



# Marine Protected Areas

*by Irina Stroia*

*“With every drop of water you drink, every breath you take, you’re connected to the sea. No matter where on Earth you live.”*

*- Sylvia Earle*

# What are MPAs?

- *According to IUCN, PA is a “clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.”*
- **FAO:** „any marine geographical area that is afforded greater protection than the surrounding waters for biodiversity conservation or fisheries management purposes will be considered an MPA“

# History of MPAs

- The world's first marine protected area (1935) - Fort Jefferson National Monument in Florida, which covered 18850 hectares of sea and 35 hectares of coastal land.

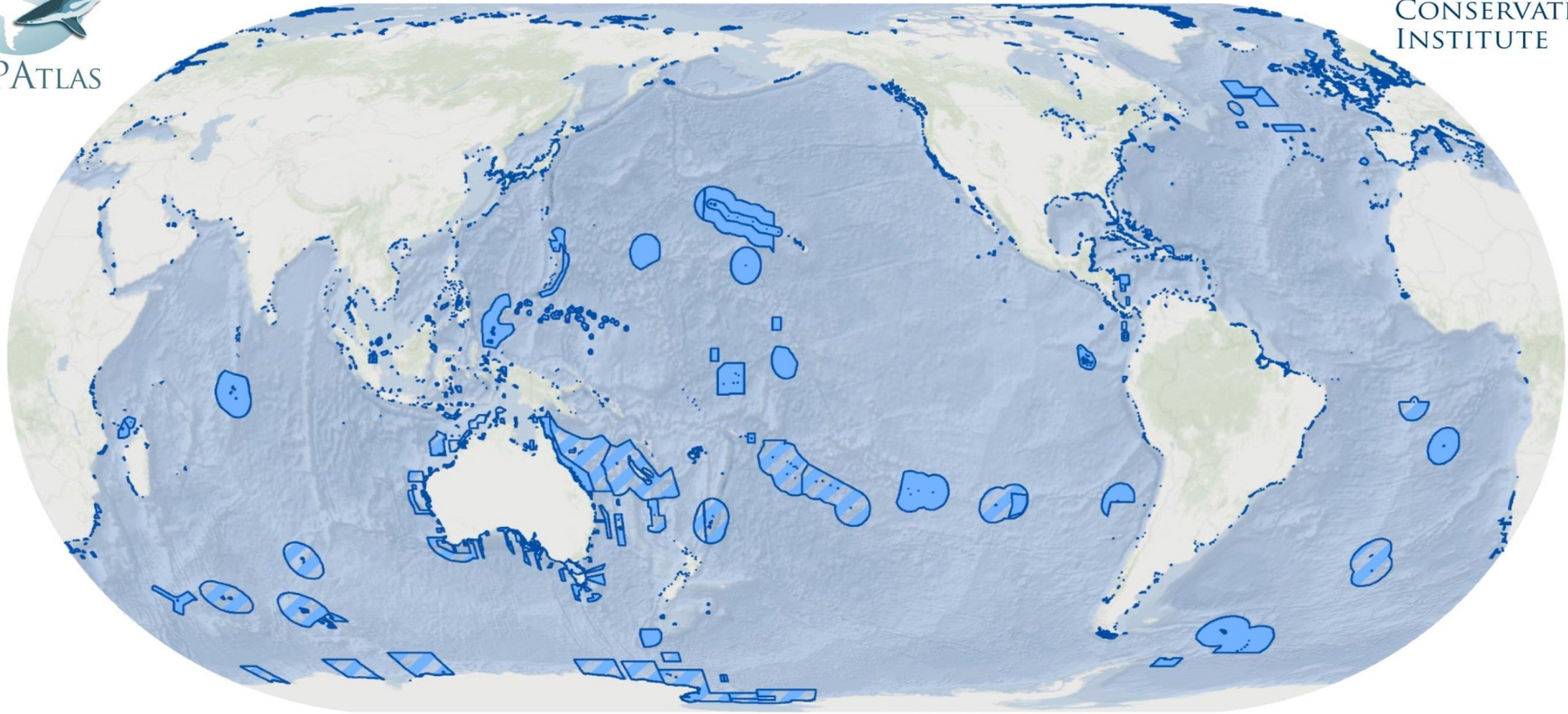


- Today, only 3% of the world's oceans are protected in implemented and actively managed marine protected areas, and of that only 1% of the ocean is strongly protected in no-take marine reserves.
- This is far from the 10% goal set by the Aichi Biodiversity Targets of the Convention on Biological Diversity

# Marine Protected Areas in the World



MPAtlas



Date: 12/29/2016

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# Why MPAs?

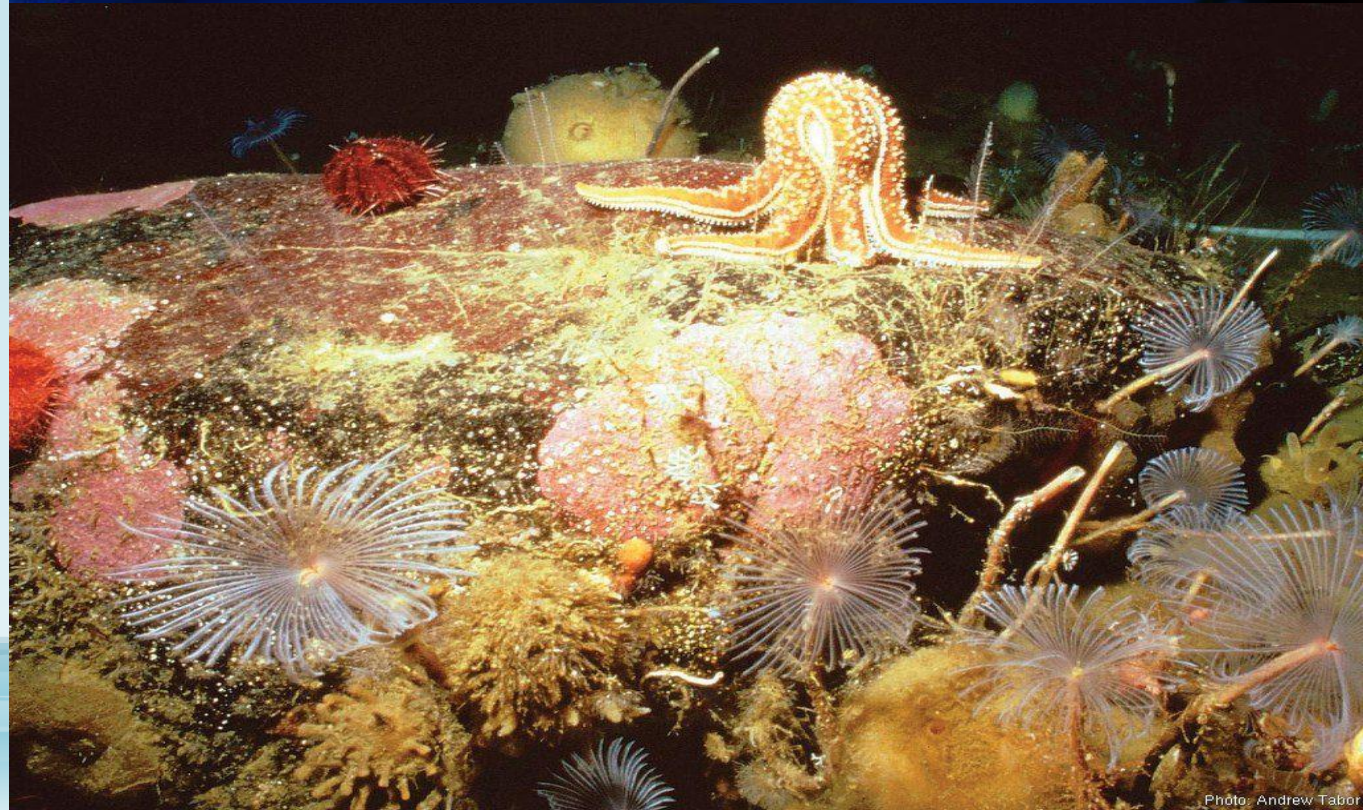
Our oceans have been and continue to be affected by a heavy burden of anthropogenic pressures:

- coastal development,
- global climate change,
- invasive species,
- overfishing and
- pollution.



