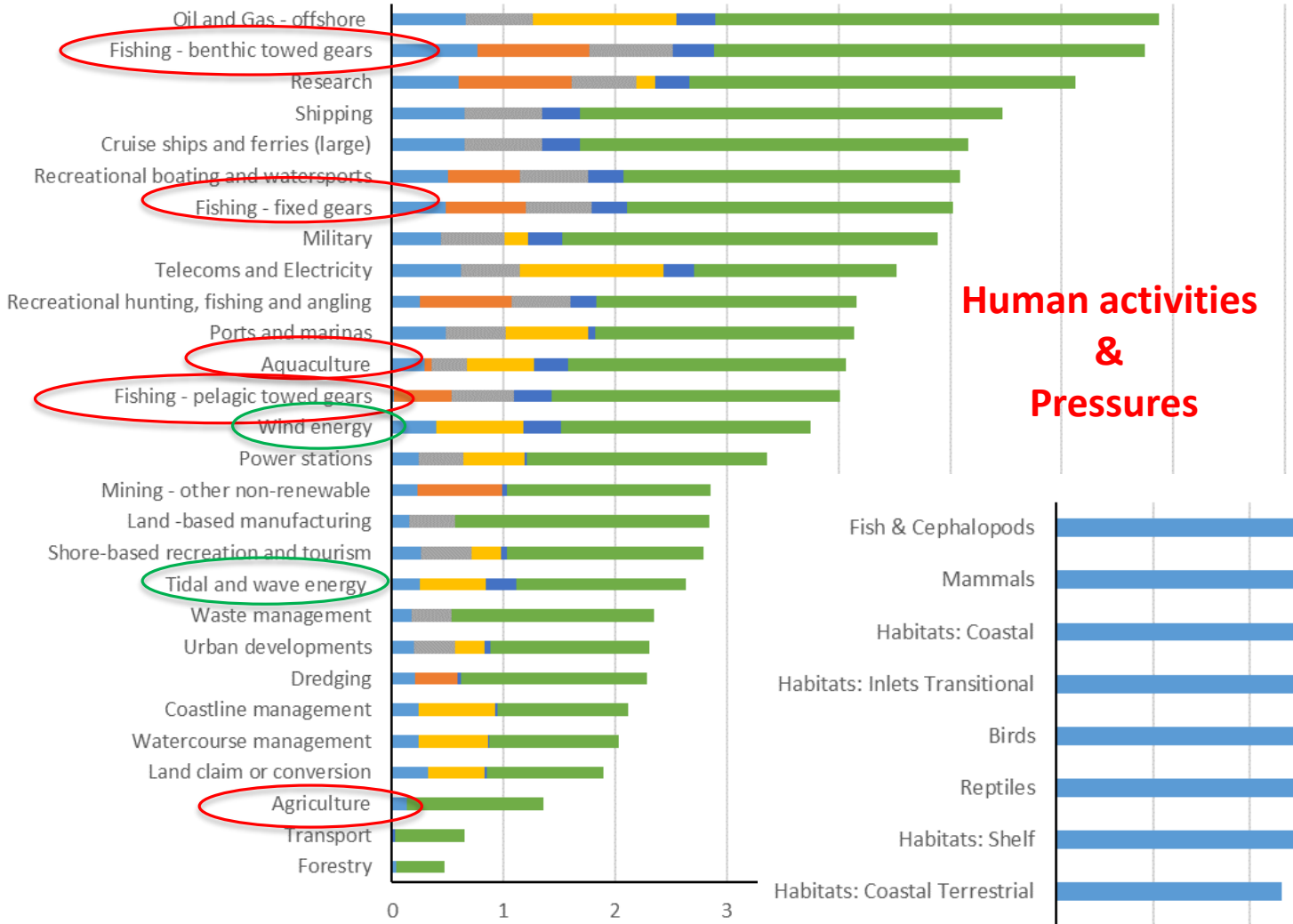




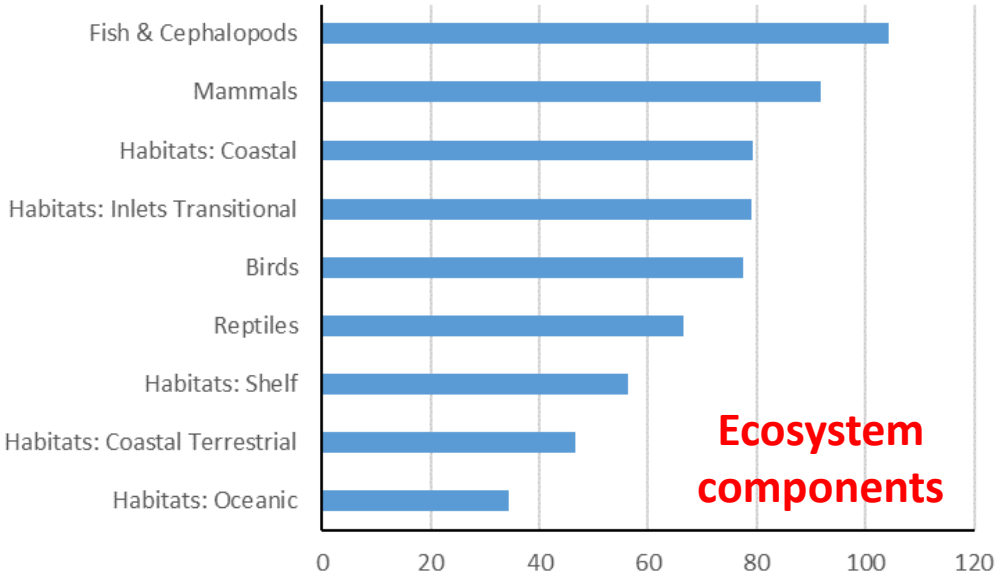
Social-Ecological System: Linkage Framework



Cumulative effects: Integrated perspective

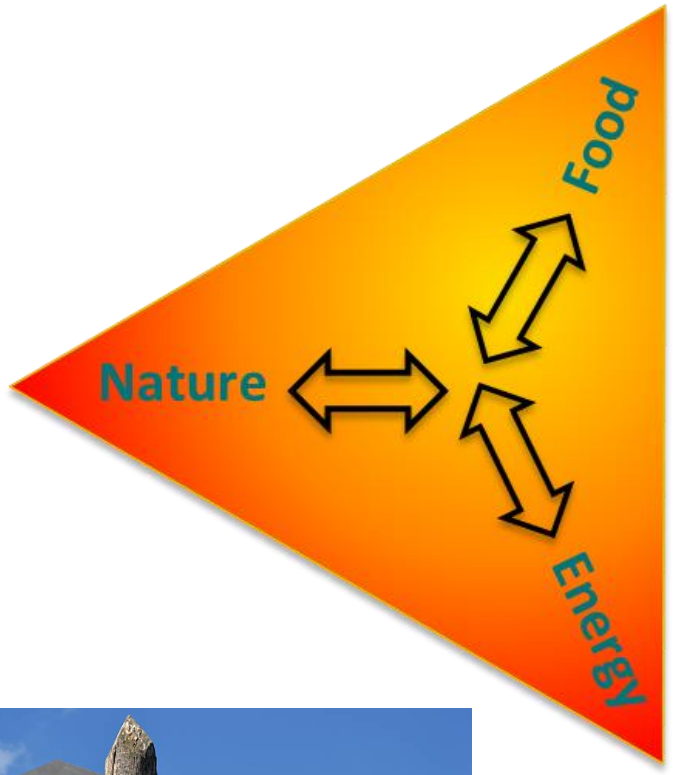


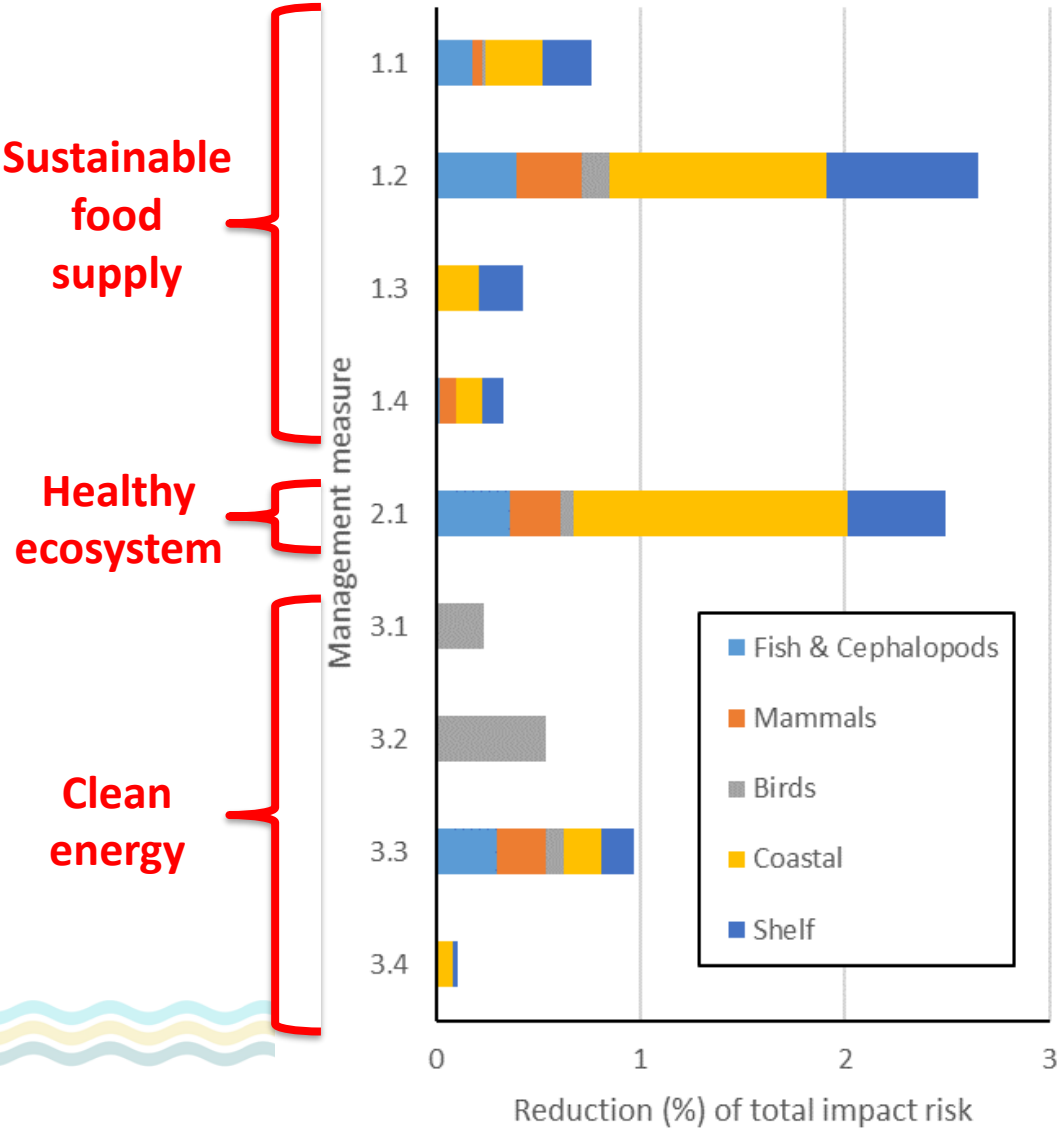
Human activities & Pressures



Ecosystem components

Integrated EBM toward different societal goals





CS1 North sea

Summary and Conclusions

- This represents a first attempt of a more integrated, ecosystem-based approach which considers diverse (and potentially conflicting) societal goals, includes several sectors, and considers their impacts on the entire ecological system (but not the social system).
- Analyses confirm that applying an integrated perspective in EBM may help balance the achievement of different societal goals.
- A risk-based approach showed the main threats to a healthy marine ecosystem and the most effective management measures to mitigate those threats.
- This provided the basis for more quantitative approaches aimed at specific threats but can forecast scenarios in the detail required by decision-makers.

