Integrating climate vulnerability assessment into Marine Protected Areas (MPA) networks design: a conceptual framework

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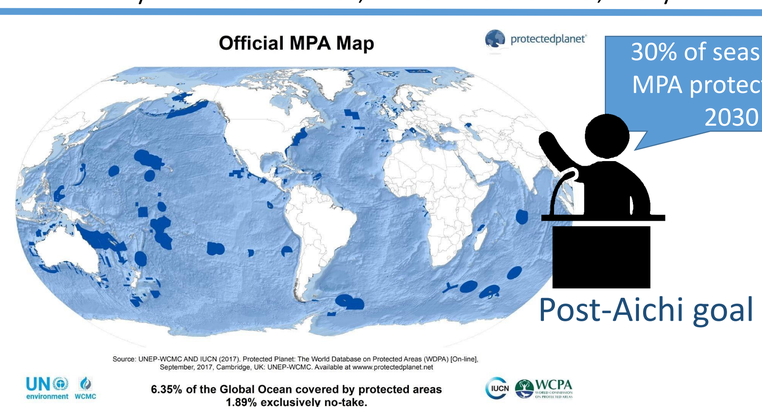
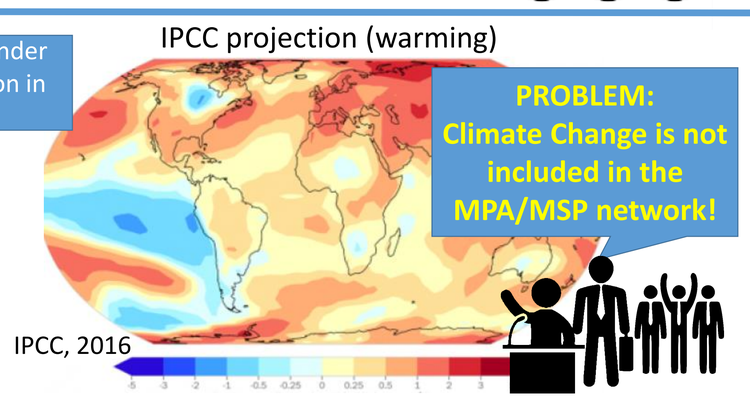
Given the worldwide **increasing number of sea uses** and the **growing pressure** exerted by these activities on ecosystems, there is a clear **need to establish concerted measures** for the **sustainable joint management** of stocks and marine space.