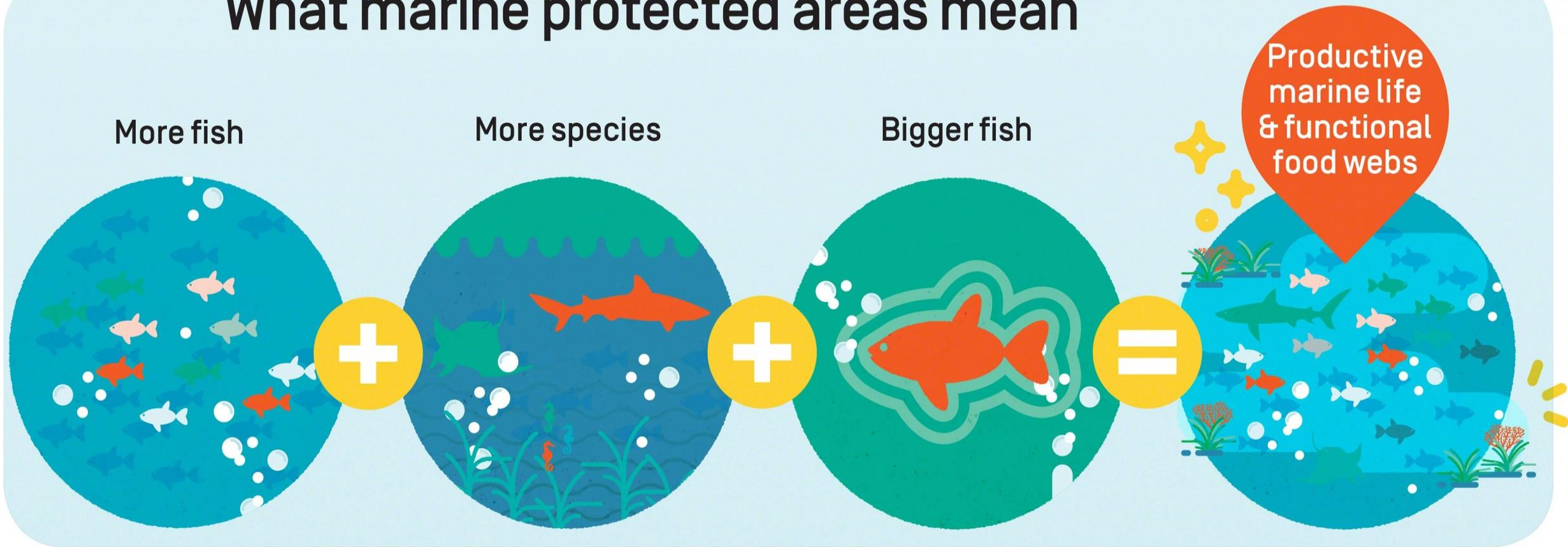
# Critical areas

- Areas that are biologically and ecologically important
- Areas that exhibits high productivity
- Areas that may be naturally more resistant or resilient to the threat of climate change





# What marine protected areas mean



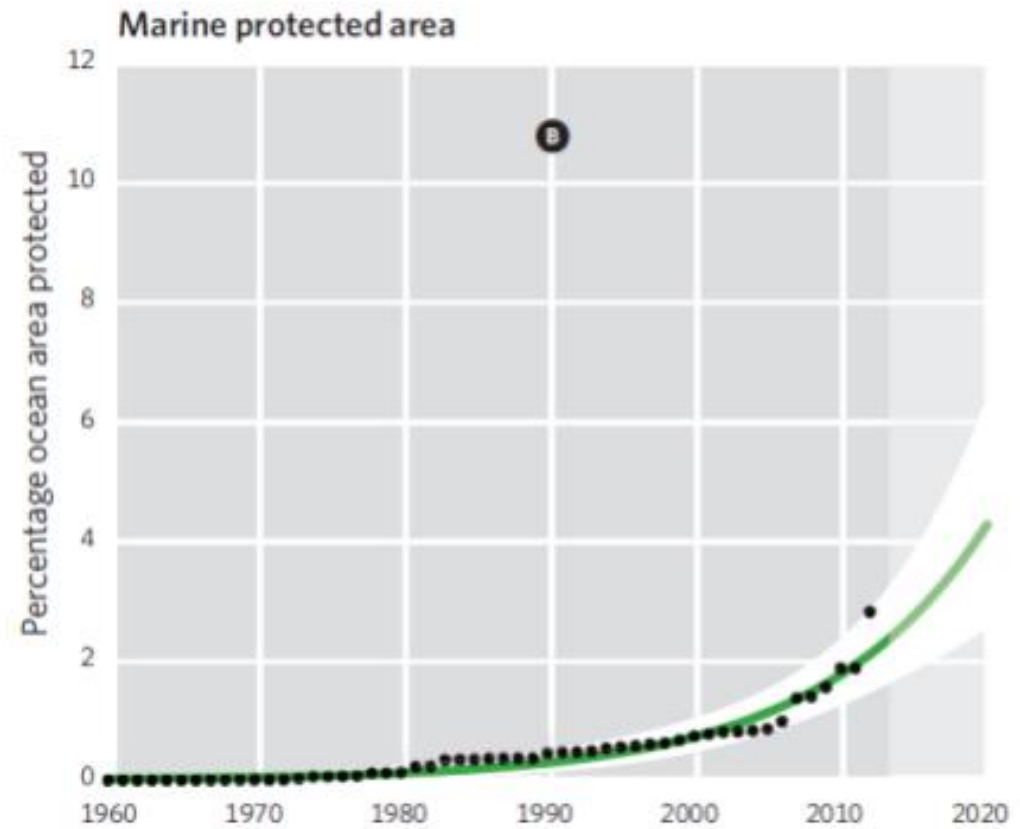
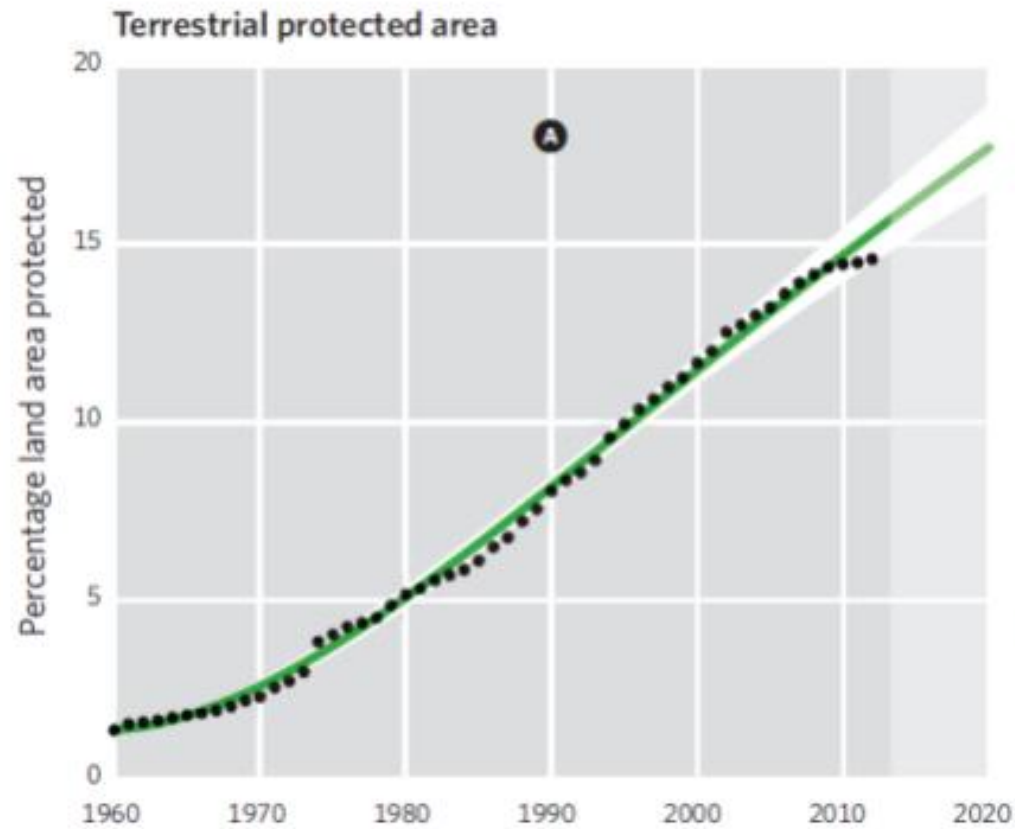
Inside well-managed marine protected areas, there are more animals and plants, a greater diversity of species and bigger individuals. Together these mean more marine life, higher productivity, functional food webs and healthier ecosystems.