محمية المحيط الحيوي
للربط القاري المتوسطي
الأندلس - المغرب

Reserva de la Biosfera
Intercontinental del
Mediterráneo
Andalucía. España - Marruecos



Case Study 2- Practice and Lessons Learnt

Intercontinental Biosphere Reserve of the Mediterranean – Andalucía - Morocco

IOC-UNESCO

10-11/10/2018

United Nations Educational, Scientific and Cultural Organization

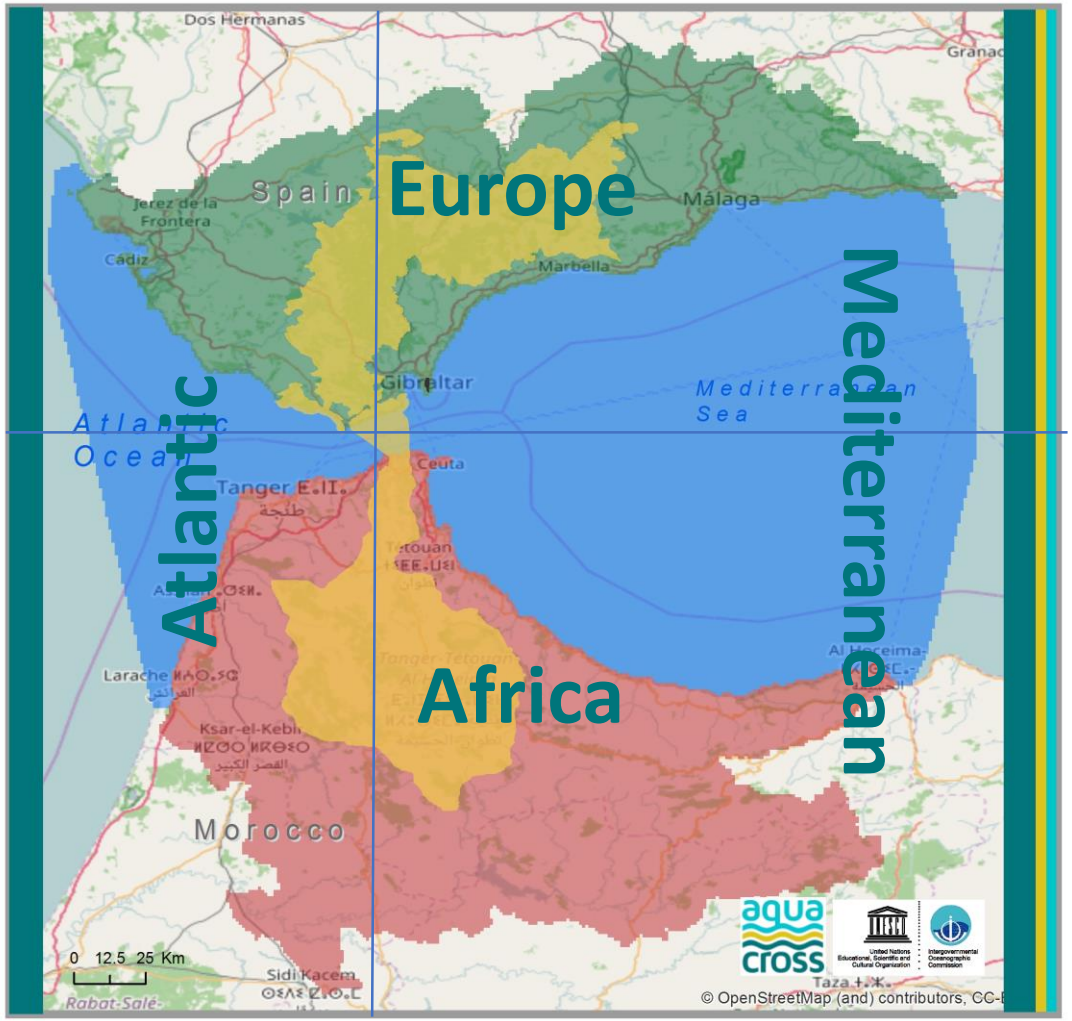
Intergovernmental Oceanographic Commission

JUNTA DE ANDALUCIA
CONSEJERÍA DE MEDIO AMBIENTE
Y ORDENACIÓN DEL TERRITORIO

Rediam

The AQUACROSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642317.

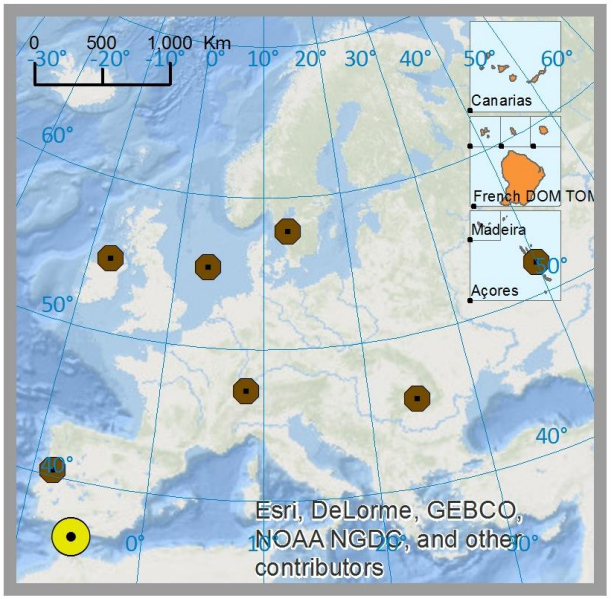
Where: In between 2 seas & 2 countries



Intercontinental Biosphere Reserve of the Mediterranean – Andalusia (Spain) Morocco (IBRM) and its Area of Influence
Legend

- Adminstrative boundaries of the IBRM
- Morocco IBRM AoI
- Andalusia (Spain) IBRM AoI
- Marine IBRM AoI
- Out of the study area
- CS2 - IBRM
- AQUACROSS Case Studies

Data source:
© WaterBase for the Morocco river basins;
© REDIAM for the Spain River Basin Districts V4;

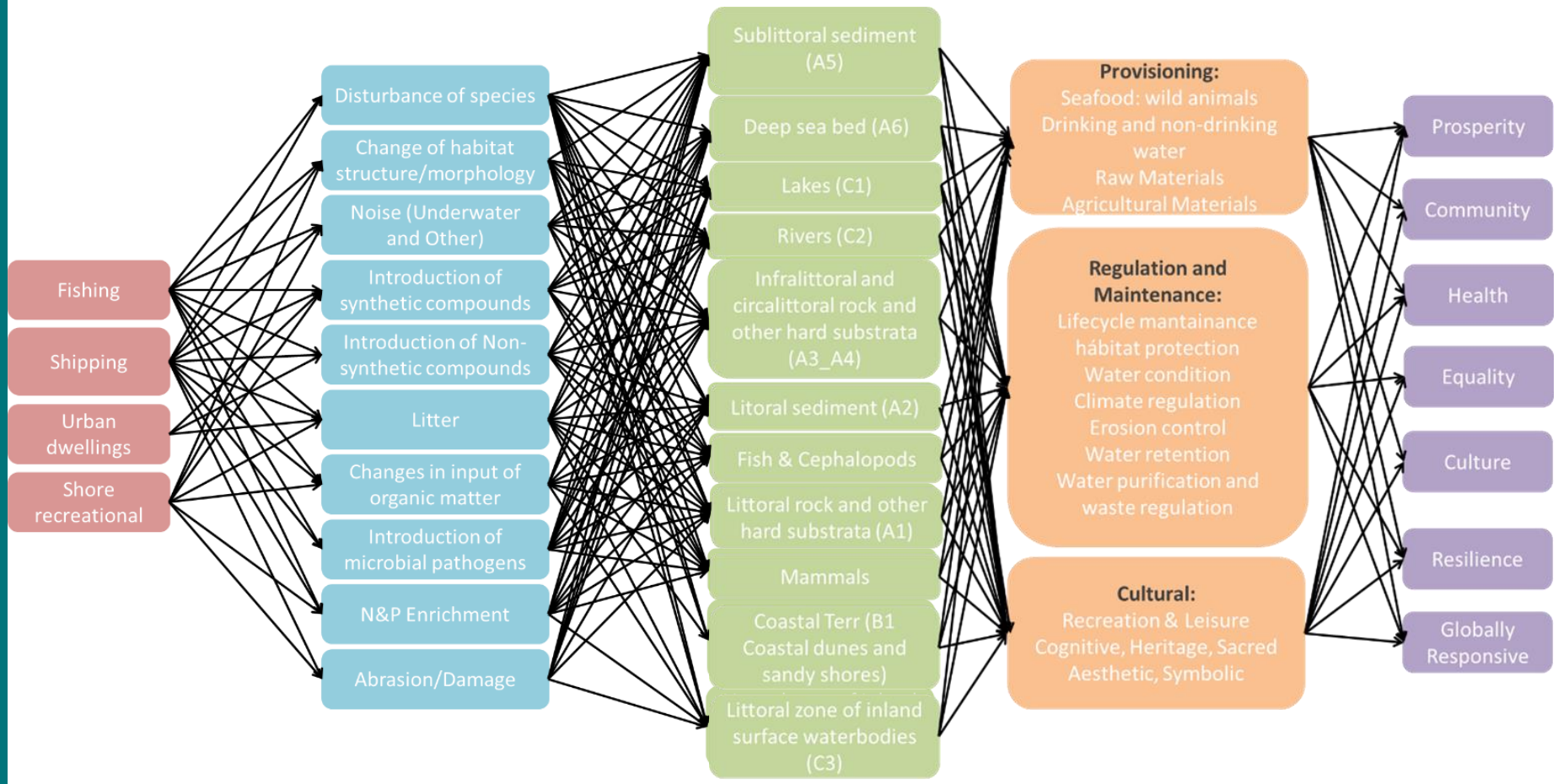


What: Green and Blue Infrastructure

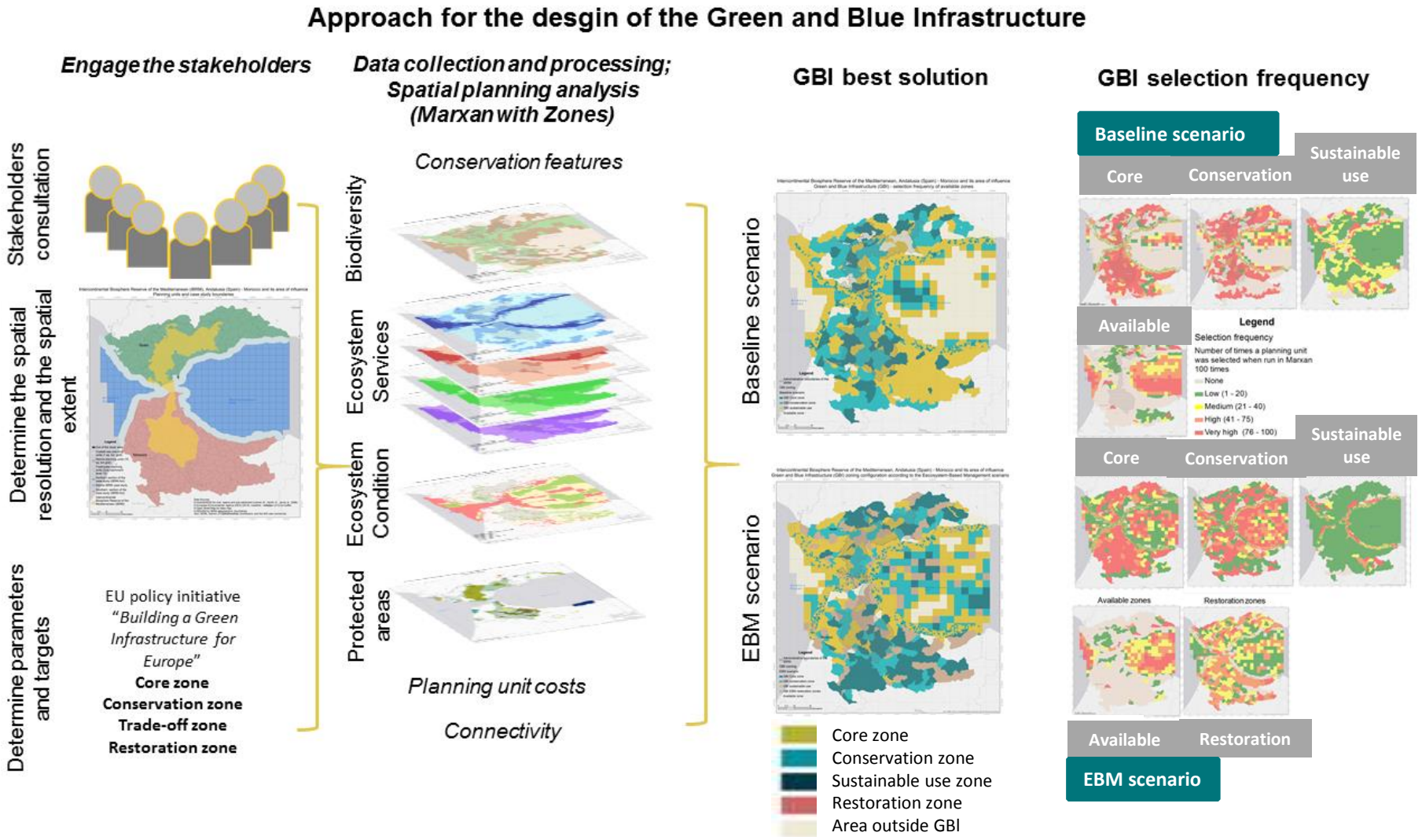
- AQUACROSS Assessment Framework to develop and design a multi-purpose Green and Blue Infrastructure.
- Identifying stakeholder objectives: synergies, conflicts, and opportunities for improvement;
- Green and Blue Infrastructure design based on spatial conservation prioritisation of biodiversity features and ecosystem services;
- Identifying the best spatial allocation for an ecosystem-based management plan for the restoration of degraded ecosystems;
- Co-creation with local stakeholders: two rounds of workshops held in Tarifa (Spain, northern section) and Tangier (Morocco, southern section).