30% of seas under MPA protection in 2030

Post-Aichi goal



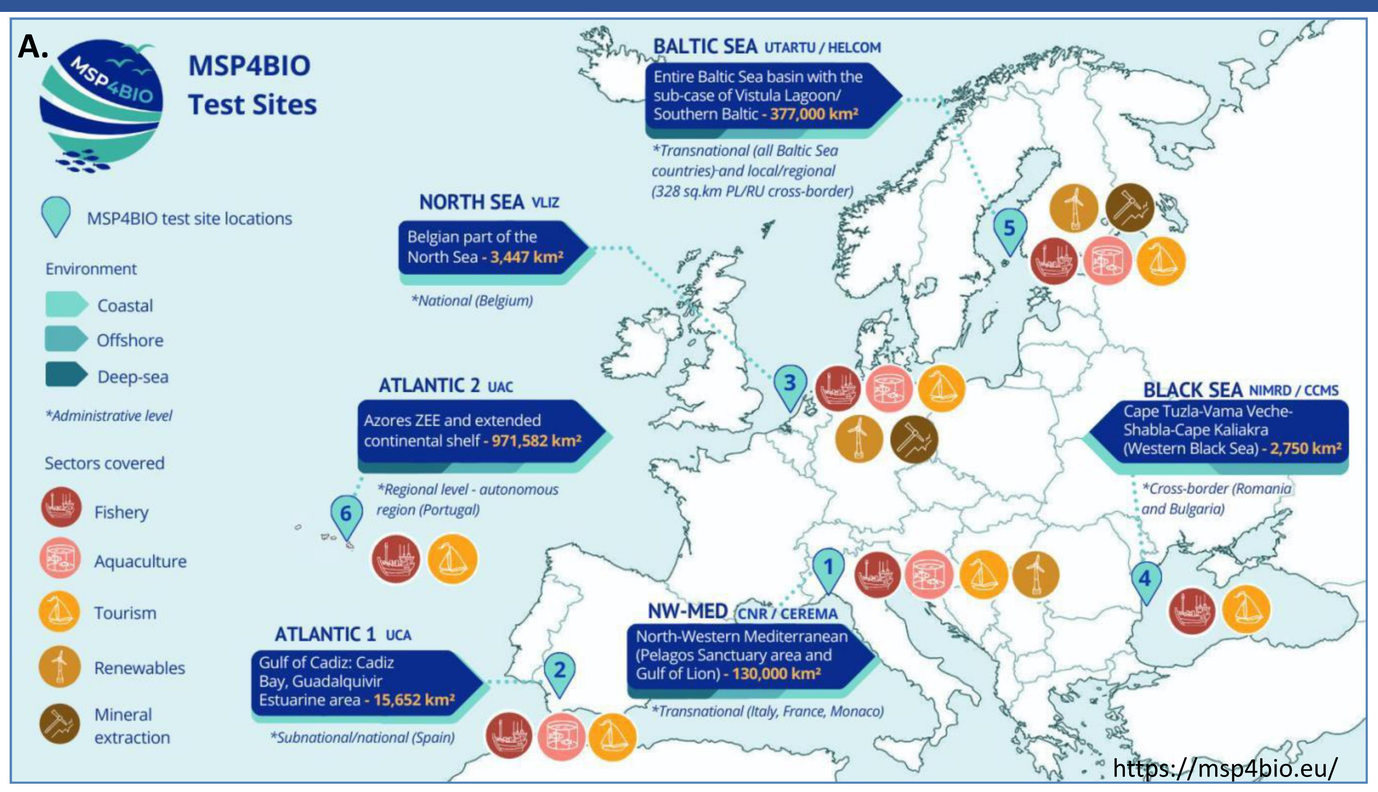
The development of the MPA network:

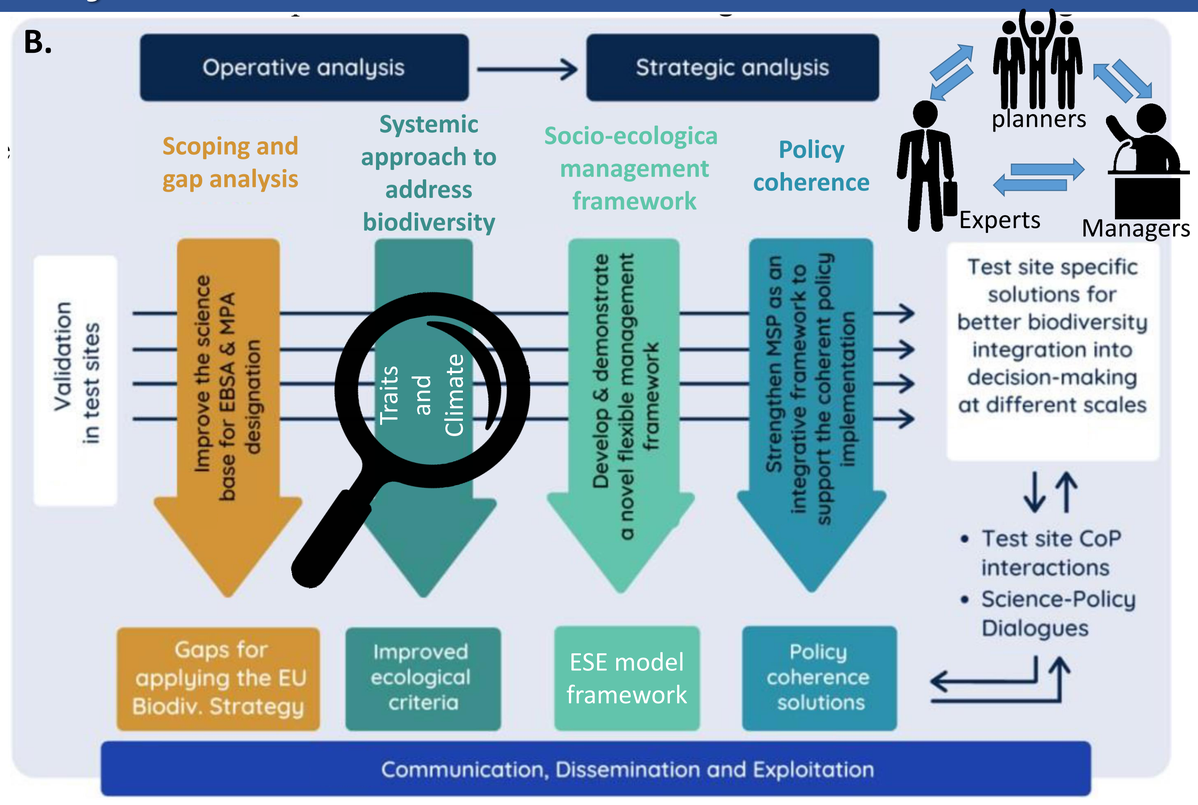
Two main marine programs are being developed internationally to achieve a better preservation of the marine ecosystems while sustaining blue growth: the **Marine Spatial Planning (MSP)** and the **Marine Protected Areas (MPA) network**. Both networks have their own community, yet they need to collaborate to address **how human activities interconnect** and **impact** the ecosystem, in order to prioritize **management actions and conservation areas**.