# Objectives of MPA

Objectives of an MPA as defined by IUCN per category

- Conserve outstanding ecosystems, species and/or geodiversity features
- Protect long-term ecological integrity of natural areas
- Protect natural biodiversity, underlying ecological structure and support environmental processes, promote education and recreation
- Protect specific outstanding natural features and associated biodiversity and habitats
- Maintain, conserve and restore species and habitats
- Protect and sustain important seascapes, associated nature conservation and other values created by interactions with humans through traditional management practices
- Protect natural ecosystems and use natural resources sustainably

# One size doesn't fit all!



Source: Secretariat of the CBD (2014),  
Global Biodiversity Outlook 4,

# Marine vs terrestrial ecosystems

## Multi-dimensionality and connectivity

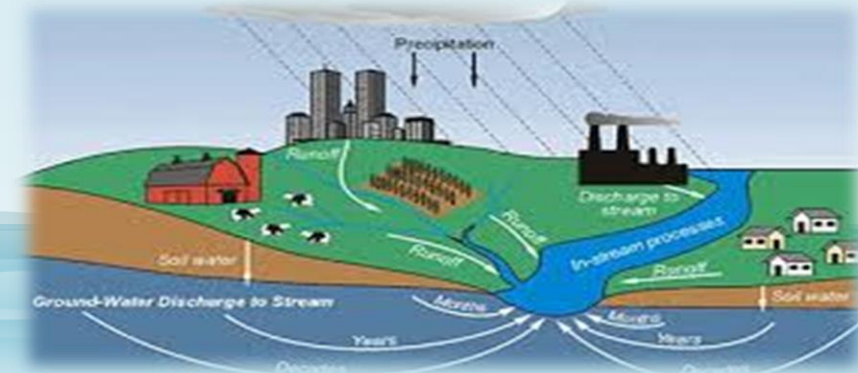
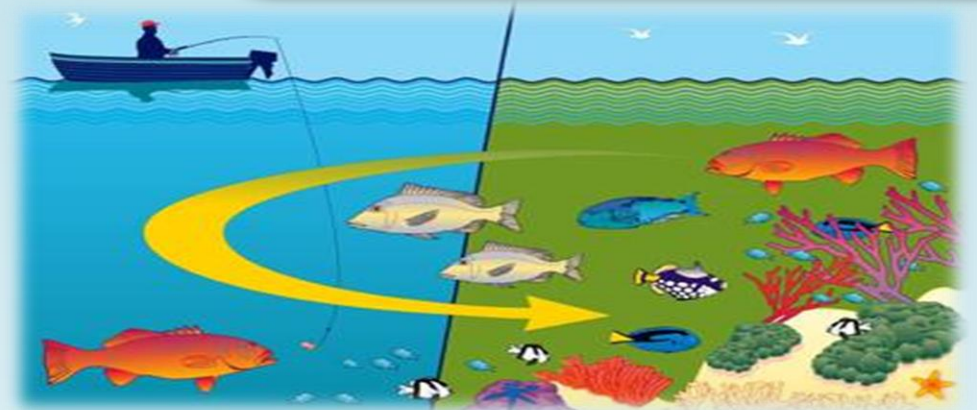
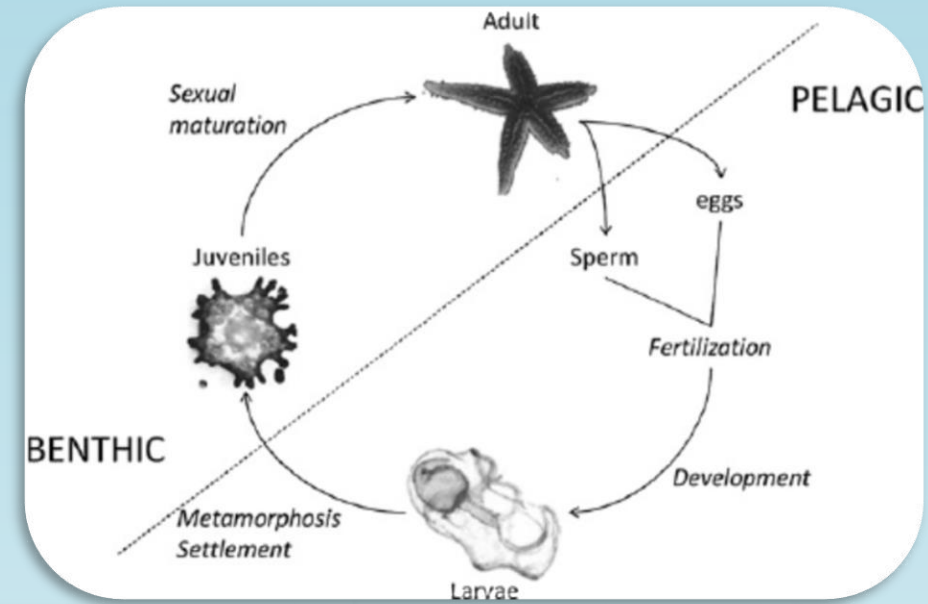
- Third dimension: changes in species distribution in water column – ecosystem do not have boundaries (merging with one another)
- Very large scale over which marine connectivity occurs

## Currents and tides

- Surrounding / „up-current“ influences from tides & currents
- More “open” systems: more exchange, influence by e.g. up-stream pollution

## Uncertainty

- More complex: wider diversity of niches and greater number of trophic levels
- Logistical problems of observing and studying marine environments; high costs



# The current MPA classification

*MPA is a broad term that encompasses all types of protected areas for marine conservation around the world.*

<b>Category</b>	<b>Description</b>
<b><i>Ia</i></b>	<b><i>Strict Nature Reserve:</i></b> Protected area managed mainly for science.
<b><i>Ib</i></b>	<b><i>Wilderness Area:</i></b> Protected area managed mainly for wilderness protection.
<b><i>II</i></b>	<b><i>National Park:</i></b> Protected area managed mainly for ecosystem protection and recreation.
<b><i>III</i></b>	<b><i>Natural Monument:</i></b> Protected area managed mainly for conservation of specific natural features.
<b><i>IV</i></b>	<b><i>Habitat/Species Management Area:</i></b> Protected area managed mainly for conservation through management intervention.
<b><i>V</i></b>	<b><i>Protected Landscape/Seascape:</i></b> Protected area managed mainly for landscape/seascape conservation and recreation.
<b><i>VI</i></b>	<b><i>Managed Resource Protected Area:</i></b> Protected area managed mainly for the sustainable use of natural ecosystems.