How: Linkage matrix framework

Socio-ecological system – D-P-S-E-EFs/Ess assessment



How: Ecosystem-based management: Green and Blue Infrastructures (GBI)



Key messages

- Efficient allocation of ecosystem-based restoration measures can be explicitly included in an optimal spatial planning design of a GBI
- GBI multi-zoning approach accounts for potential trade-offs, and maximize co-benefits, between ecosystem services and biodiversity
- Restoration areas improve the connectivity across GBI while meeting the target 2 of the EU biodiversity 2020
- GBI successfully achieves a transboundary spatial planning across different aquatic ecosystems

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Reserva de la Biosfera
Intercontinental del
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Andalucía. España - Marruecos



Thank you
Muchas gracias
شكرا

aquacross.ip@unesco.org

Intergovernmental Oceanographic Commission of UNESCO

United Nations Educational, Scientific and Cultural Organization

Intergovernmental Oceanographic Commission

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Case Study 3- Practice and Lessons Learnt

Danube River Basin

BOKU-IHG, ACTeon, IGB

10-11/10/2018

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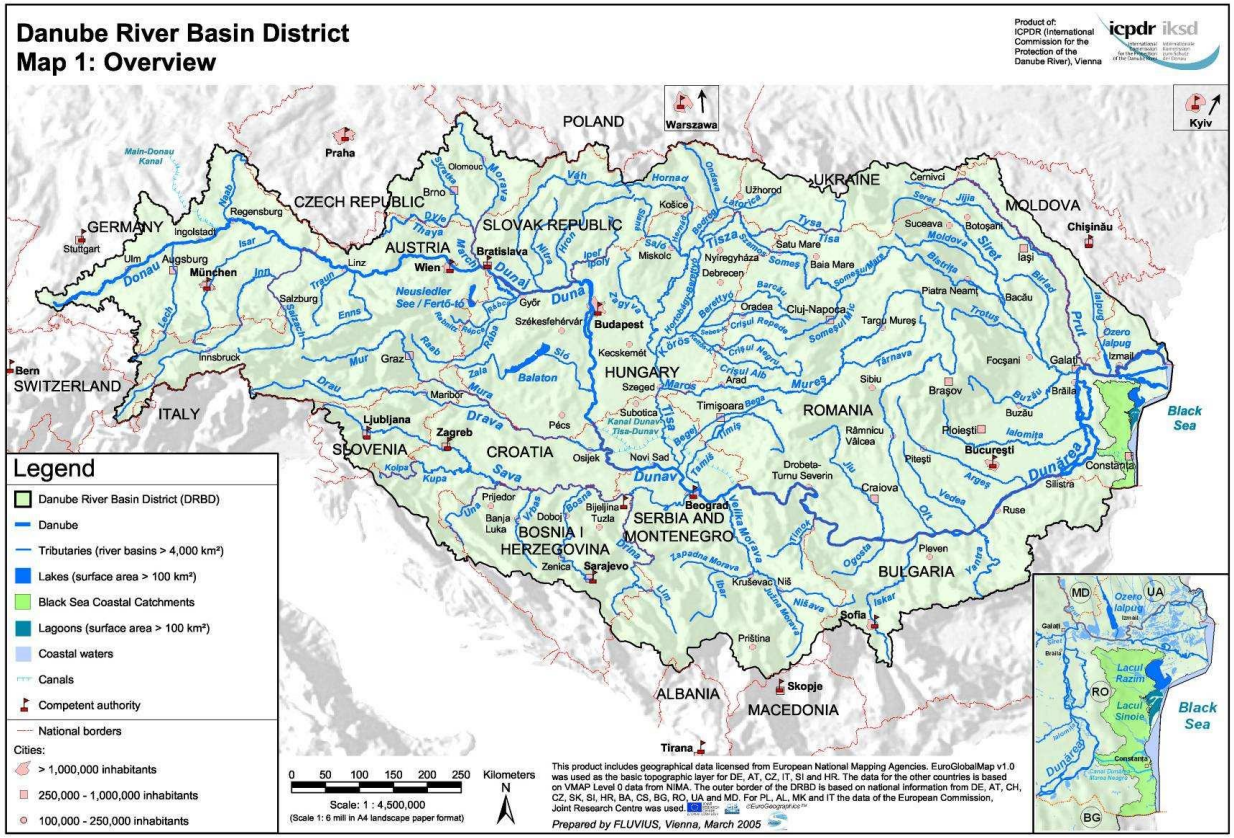
Where: Most International River Basin



Basin:

- 19 countries
- 800,000km²

Danube:

- 2,800km
- 10 countries
- 27 large and
- >300 small tributaries

ICPDR, 2016

What: River-floodplain systems

Hotspot of

- Biodiversity and
- Ecosystem services

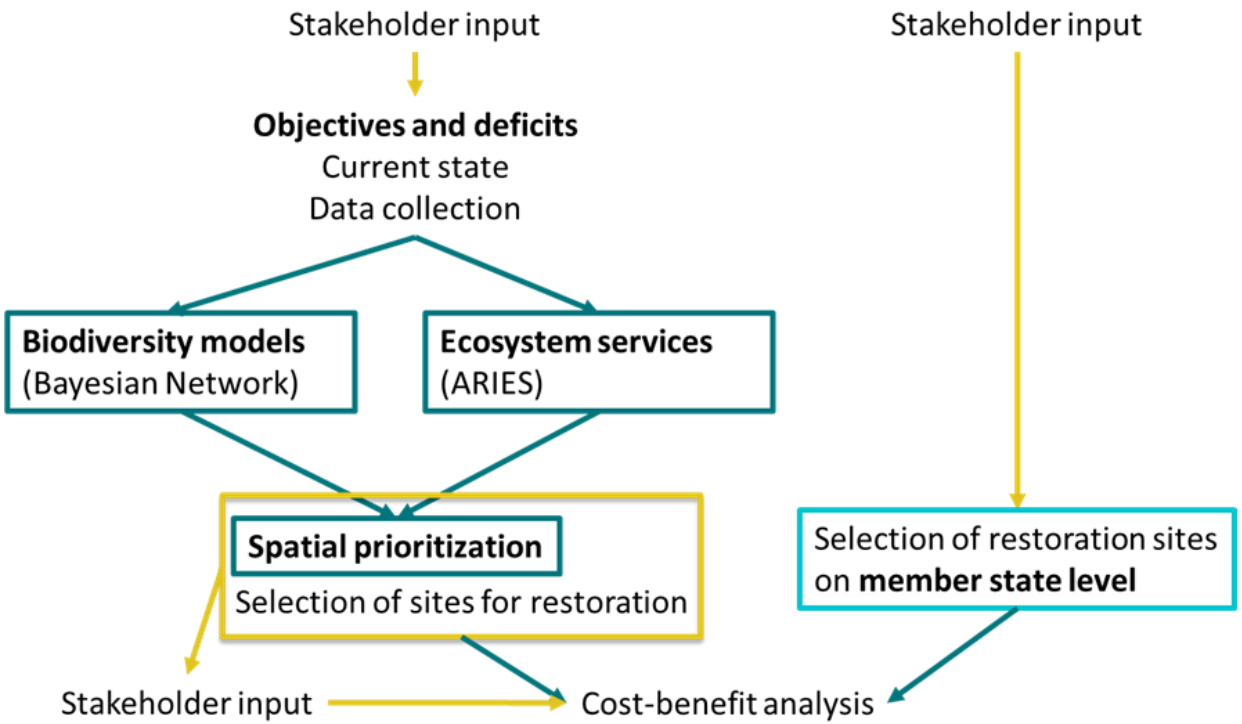
Threatened by multiple human activities:

- construction of hydropower plants,
- expansion of agricultural use,
- large-scale river regulation measures related to flood protection and navigation

River floodplain restoration to:

- Conserve biodiversity
- Achieve “good status”
- Flood protection
- Pollution reduction
- Climate adaptation
- Recreation

How: AQUACROSS Assessment Framework



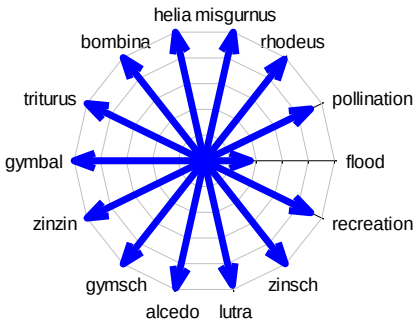
Systematic Priotitisation

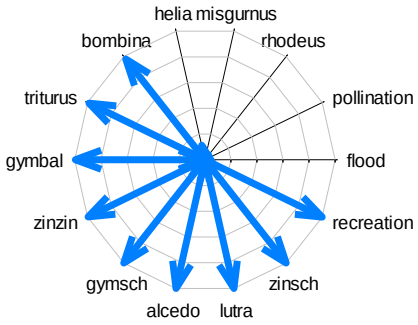
of river-floodplain systems for

- **Restoration** and
- **Conservation**

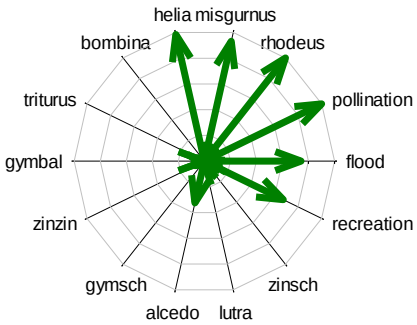
Selected sites within our
EBM scenario were evaluated against a **Baseline scenario**

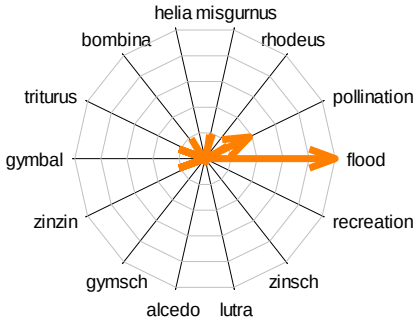
Results



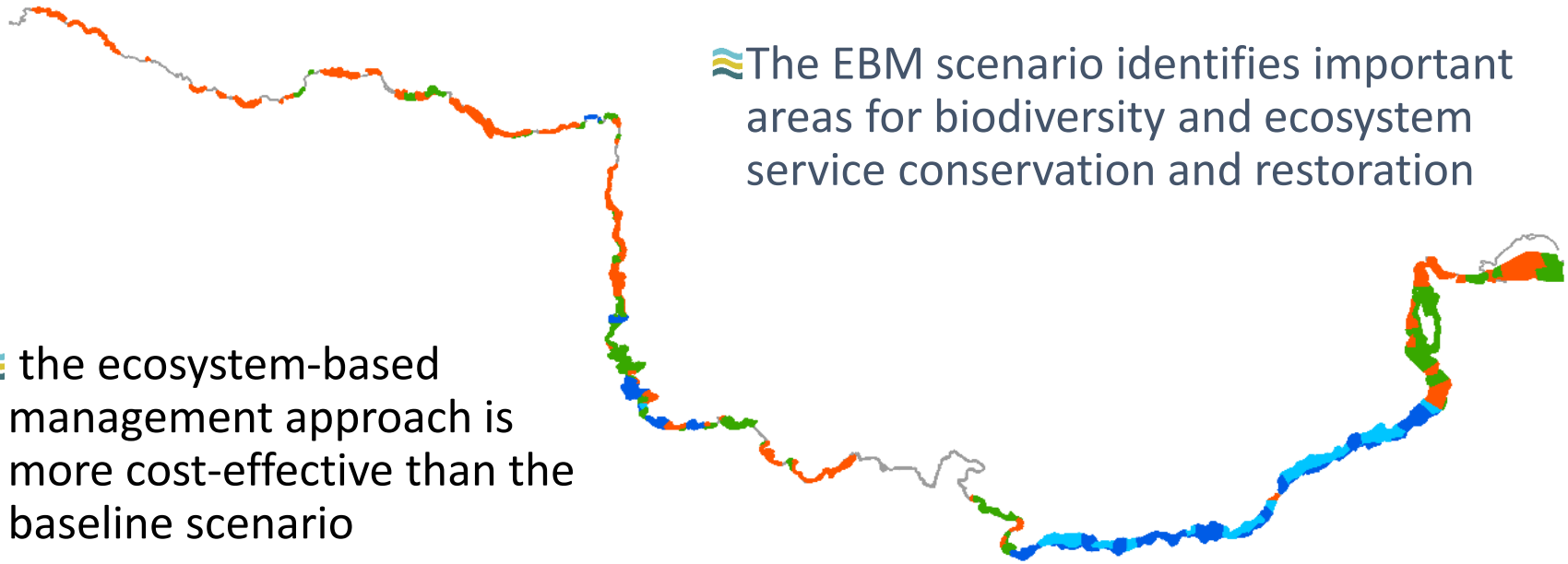


conservation





restoration



- The EBM scenario identifies important areas for biodiversity and ecosystem service conservation and restoration

- the ecosystem-based management approach is more cost-effective than the baseline scenario

Key messages

- the **ecosystem-based management** approach is considering the multi-functionality of river-floodplain systems - biodiversity, ecosystem service and multiple human activities
- Therefore, it fosters integrated conservation and restoration planning across multiple policies by creating the opportunity to pursue different policy objectives simultaneously.
- The approach may also foster transboundary coordination and cooperation as it considers the whole navigable main stem of the River Danube on ecosystem scale independent from jurisdictional, administrative and political boundaries.

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Thank you!

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Case Study 4: Management of Invasive Species in Lough Erne County Fermanagh

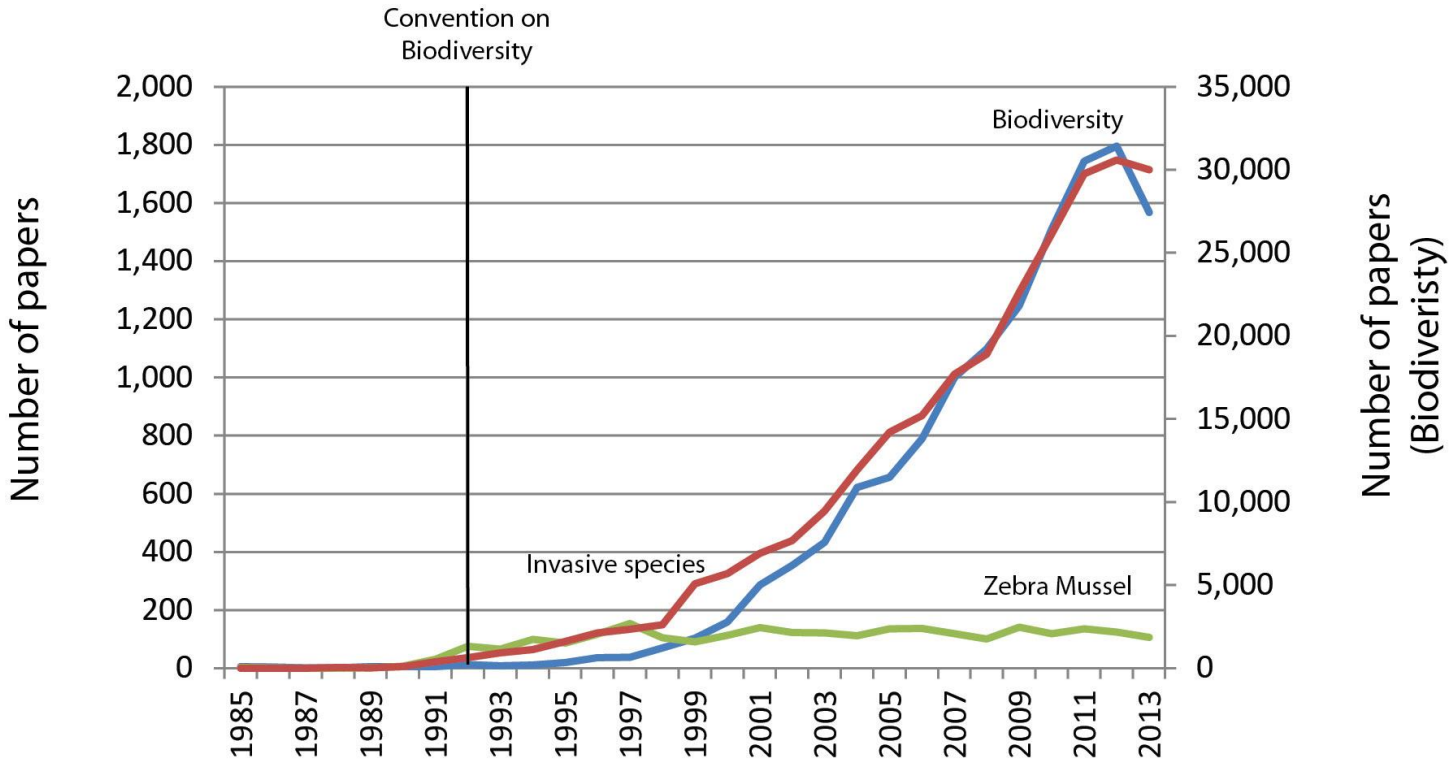
Dr. Tim O'Higgins

Brussels 9/10/2018

The AQUACROSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642317.