Including climate as a driver of change:

For decades, scientists and planners implemented regulations inside MPA to protect essential habitats and functioning areas for a broad panel of species. But the increasing recognition of **climate as a driver of change** requires to **reconsider the perenity of the management actions deployed** in the marine territories. One of the methodologies currently proposed is to **include climate vulnerability analyses** in the **models** used in spatial planning.

The MSP4BIO Project



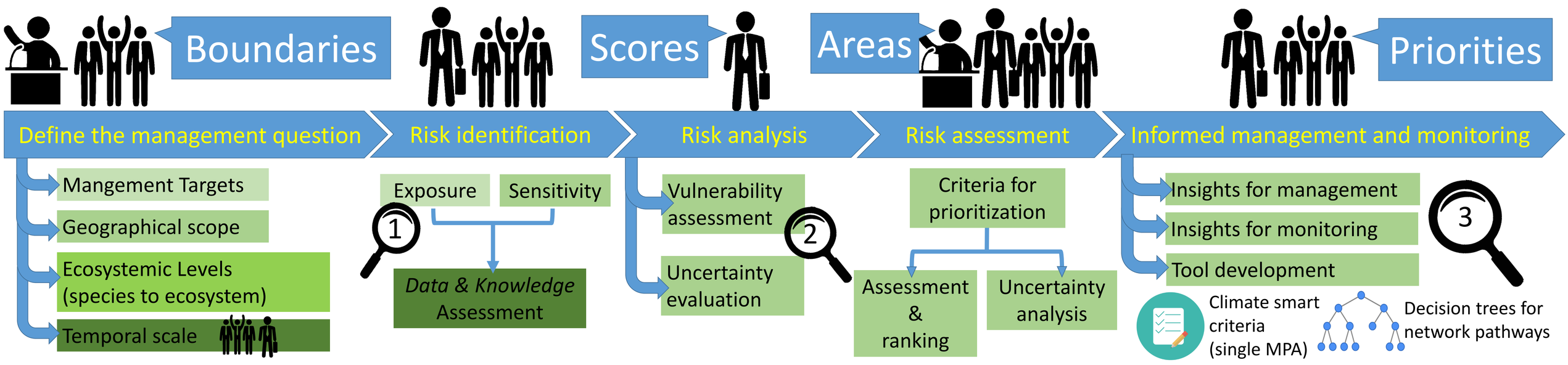


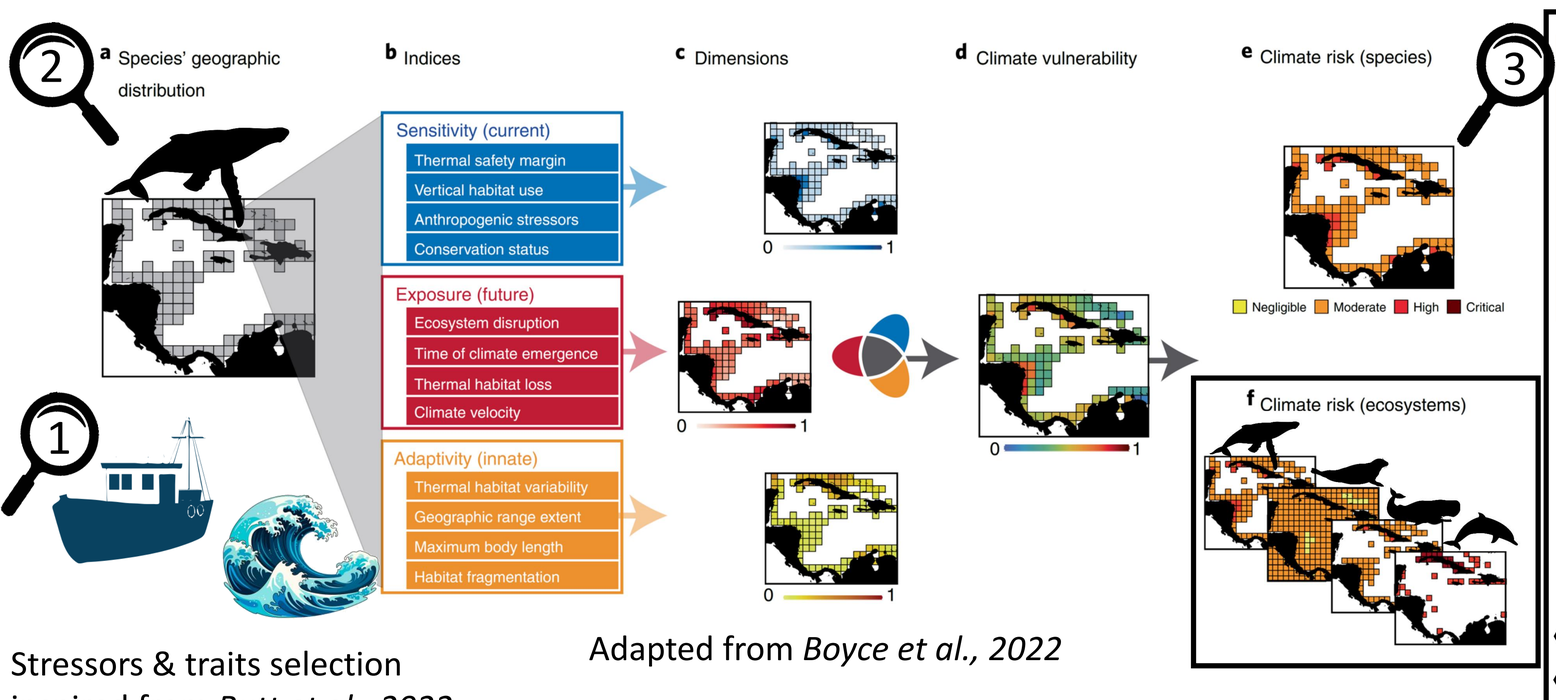
The MSP4BIO project (2022-2025) aims at improving science-based MSP to safegard and restore biodiversity in a coherent European MPA network. One of the main challenges of the project is to integrate a climate vulnerability assessment in existing single MPA and MPA network to improve their current management and to highlight new area of conservation interest taking into account Climate Change. The **method** (*still under development*) aims at designing a workflow, from MPA management goals to the decision process, based on decision trees **adressing management trade-off** to be applied to **management priorities** arising from the different test sites of the project (A). The vulnerability assessment will then be included in a broader **Ecological-Socio-Economic (ESE) European model** (B).

How to take into account the drivers of changes ? The Climate Flowchart

Methodology: Evaluating Climate vulnerability and providing prioritization tools to MPA managers at EU scale

Example flowchart for *marine mammals* in a Mediterranean Sea MPA network (*work in progress*)





Stressors & traits selection inspired from *Butt et al., 2022*

Adapted from *Boyce et al., 2022*