# Features of Marine Protected Areas Worldwide

## No-Use Zone

No activities permitted.

## No-Take Zone

Measures are taken to protect species whose populations may be affected in other zones/areas. Examples include spawning and nursery grounds.

Non-extractive activities are permitted, such as diving and mooring.

## Buffer Zone

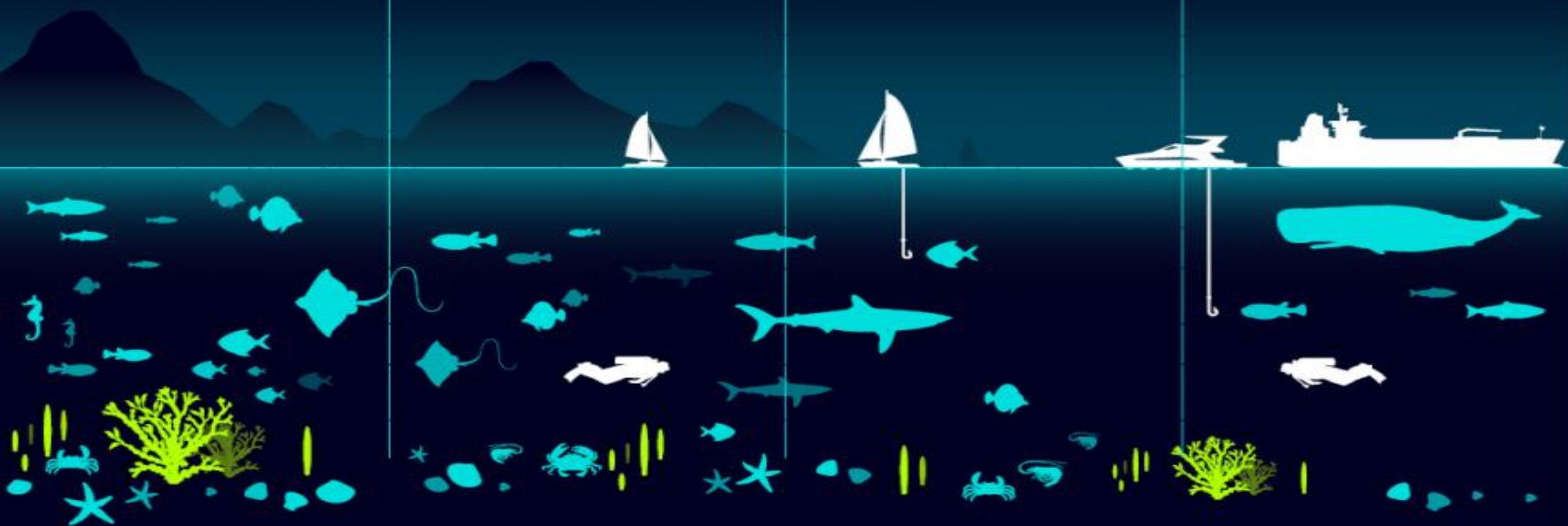
Transitional zones from no-take zones to multiple-use zones.

Moderate activities, such as hook-and-line fishing, limited aquaculture, and limited tourism are permitted.

## Multi-Use Zone

All tourism, fishing and aquaculture activities permitted.

Permitted activities include diving and snorkeling, artisanal fishing, large-scale commercial fishing, and aquaculture.