Main Questions

In 2014, in order to meet its obligations under Aichi Target 5 of the Convention on Biodiversity, the European Union introduced its regulation on Invasive Alien Species (EC, 2014). Under the directive a suite of Invasive Alien Species (IAS) of union concern has been drawn up. Where these species are widespread members state are obliged to put in place effective management measures.



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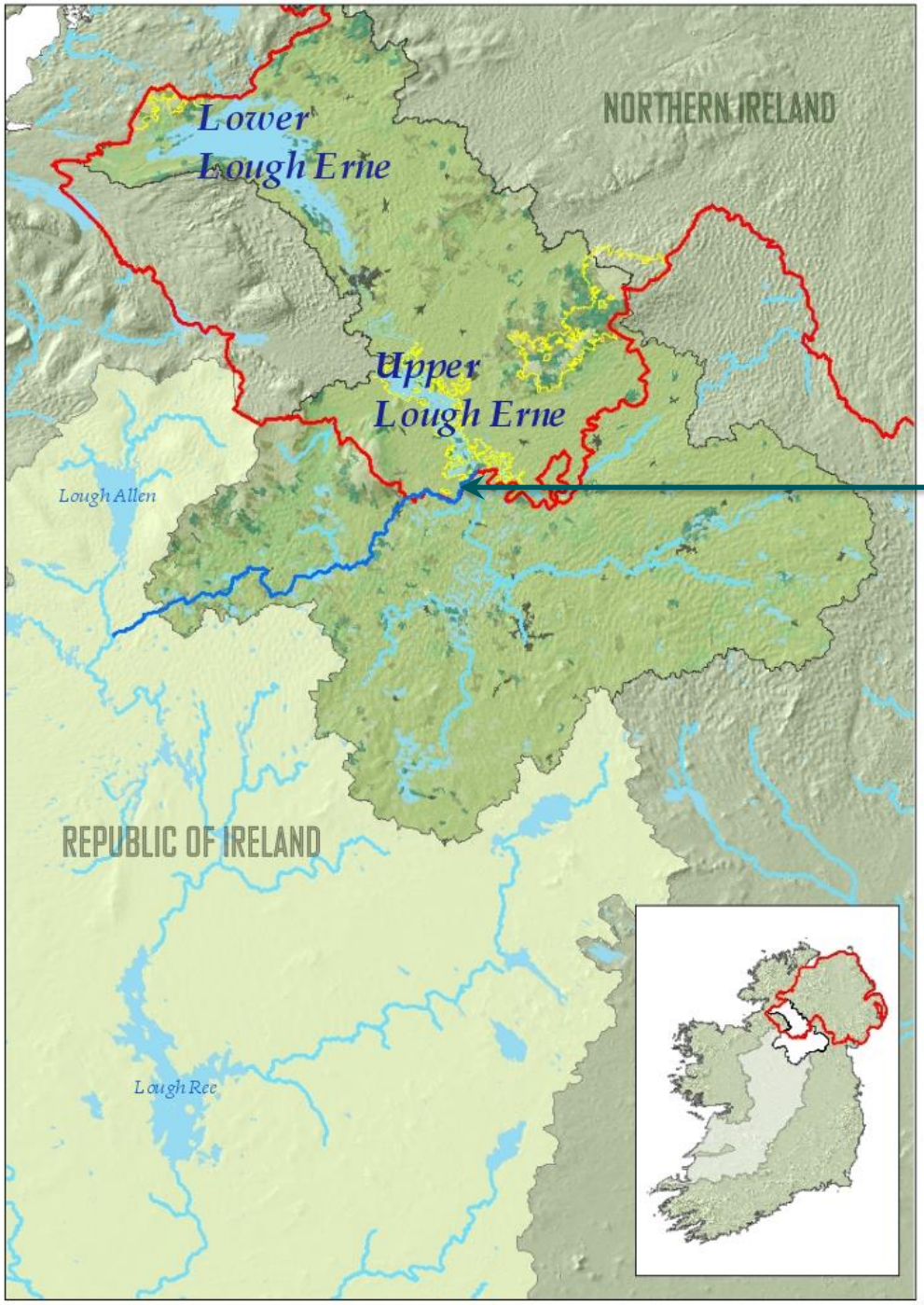

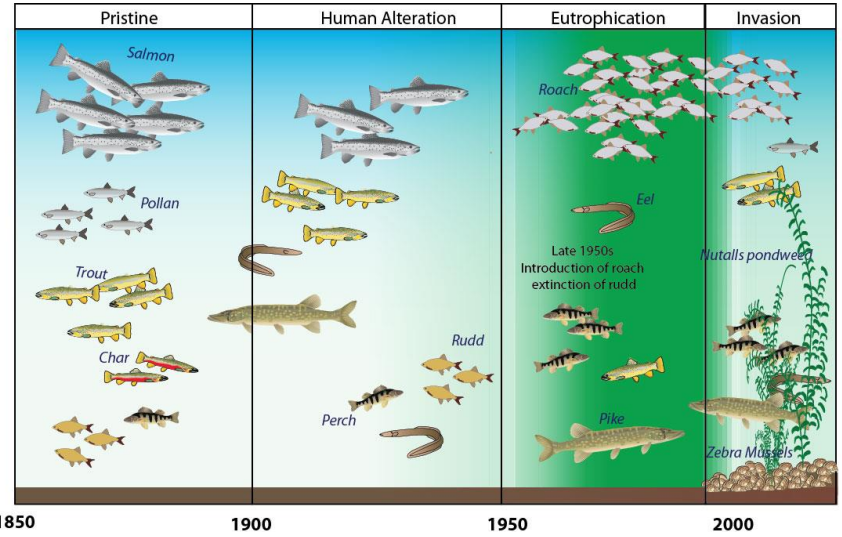

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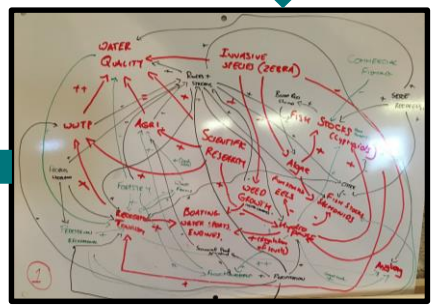
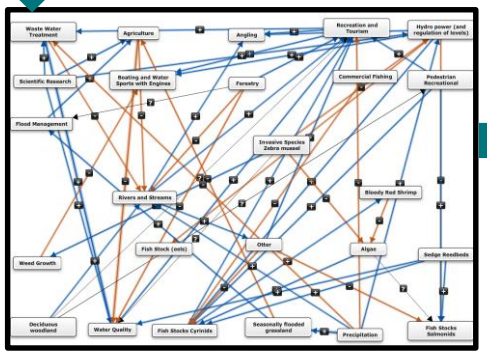
Fuzzy Cognitive Mapping (FCM)