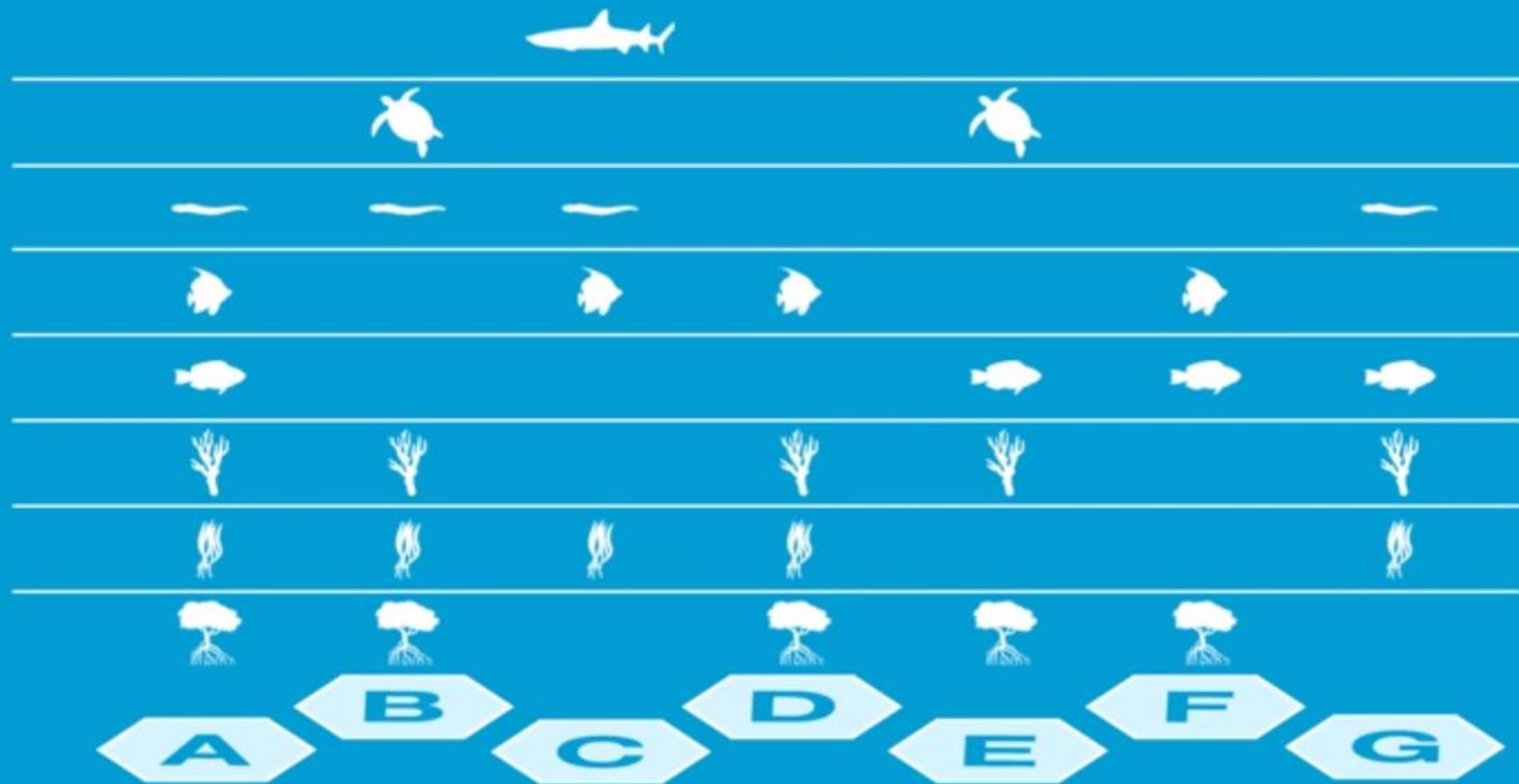


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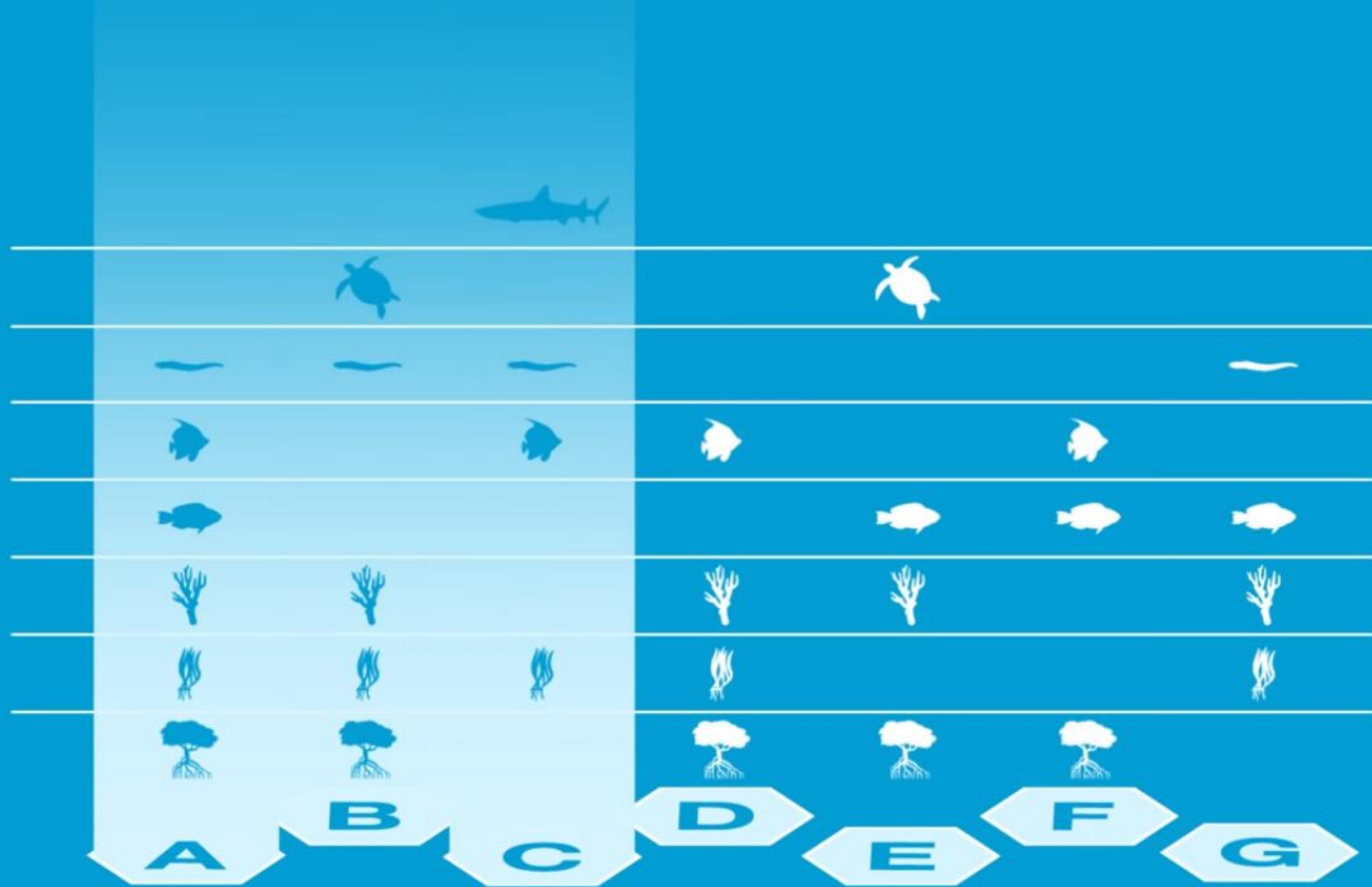
Marine Managed Areas: What, Why, and Where, Science to Action

# Ecosystem functions

- MPAs should include large areas, a broad range of habitats, and a high diversity of species
- Protecting functional groups is an important strategy for supporting ecosystem function







# The focus of the thesis

## Legal Challenges of BMPA and PMPA

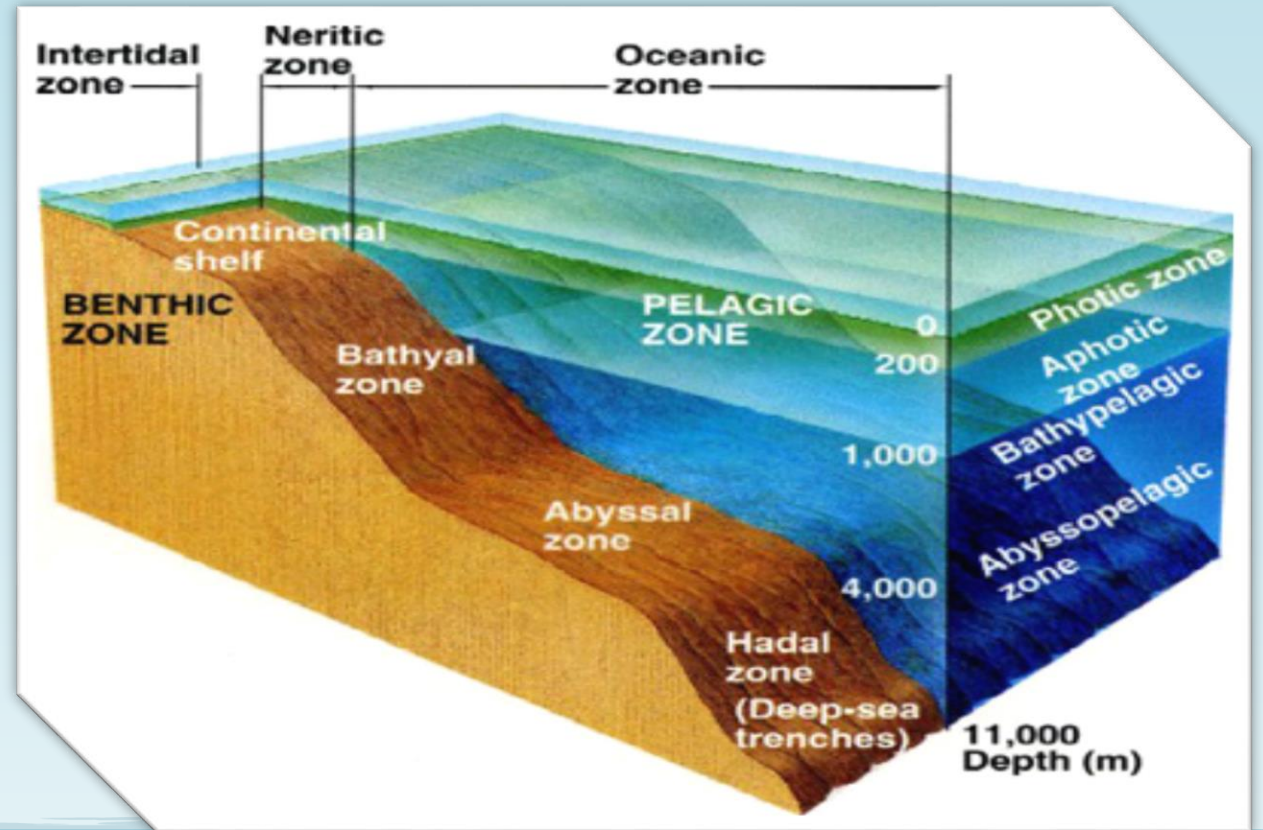
- Are pelagic and benthic marine protected areas the missing link in the development of marine conservation?
- Is the current legal framework promoting a fragmented legislation, making it difficult to have adequate and consistent management plans?
- To what extent does ecosystem approach promotes conservation and sustainable use of the sea in benthic and pelagic zone planning?
- How do PMPA and BMPA fit into the IUCN classification or are they a new strategy beyond the current setting?