Stakeholder workshop

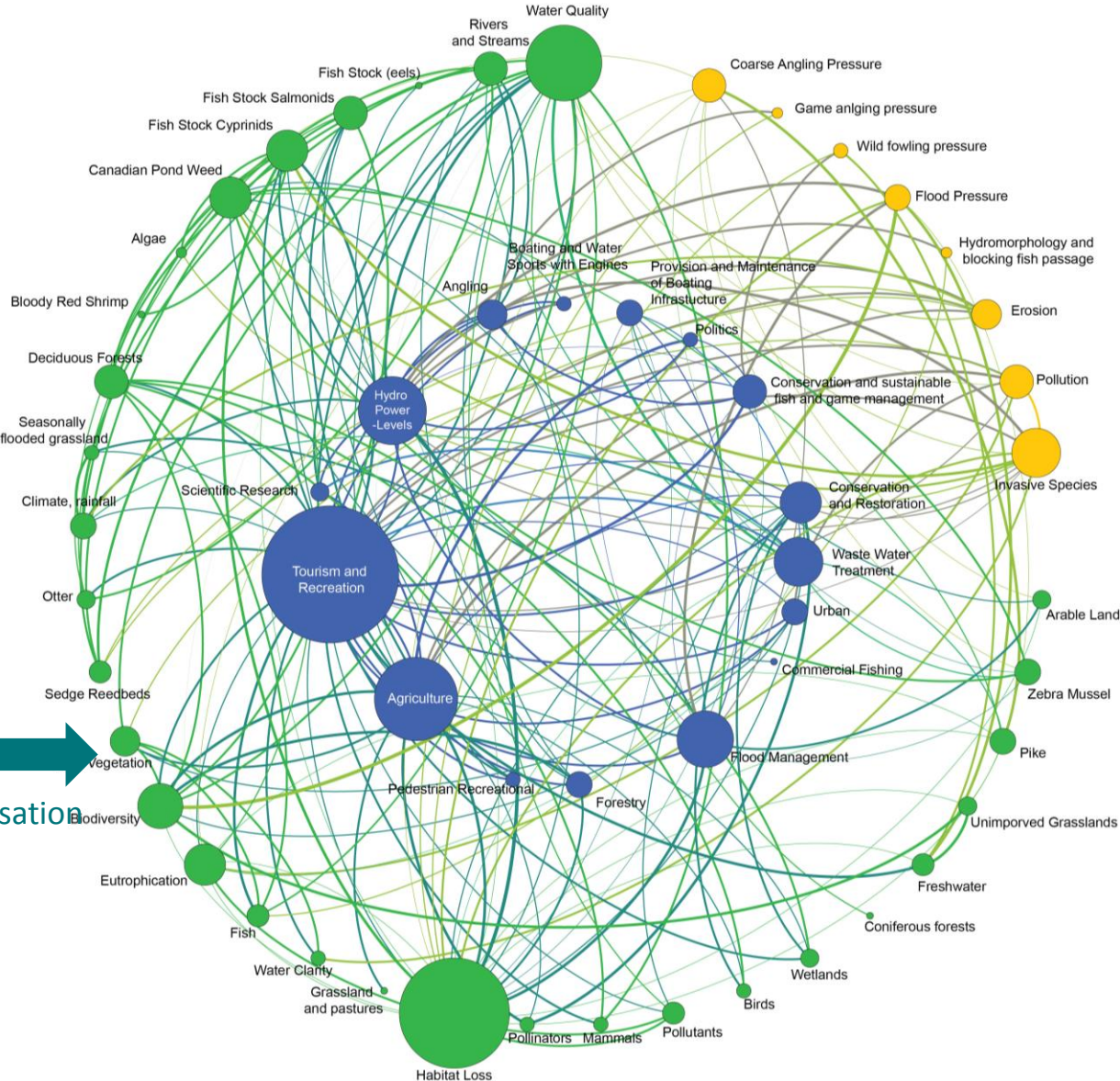


Mental models

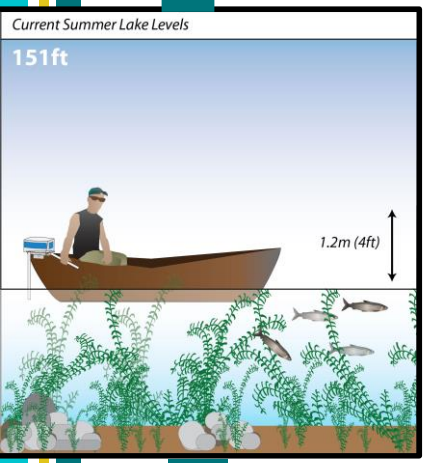


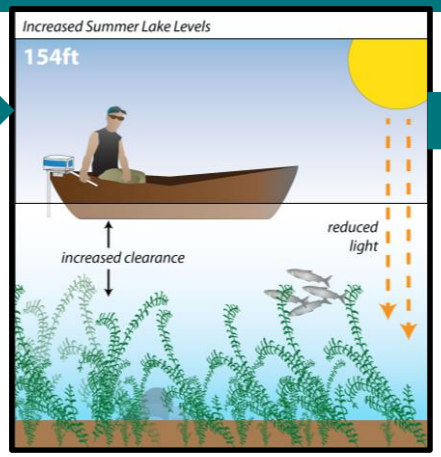
Qualitative dynamic FCM

Visualisation

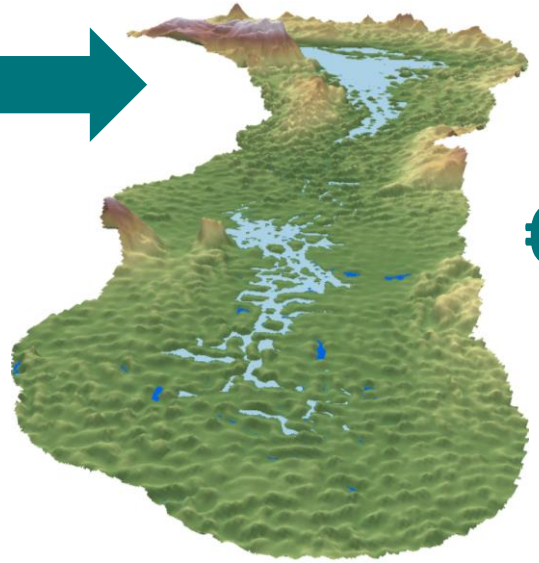


Ecosystem Based Management Measures



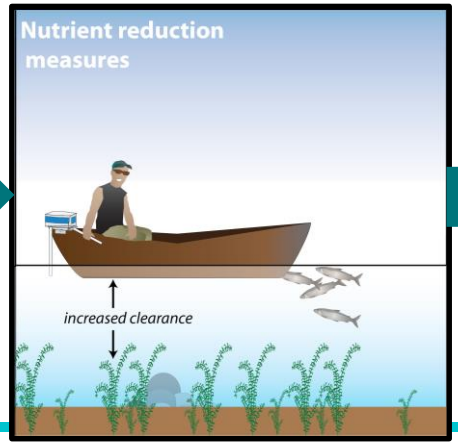


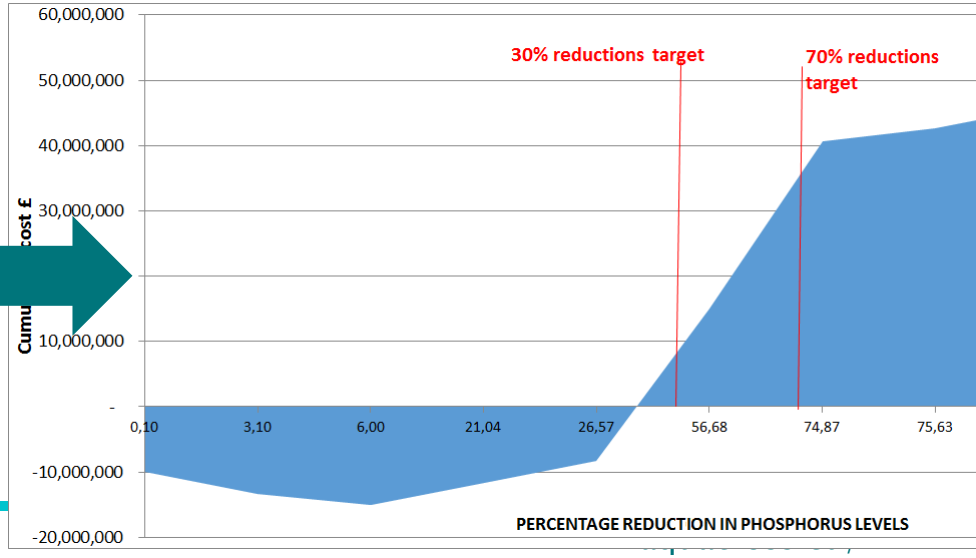
Direct Stakeholder input



€0.5-2m

Identified through FCM







Case Study 5: Improving integrated management of Natura 2000 sites in the Ria de Aveiro Natura 2000 site, from catchment to coast, Portugal

Ana Lillebø, Heliana Teixeira, António Nogueira Brussels 9/10/2018

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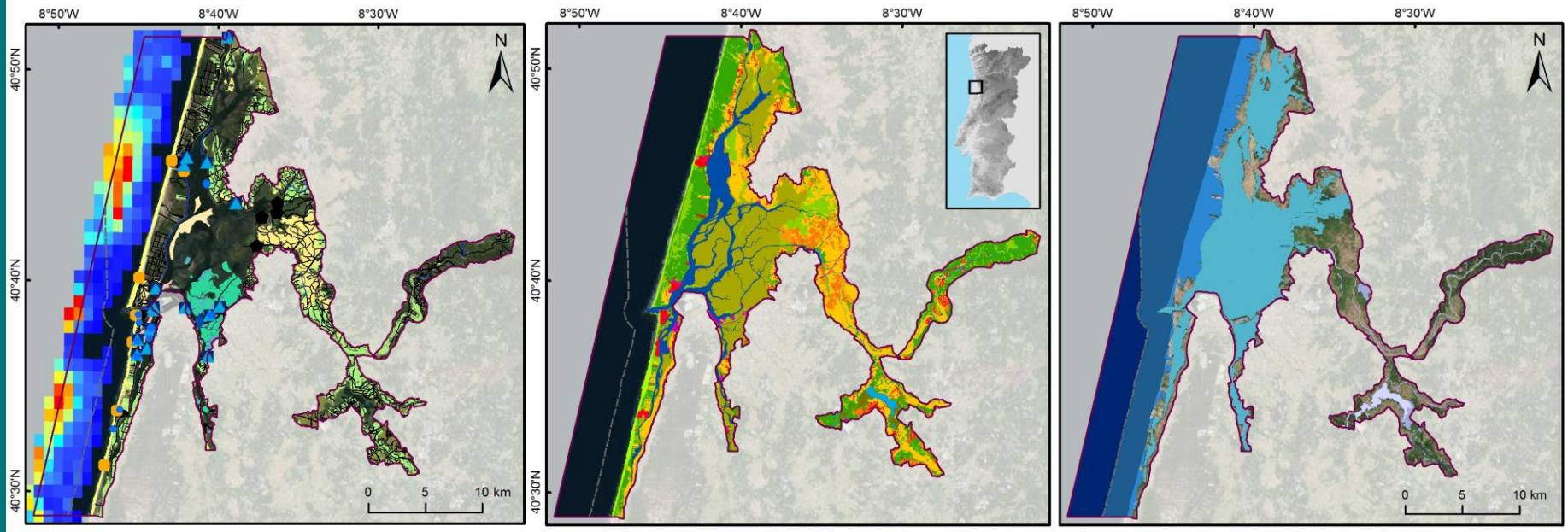
The social-ecological system



Activities

- Boating without engine
- Boating with engine
- Diving
- Marinas and dock/port facilities
- Tidal Sluices
- Public beach
- Angling and sport fishing
- Transport
- Public beach
- Shipping
- Coastal defence
- Urban dwellings
- Fin-fish aquaculture
- Macro-algae aquaculture
- Shellfish aquaculture
- Saltworks
- Bait digging
- Shellfish hand collecting
- Agriculture
- Livestock
- Forestry

Fishing (h/yr): 110.28 – 0.18

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

- WFD coastal boundary
- Natura 2000 Study Area

Land Use

- 1.1 Urban fabric
- 1.2 Industrial, commercial and transport units
- 1.3 Mine, dump and construction sites
- 1.4 Artificial, non-agricultural vegetated areas
- 2.1 Arable land
- 2.2 Permanent crops
- 2.3 Pastures
- 2.4 Heterogeneous agricultural areas
- 3.1 Forests
- 3.2 Scrub and/or herbaceous vegetation associations
- 3.3 Open spaces with little or no vegetation
- 4.1 Inland wetlands
- 4.2 Maritime wetlands
- 5.1 Inland waters
- 5.2 Marine waters

Realms

- Lakes
- Rivers
- Wetlands
- Riparian
- Inlets & Transitional
- Coastal Terrestrial
- Coastal
- Shelf
- Agricultural
- Terrestrial Natural
- Urban

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

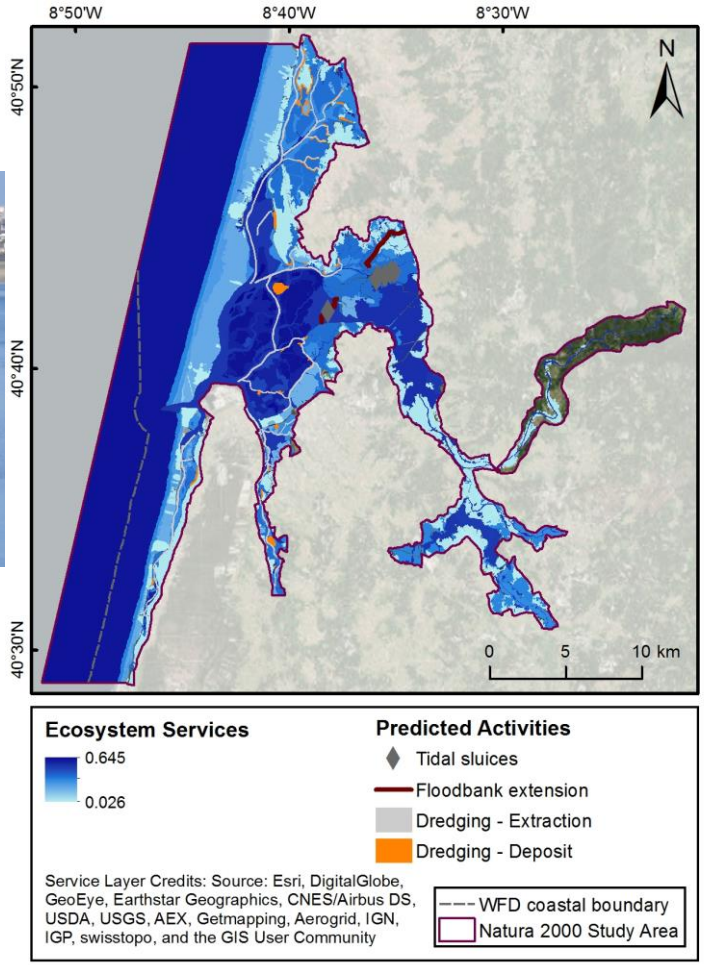
- Natura 2000 Study Area
- WFD coastal boundary

Main Challenge

Mitigate negative unintended impacts on biodiversity in a Natura 2000 freshwater–marine continuum

In 2018/2019, two management interventions will be implemented:

i) a dredging programme to enable hydrodynamic equilibrium and navigability in the lagoon

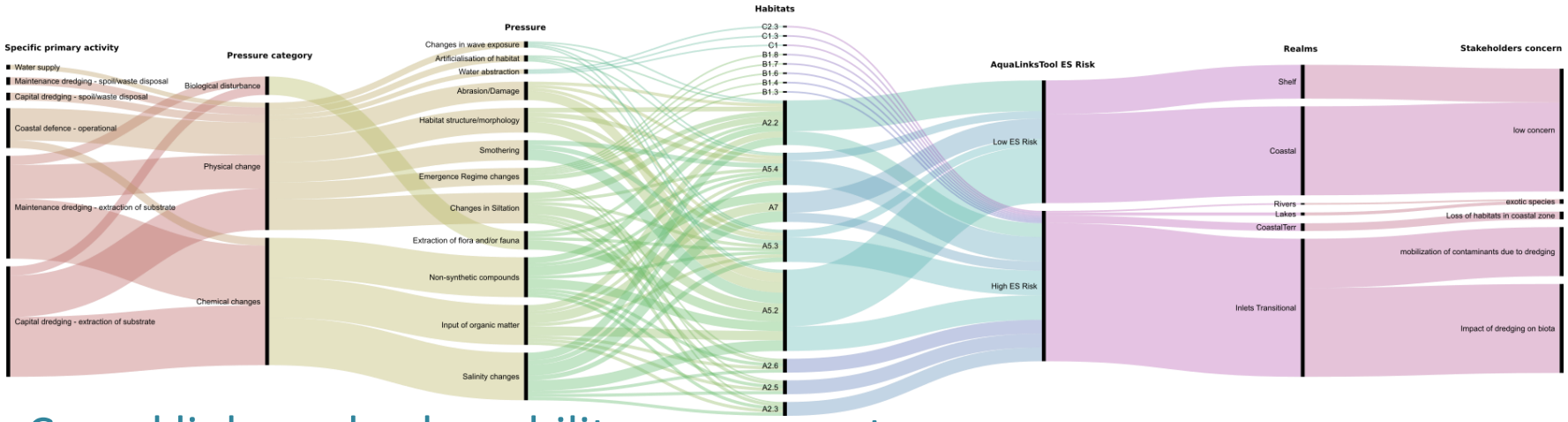


ii) the extension of a floodbank to disable surface saltwater intrusion into Baixo Vouga Lagunar agricultural area.

Both measures are:
Acceptable – political
Feasible – financial incentives
Institutional fitness check – governance

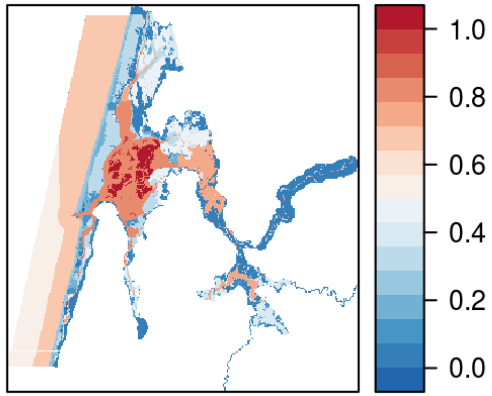
Understand the social–ecological system

- Policy instruments



- Casual links and vulnerability assessment

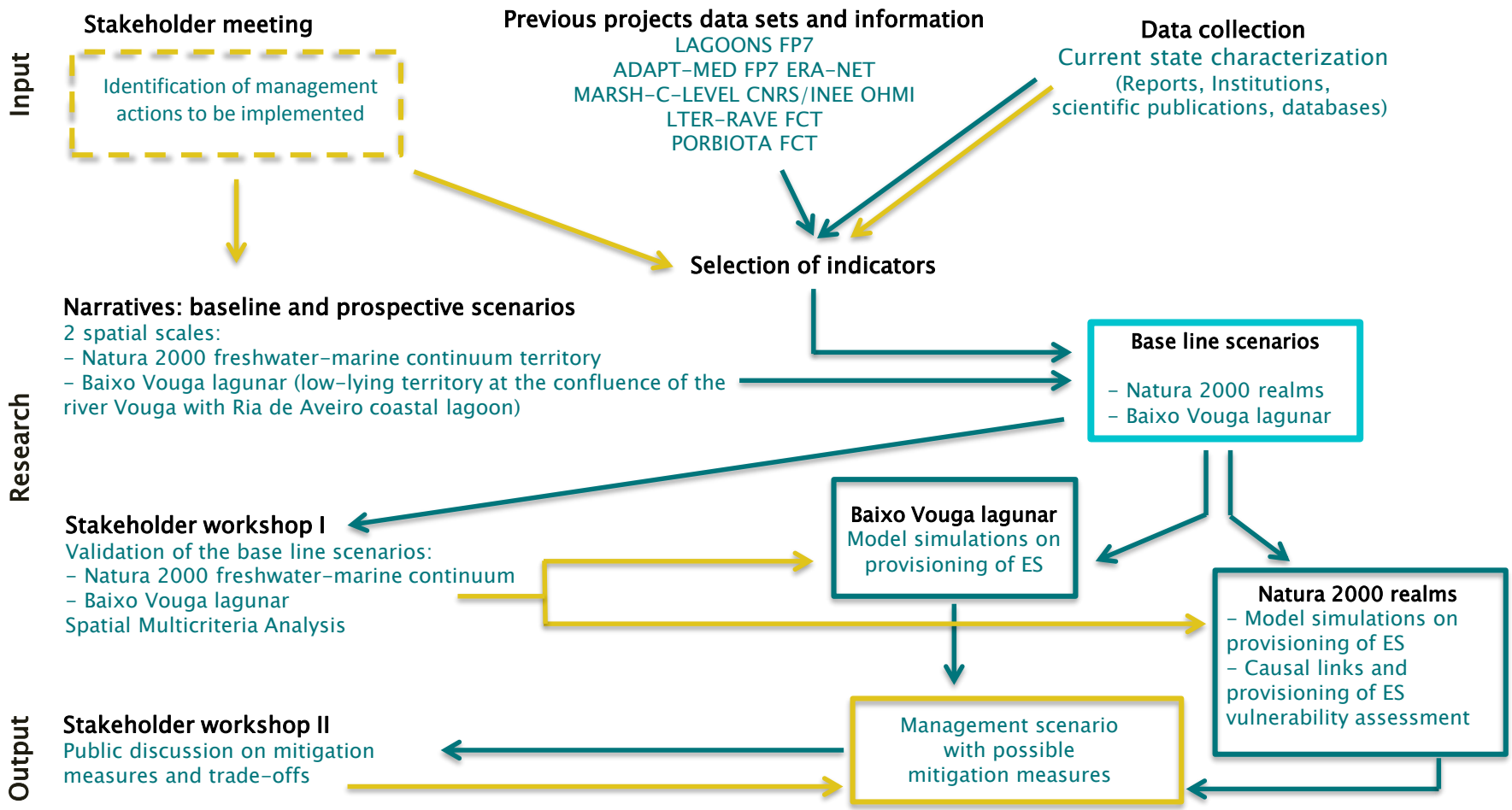
Linkage framework between Drivers-Pressures-Ecosystem Component-Ecosystem Services vulnerability assessment with AquaLinksTool and the major concern identified by stakeholders



- Spatial Multicriteria Analysis

Stakeholders participatory process on Ecosystem Services valuation

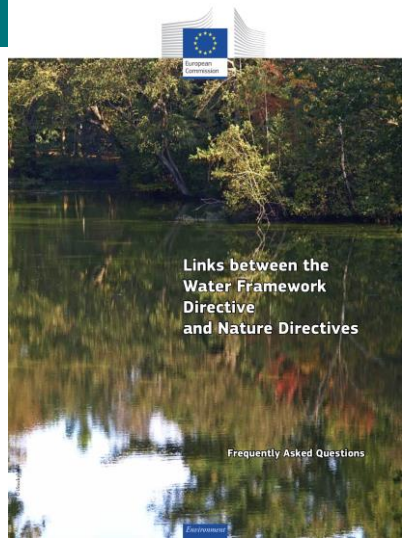
Scenario development workflow



Ecosystem Based Management co-developed solutions

Overall policy instruments applicable to water-dependent Natura 2000 sites

- Harmonised WFD and HD monitoring programmes



Case study specific policy plans and programmes

- Development of the Vouga estuary management plan

Planos de Ordenamento de Estuários

Políticas > Água > Ordenamento > Planos de Ordenamento de Estuários

Os Planos de Ordenamento dos Estuários, abreviadamente designados por POE, são planos especiais de ordenamento do território que consagram as medidas adequadas à protecção e valorização dos recursos hídricos na área a que se aplicam de modo a assegurar a sua utilização sustentável, vinculando a Administração Pública e os particulares.

- Engage local users and landowners in the restoration actions

- Restoration of tidal wetlands, namely saltmarshes and seagrasses

http://www.tampabaywatch.org/salt-marsh.html

http://seagrassrestoration.net/zostera-restoration-in-nz/

- Promote the value of ecosystems services provided by tidal wetlands



Case Study 6: Eutrophication in Lake Ringsjön and Rönne å catchment, Sweden

Understanding opportunities and measures for managing aquatic, co-produced ecosystem services

Romina Martin and Maja Schlüter

10/10/18

The AQUACROSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642317.

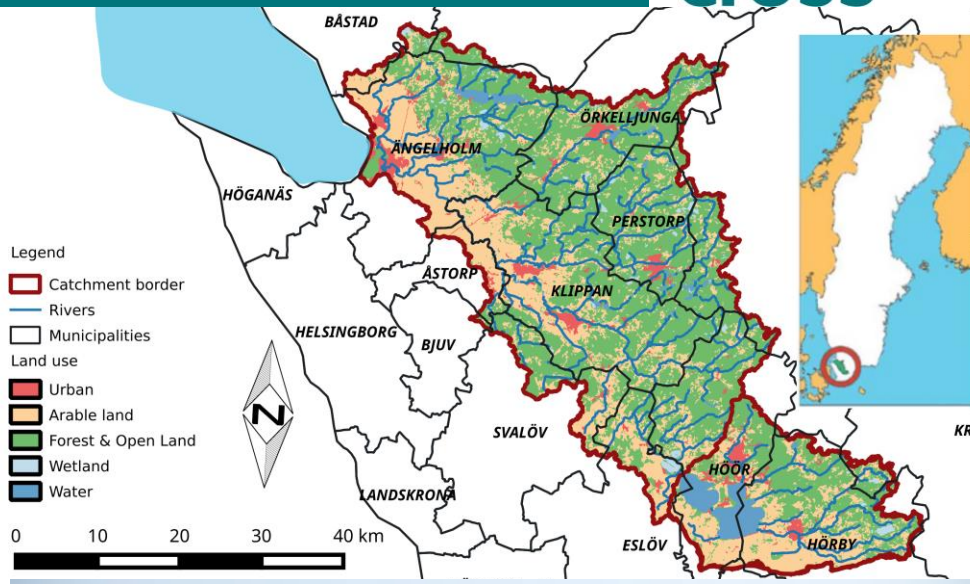
A eutrophic freshwater catchment

Rönne å catchment in Southern Sweden

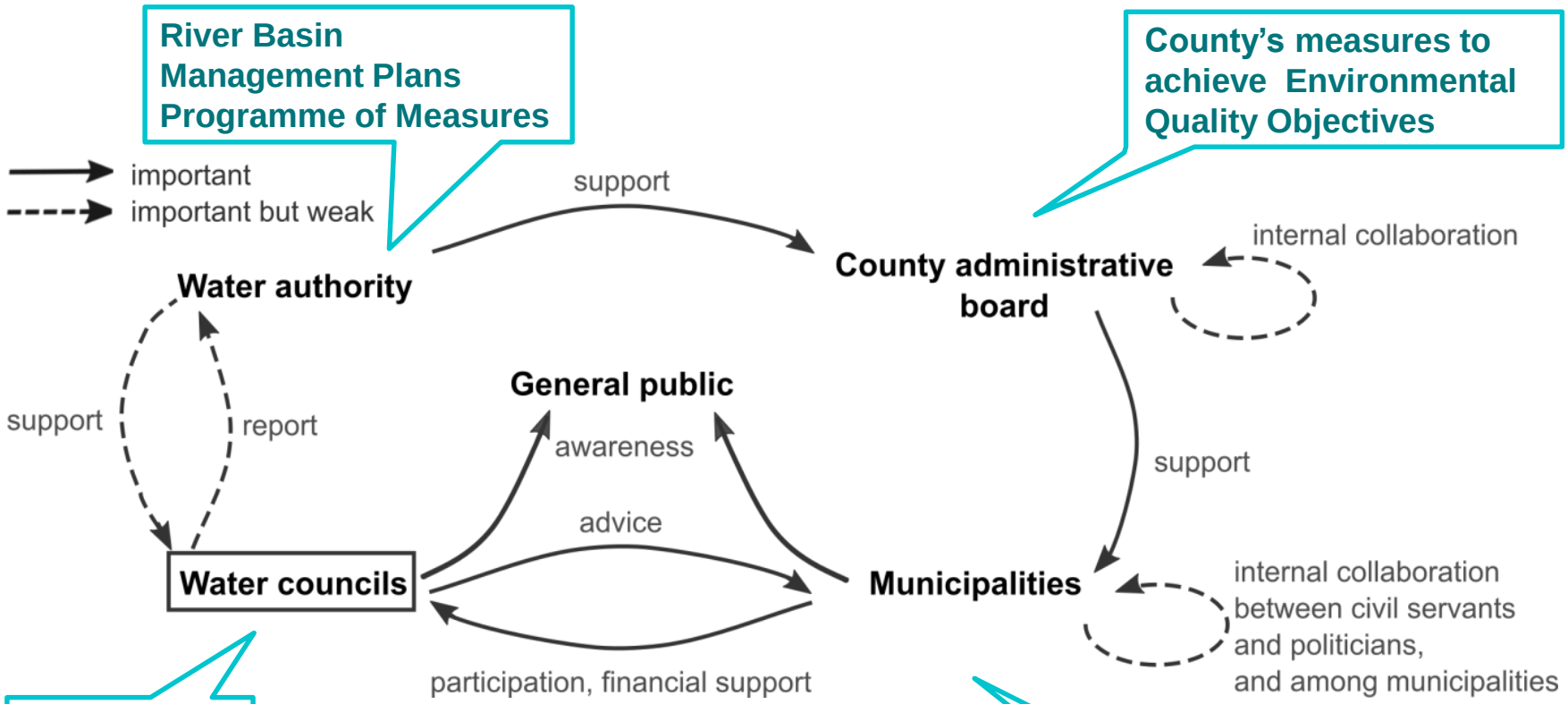
- Transitioning from agricultural to multi-functional landscape

Lake Ringsjön

- Received nutrients from agriculture and insufficient sewage treatment
- Restoration ongoing
- Freshwater services and biodiversity increase with clear water state

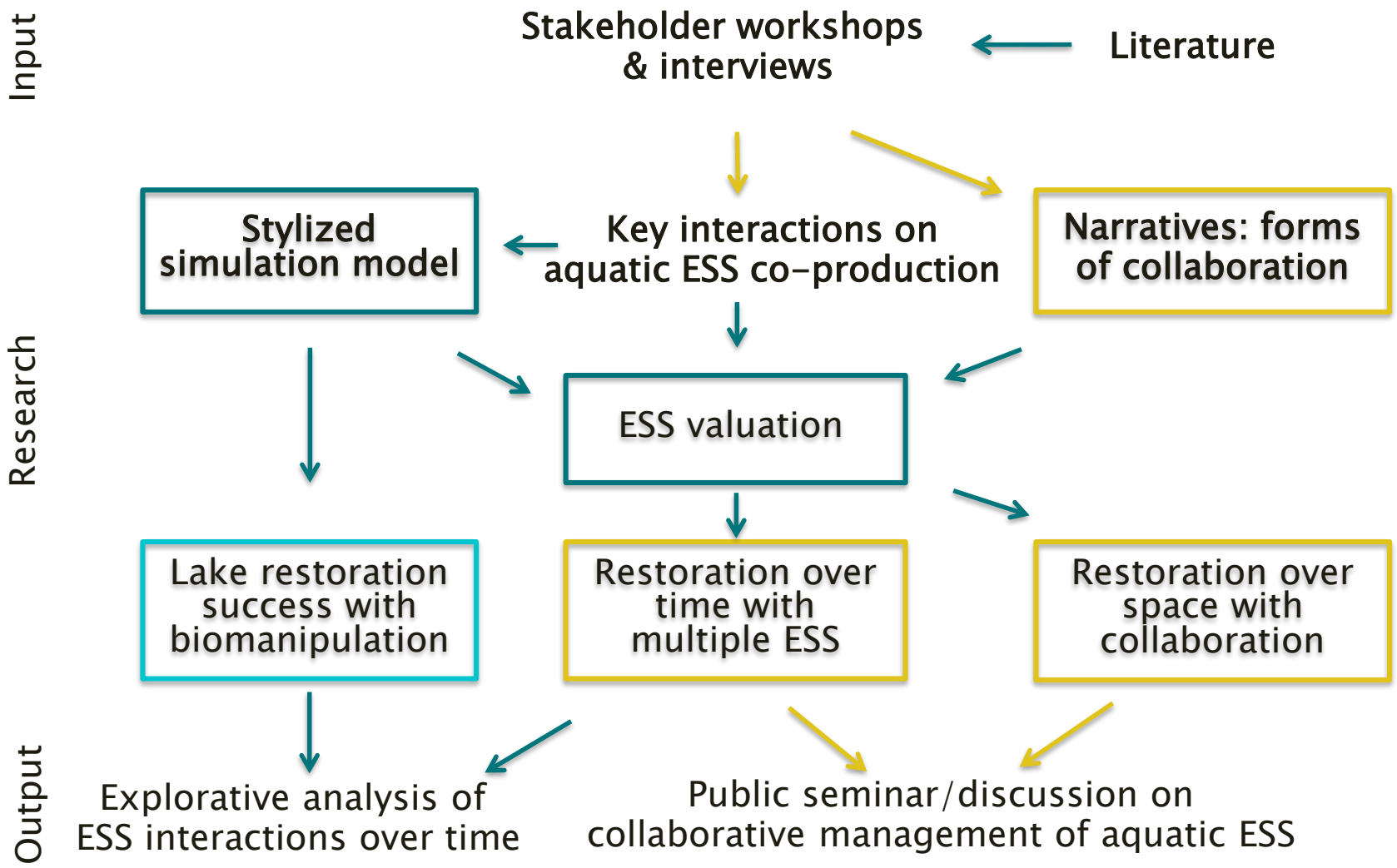


Local water governance in Sweden



- How fast can good water quality be restored collaboratively?