# A new classification is proposed

Ecosystem approach MPA classification:

➤ PMPA (pelagic protected area)

➤ BMPA (benthic protected area)



# Marine Ecosystems

## Benthic marine ecosystem

**Benthos is the community of organisms that live on, in, or near the seabed, also known as the benthic zone. This community is categorized according:**

- **to size: macrobenthos, meiobenthos, microbenthos**
- **location: endobenthos, epibenthos, hyperbenthos**
- **type of species: zoobenthos (animal) and phytobenthos (plants)**

## Pelagic marine ecosystem

**The pelagic zone can be thought of in terms of an imaginary cylinder or water column that goes from the surface of the sea almost to the bottom. The pelagic ecosystem contains:**

- **Pelagic fish**
- **Pelagic invertebrates**
- **Pelagic birds**
- **Pelagic reptiles**

jellyfish



turtle



dolphin



bigeye tuna



blue whale



**Epipelagic**

catshark



crab



krill



squid

**Mesopelagic**

viperfish



sea star

octopus



**Bathypelagic**

anglerfish



black swallower

**Abyssopelagic**

**Oceanic divisions**

tube worms



sea cucumber



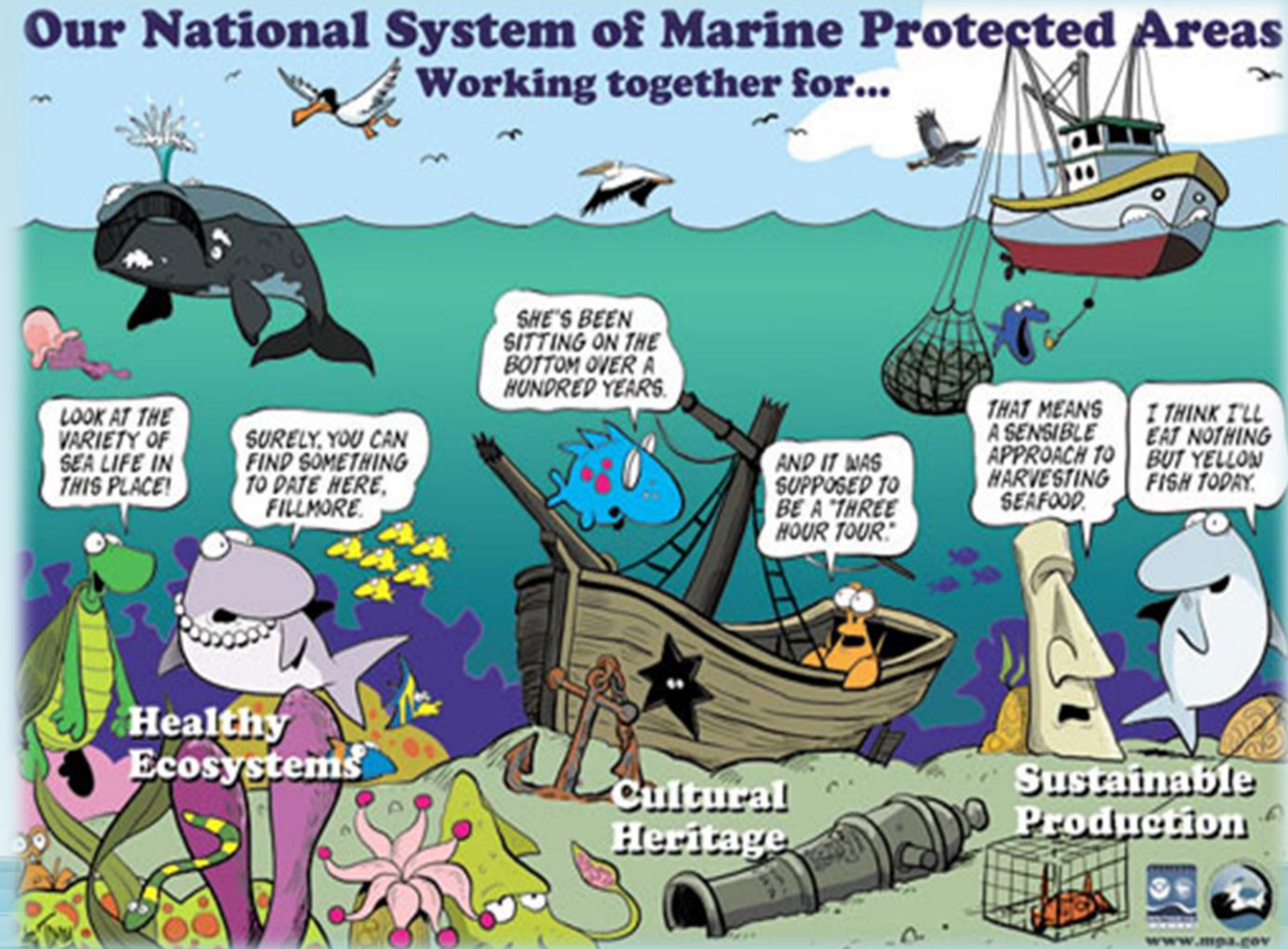
liparid fish



**Hadalpelagic**

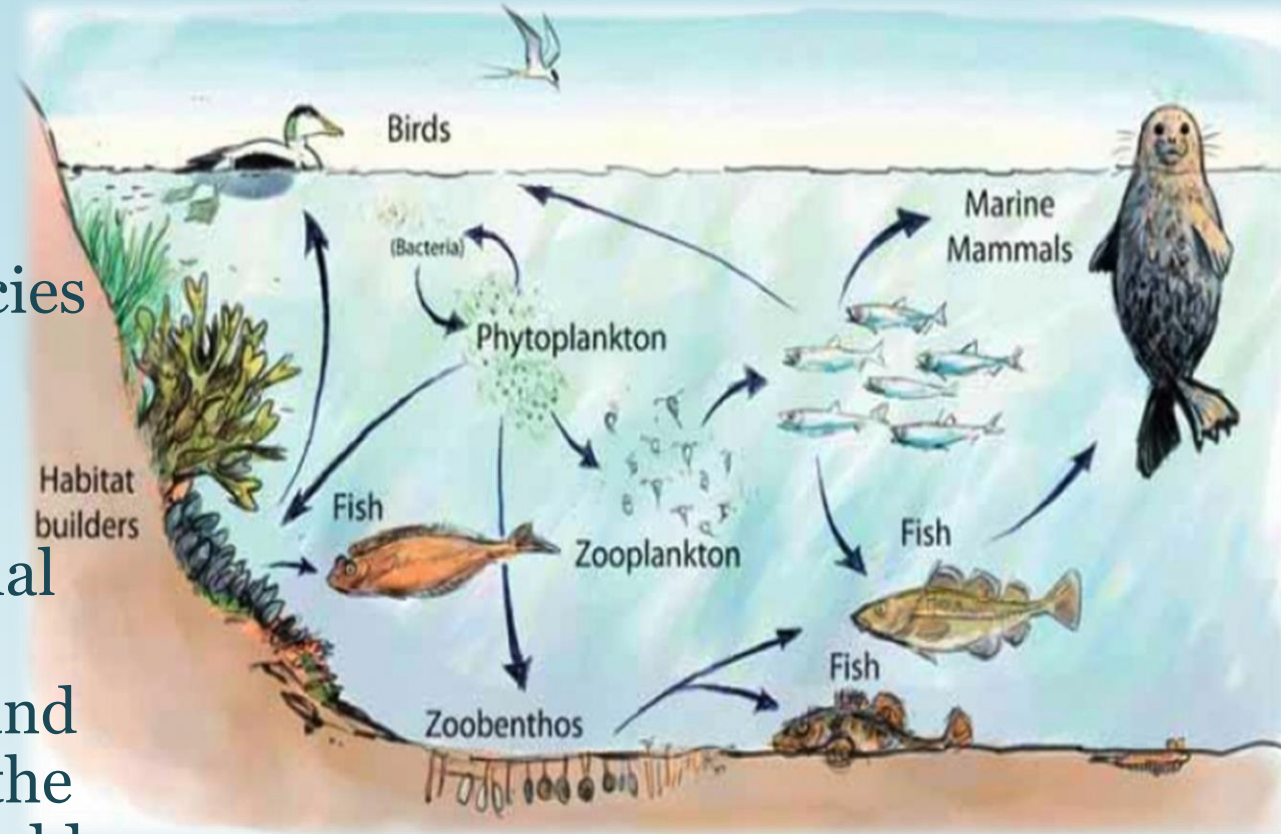
# Ecosystem approach

- *"Ecosystem" means a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functional unit". (Article 2 of the Convention)*
- The ecosystem approach is a strategy for the integrated management of water and living resources that promotes conservation and sustainable use in an equitable way.



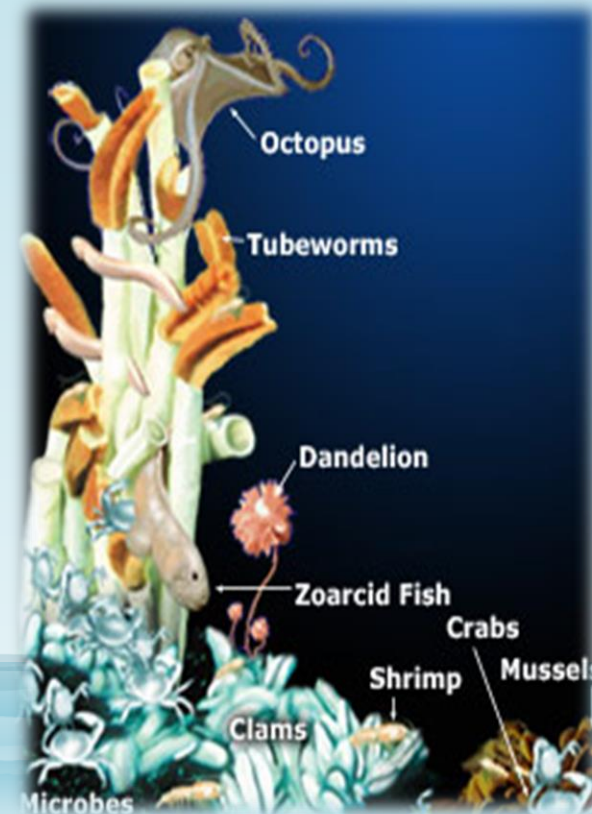
# Why PMPA?

- To protect biodiversity **hotspots** on the water column
  - Feeding areas for both seabirds and other marine species
  - Breeding areas for certain marine species
  - Replenish fish population