Scenario development process



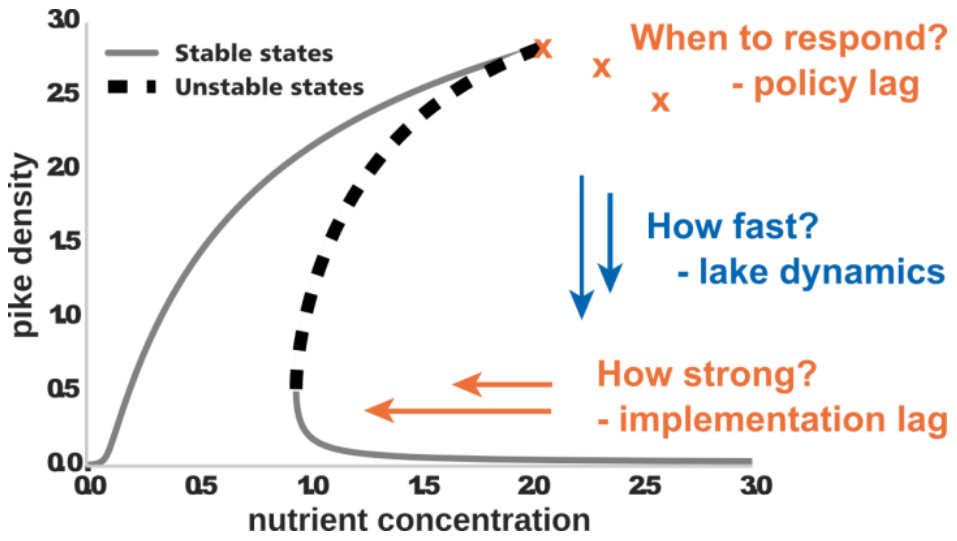
Insight: Ecosystem services are co-produced

Explicit consideration of

- Time lags and feedbacks
- Trade-offs among ecosystem services
- Cross-boundary coalitions for measure implementation

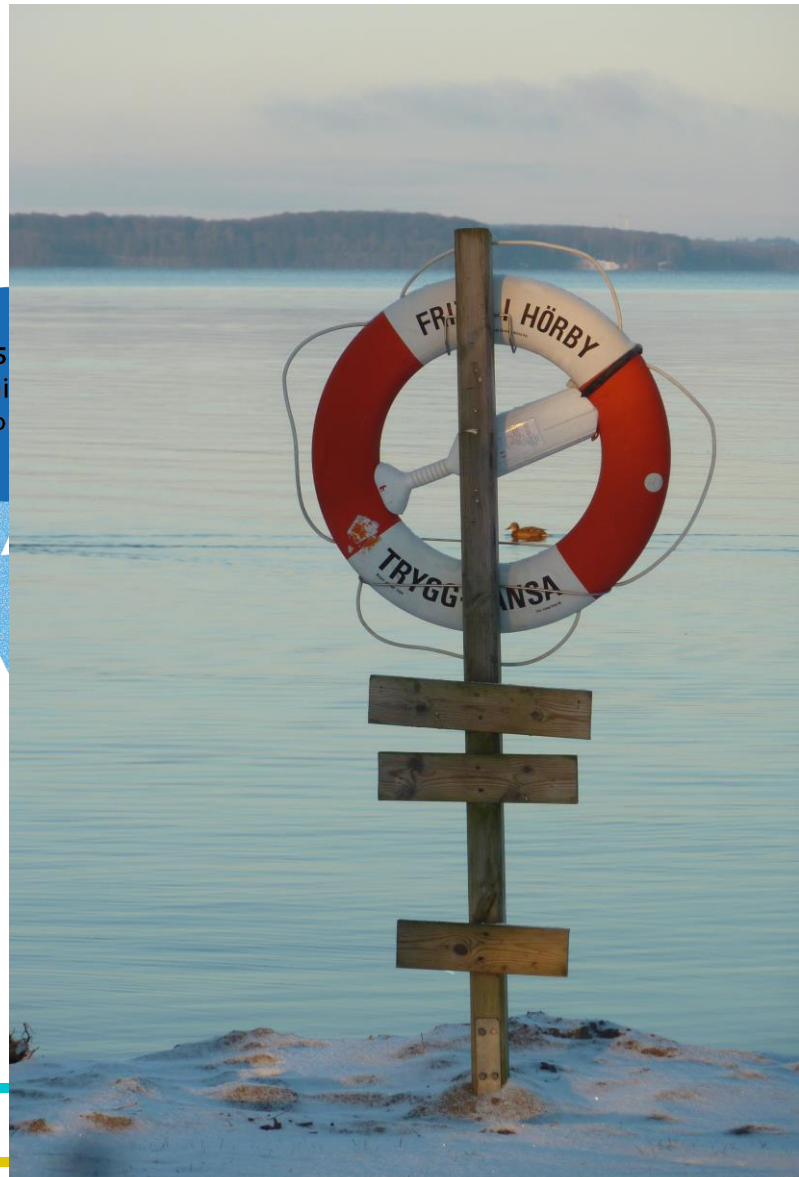
Pushing modelling frontiers

- Complex social-ecological interactions
- Reinforcing over time
- Intertwined over space and actors



Ways to improve local water governance

- **Resilience thinking:** Feedbacks and social-ecological interactions have long-term consequences
- Ecosystem service **trade-offs and synergies** need strategic foresight.
- Water councils are well equipped for **stewarding freshwaters** through forming strong alliances



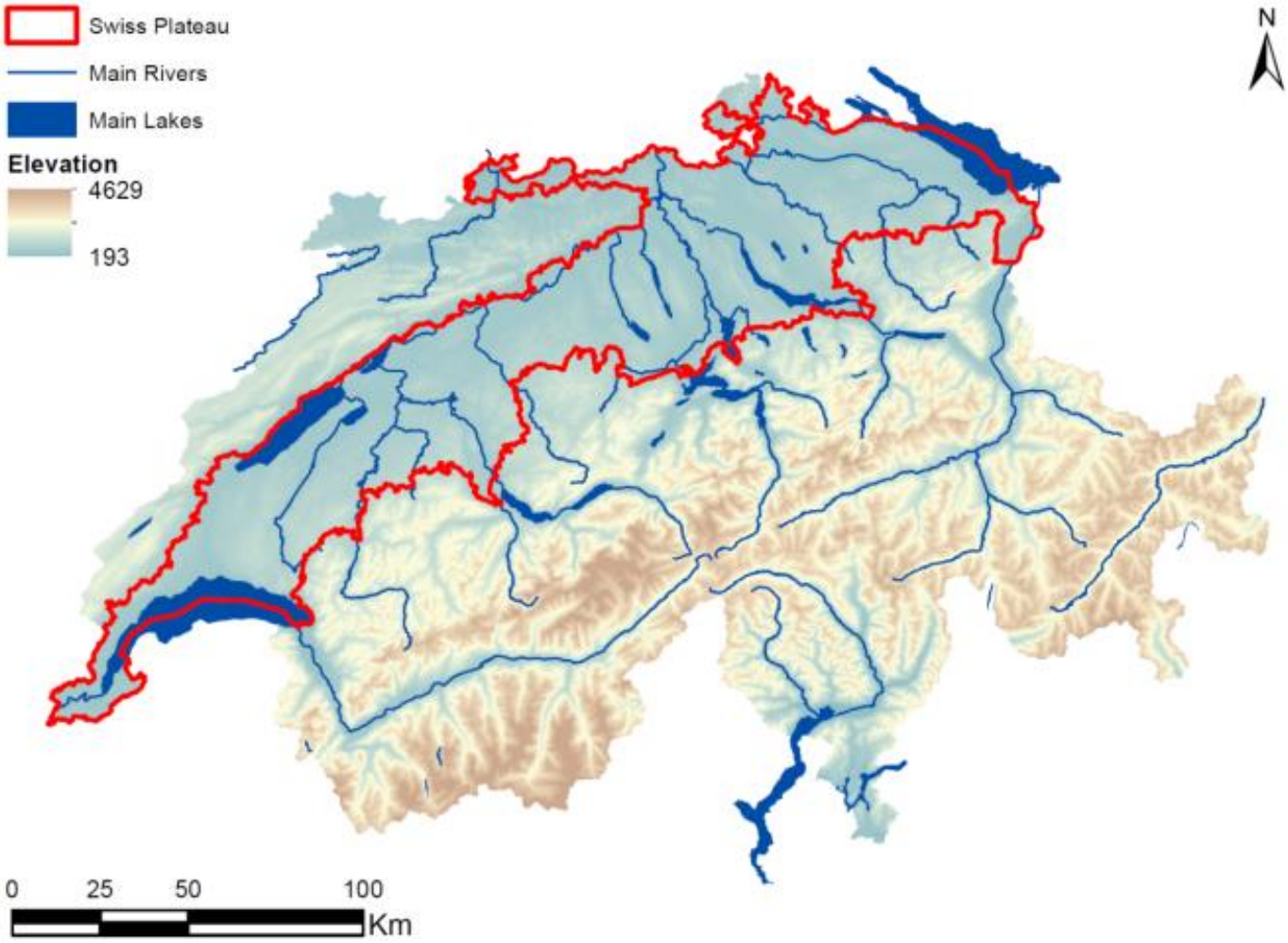


CS 7 Biodiversity management for rivers in the Swiss Plateau

Nele Schuwirth, Mathias Kuemmerlen, Peter Vermeiren, Peter Reichert

The AQUACROSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642317.

Swiss Plateau



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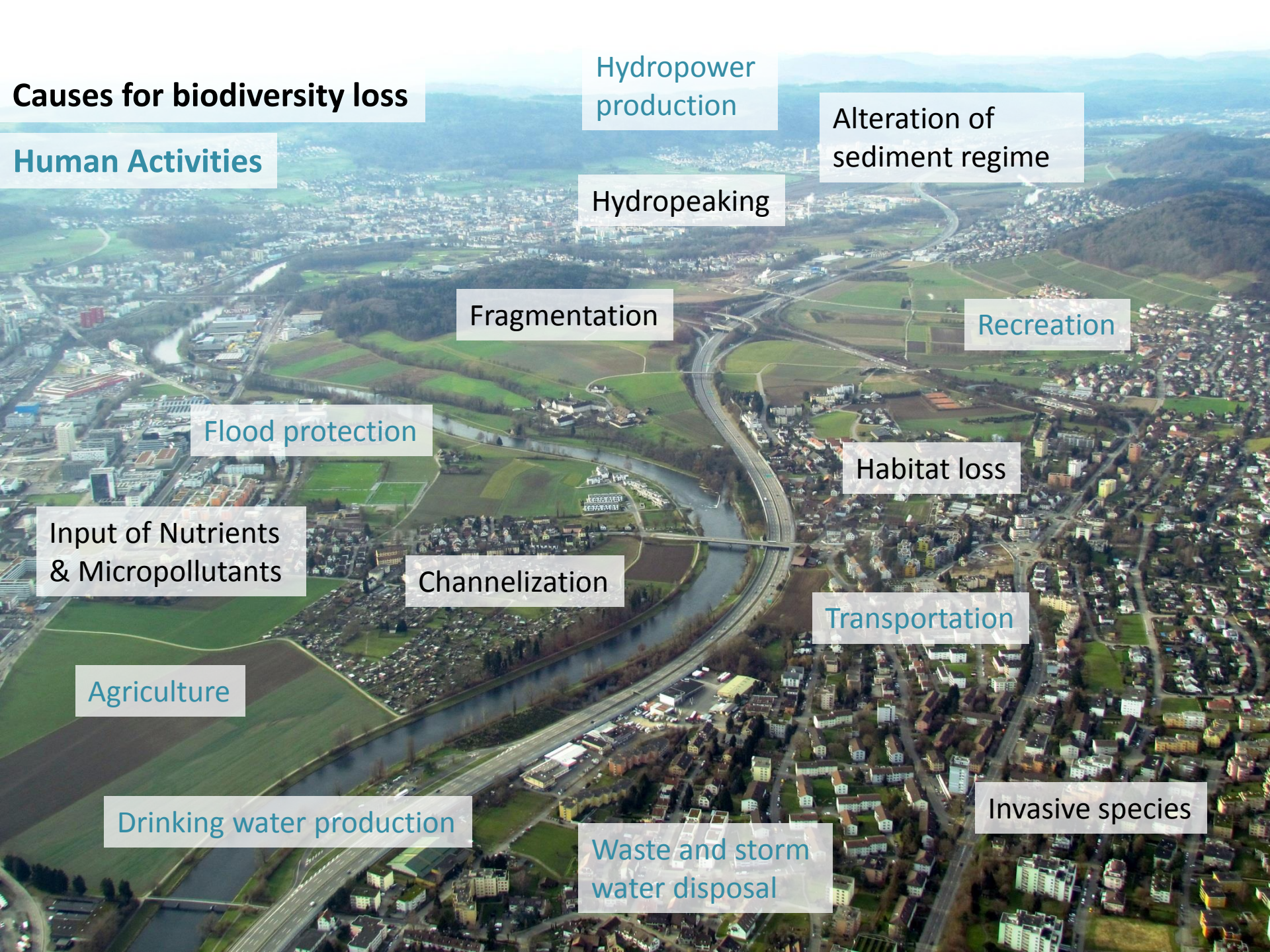

Causes for biodiversity loss
Human Activities
Hydropower production
Alteration of sediment regime
Hydropeaking
Fragmentation
Recreation
Flood protection
Habitat loss
Input of Nutrients & Micropollutants
Channelization
Transportation
Agriculture
Drinking water production
Invasive species
Waste and storm water disposal

Context

- Swiss policy: restoration of 25% of the rivers currently in a bad morphological state over the next 80 years (ca. 4000km), supported with 40 Mio CHF/year
- cantons have to deliver a strategic planning for the next 20 years, to be updated every 12 years for spatial prioritization of measures
- rough federal guidance for strategic planning mainly based on hydromorphological assessment and infrastructure
- (formal) coordination between river restoration and other river management policies currently lacking
  (e.g. upgrading wastewater treatment plants to remove micropollutants)
- in the past, river restoration measures often did not show biological success, mainly due to lacking coordination and limited recolonization potential

Aims

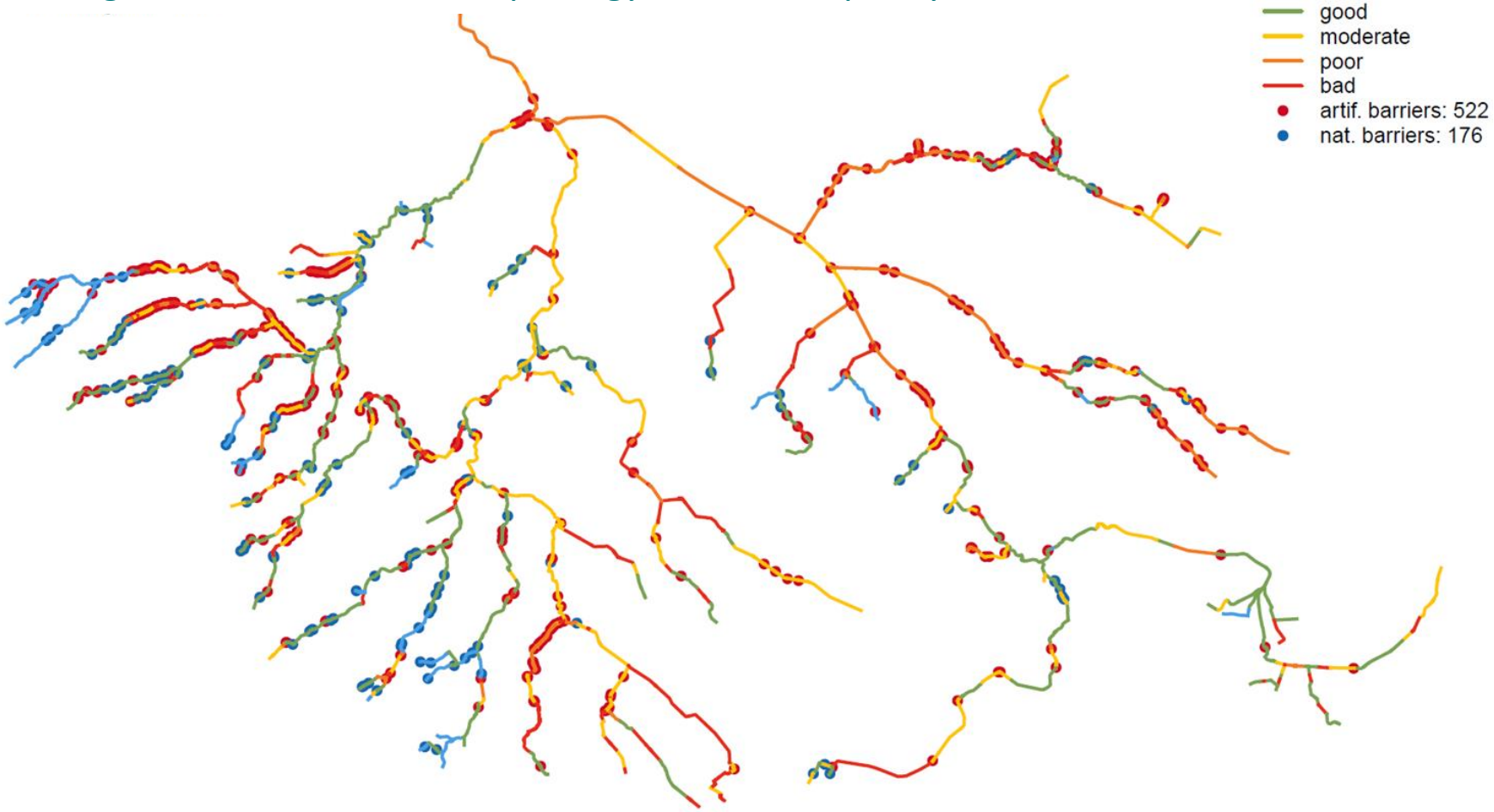
develop methods for the spatial & temporal prioritization of management measures based on currently available data that allows

- a better coordination across sectors,
- a joint evaluation of a portfolio of measures,
- to stimulate planning processes in practice

1. Propose integrative and spatially explicit criteria to evaluate the ecological state of catchments
2. Search for combinations of measures that maximise the ecological state while considering budget and other constraints

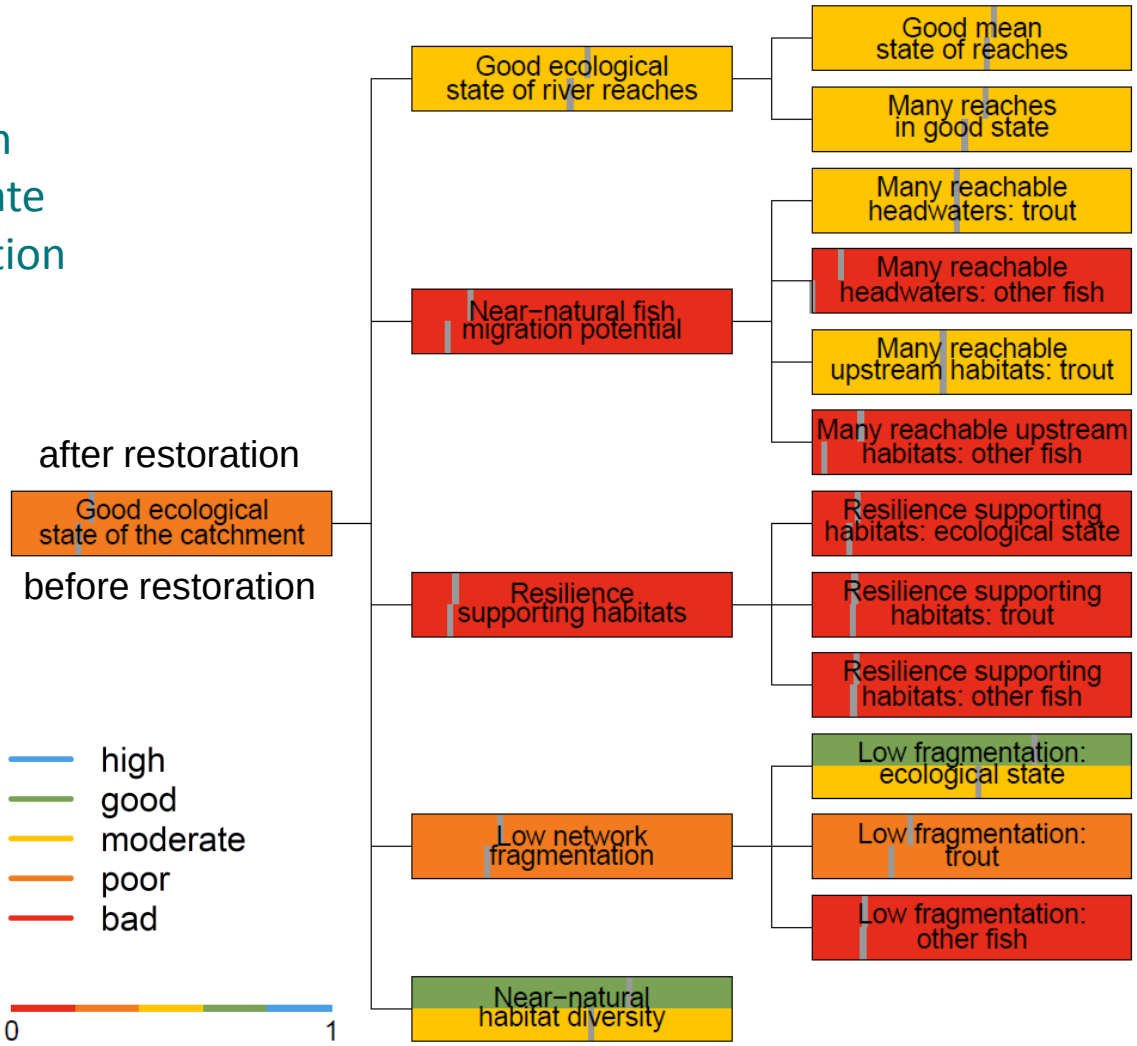
Reach scale assessment

ecological state based on morphology and water quality



Catchment scale assessment

considers spatial arrangement of reaches in good or bad ecological state and barriers to fish migration



Event: Aquacross Final Conference
Authors: Nele Schuwirth, Mathias Kuemmerlen, Peter Vermeiren, Peter Reichert



Case Study 8: Faial-Pico Channel, Azores

Ecosystem-based solutions to solve sectoral conflicts on the path to sustainable development in the Azores

Hugh McDonald, Ben Boteler, Holger Gerdes, Helene Hoffman, Keighley McFarland, Lina Röschel, and AQUACROSS Consortium

10/10/2018

The AQUACROSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 642317.

Overall Aim: support effective and equitable Marine Protected Areas

- **Marine Protected Areas:** a key tool to protect biodiversity

but…

- …scientists question **efficacy** and **equity** of existing Marine Protected Areas

Convention on Biological Diversity

nature
International journal of science

Nature **543**, 665–669 (30 March 2017)

Capacity shortfalls hinder the performance of marine protected areas globally

David A. Gill[1,2†], Michael B. Mascia[3], Gabby N. Ahmadia[4], Louise Glew[4], Sarah E. Lester[5], Megan Barnes[6,7], Ian Craigie[8], Emily S. Darling[9], Christopher M. Free[10], Jonas Geldmann[11,12], Susie Holst[13], Olaf P. Jensen[10], Alan T. White[14], Xavier Basurto[15], Lauren Coad[16,17], Ruth D. Gates[18], Greg Guannel[19], Peter J. Mumby[20], Hannah Thomas[21], Sarah Whitmee[22], Stephen Woodley[23] & Helen E. Fox[4,24]

Marine protected areas (MPAs) are increasingly being used globally to conserve marine resources. However, whether many

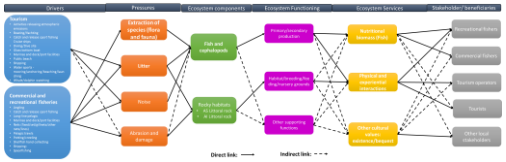
Context and background: Faial-Pico Channel Marine Protected Area

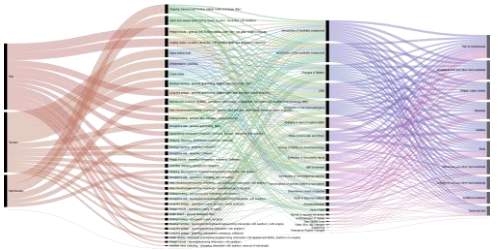
- Rich in marine biodiversity, valued by:
  - Fishers (commercial and recreational)
  - Tourists
  - Others
- But, despite protected area designation – biodiversity declining!

- **Local aim**: collaborate with local stakeholders and policymakers to apply the AQUACROSS Assessment Framework to understand the Channel, and identify actions to efficiently and equitably ensure the Channel's long-run sustainability

What was done?

- Analyse local **policy** and **stakeholder** objectives
- Characterise the **socio-ecological system**
- Develop baseline **scenario**
- Identify and evaluate **Ecosystem-Based Management Plan**



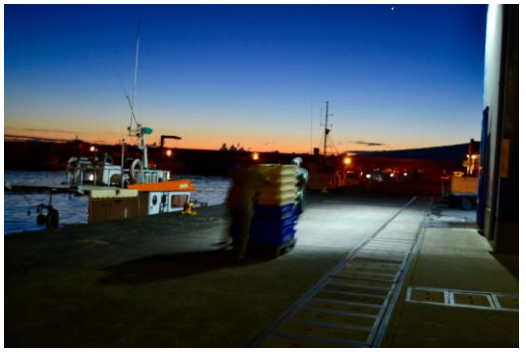


Co-creation with local stakeholders - recreational and commercial fishers, diving operators, NGOs, scientists, local policy reps, and others – including two day-long workshops.

Results: Ecosystem-based management plan

EBM Plan:

1. Increased scientific monitoring
2. Stakeholder Advisory Group
3. Integrated, coordinated Channel management
4. Simplify/increase communication and enforcement fishing and biodiversity regulations
5. Share costs through a sustainability tax or diving fee.



Evaluation: relative to baseline, EBM Plan will

- **support increased protection of biodiversity**
- **Support sustainability of social system and adaptive management** (stakeholder engagement, knowledge, coordination

Conclusions: Stakeholders support effective and efficient Marine Protected Areas

- Stakeholder engagement and participation supports **effective** and **equitable management of Marine Protected Areas** and **ecosystem-based management.**

They can help:

- identify challenges and priorities,
- co-create innovative solutions,
- offer low-cost knowledge and expertise,
- support ongoing monitoring, enforcement, and evaluation.

Learn more: https://aquacross.eu/casestudies

AQUACROSS Case Studies – Learn more

To learn more:

- **aquacross.eu/casestudies**
  - 30 page Case Study Report
  - 3 page summary for local stakeholders
- Posters – in the Case Study Gallery
- Networking drinks – film