- The term was first coined by Myers to identify geographic regions of 'exceptional concentrations' of endemic species undergoing exceptional loss of habitat, and a 'hotspot' originally highlighted where the greatest number of terrestrial species could be protected per conservation dollar invested. (Myers 1988, 1990, 2003, Myers et al. 2000).



# Why BMPA?

- Not long ago the seabed was considered the ocean's desert, but ever since technology has enabled us to reach further and deeper in the seas, scientists have discovered interesting marine creatures with unique abilities, which can survive in harsh environment of high salinity, no sunlight, high levels of toxicity, etc.
- To protect benthic communities such as:
  - Coral reefs
  - Seamounts
  - Hydrothermal vents
  - Other benthic communities





# Some products from MGRs

## - Pharmaceuticals:



Pain killer Prialt from cone snail *Conus Magus*



Cancer drug Yondelis from sponge *Ecteinascidia turbinata*

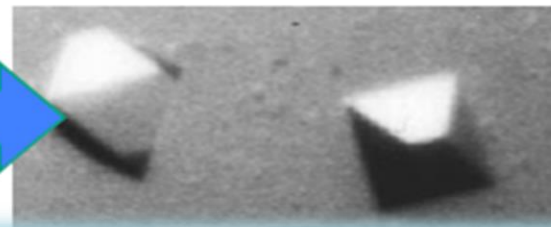
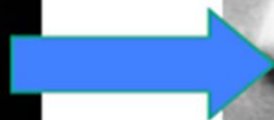
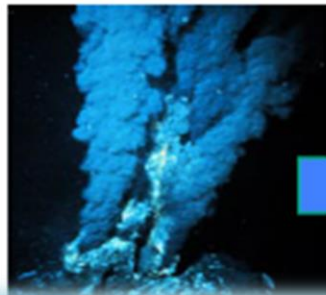
## - Cosmetics:

Estee Lauder cosmetic cream from soft coral

*Pseudopterogorgia elisabethae*



## - Enzymes:



Deep Vent DNA polymerase  
From hydrothermal vent bacterium *Pyrococcus*  
GB-D – Guyamas Basin

# Fragmentation of legislation

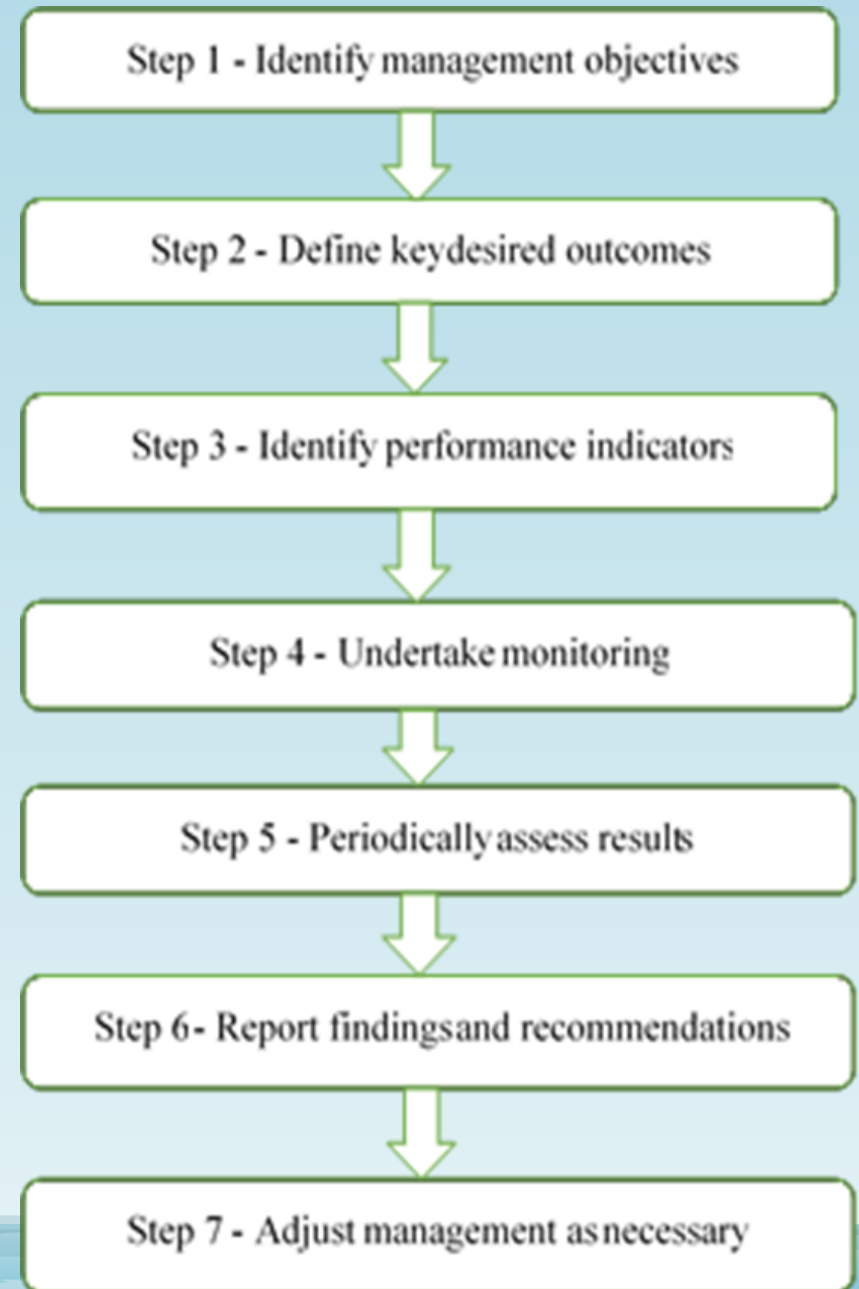
- The fragmentation of public international environmental law is a long-observed phenomenon that demonstrates uneven normative and institutional development and evolution in inter-state relations. Separate legal norms and institutions have developed largely independently from one another, often instigated by non-identical groupings of states and in response to specific functional issues.
- Global treaties
  - United Nations Convention on the Law of the Sea
  - The Convention on Biological Diversity
- Regional Organizations
  - PIMPAC
  - NAMPAM
  - CCAMLR
- National legislation



# Management plan of MPAs

Although there is no universal management plan.

- Primary objective of MPA
- Regulations: quotas, equipment restrictions, licenses & permits, etc.
- Enforcement
- Monitoring
- Governance



# Management of MPA (2)

## Governance

- Use of marine resources governed by different laws and regulations
- MPAs overlap multiple jurisdictions and involve multiple management partners with different responsibilities

## Need to

- Effectively coordinate multiple jurisdictions
- Establish a more coordinated program of management, assistance, and information-sharing
- Public engagement in MPA planning is vital to achieving conservation goals

## Marine Protected Areas can only work if they are:



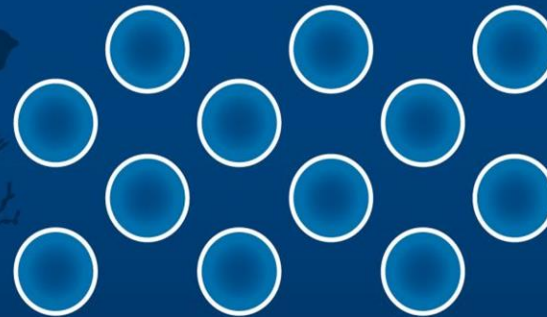
1. Big enough



2. Close enough



3. Representative



4. Numerous enough



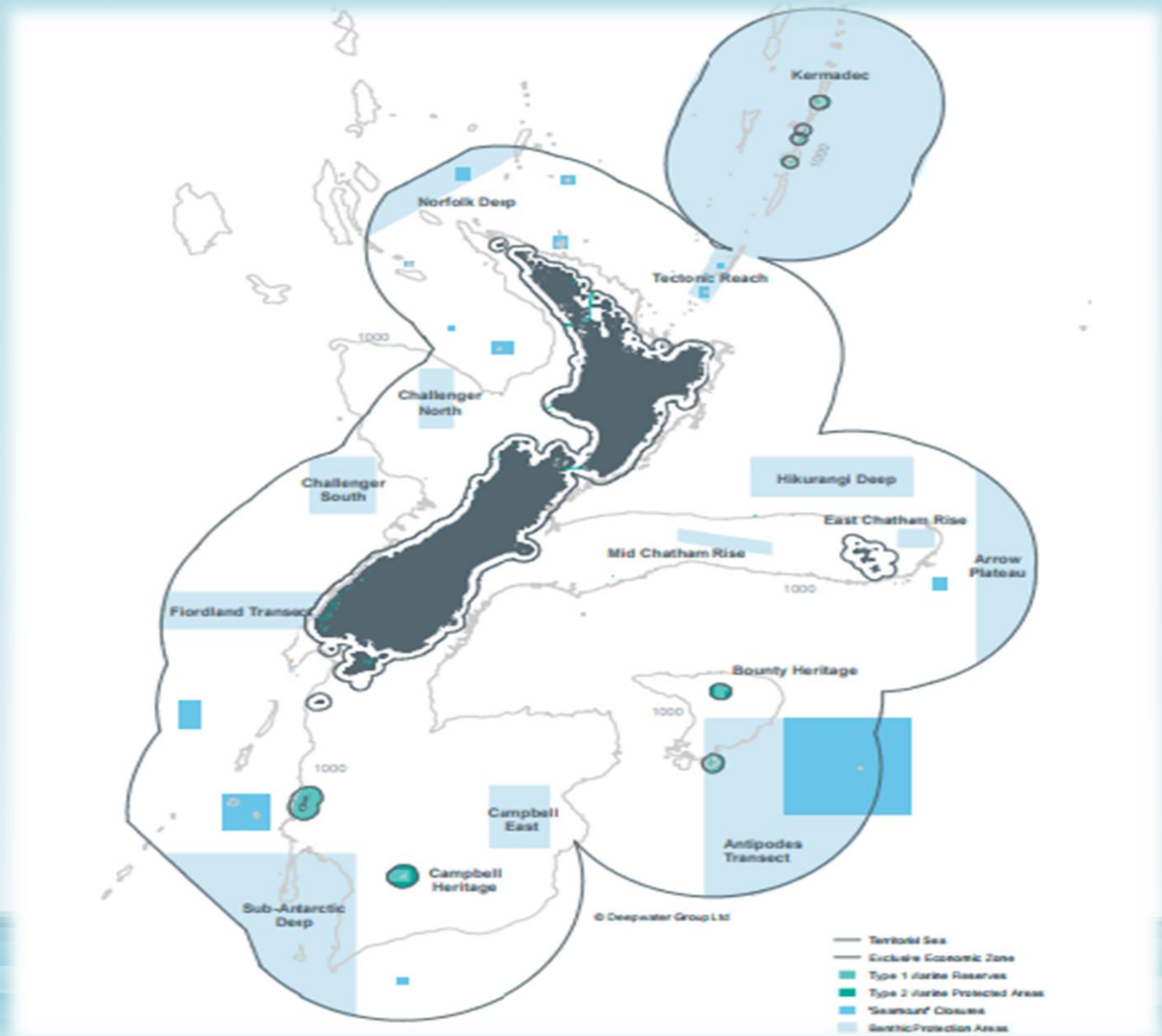
5. Actively protected

# Challenges in planning MPAs

- the transboundary effects of management decisions on neighboring ecosystems should be considered by those managing the ecosystem;
- the approach must be applied at the appropriate spatial and temporal scales;
- ecosystems should be managed in an economic context, that is, taking account of externalities either that impact on the ecosystem or that are created by its management, and incentives should be created to promote its conservation; and
- an appropriate balance between conservation and use of biodiversity should be struck.

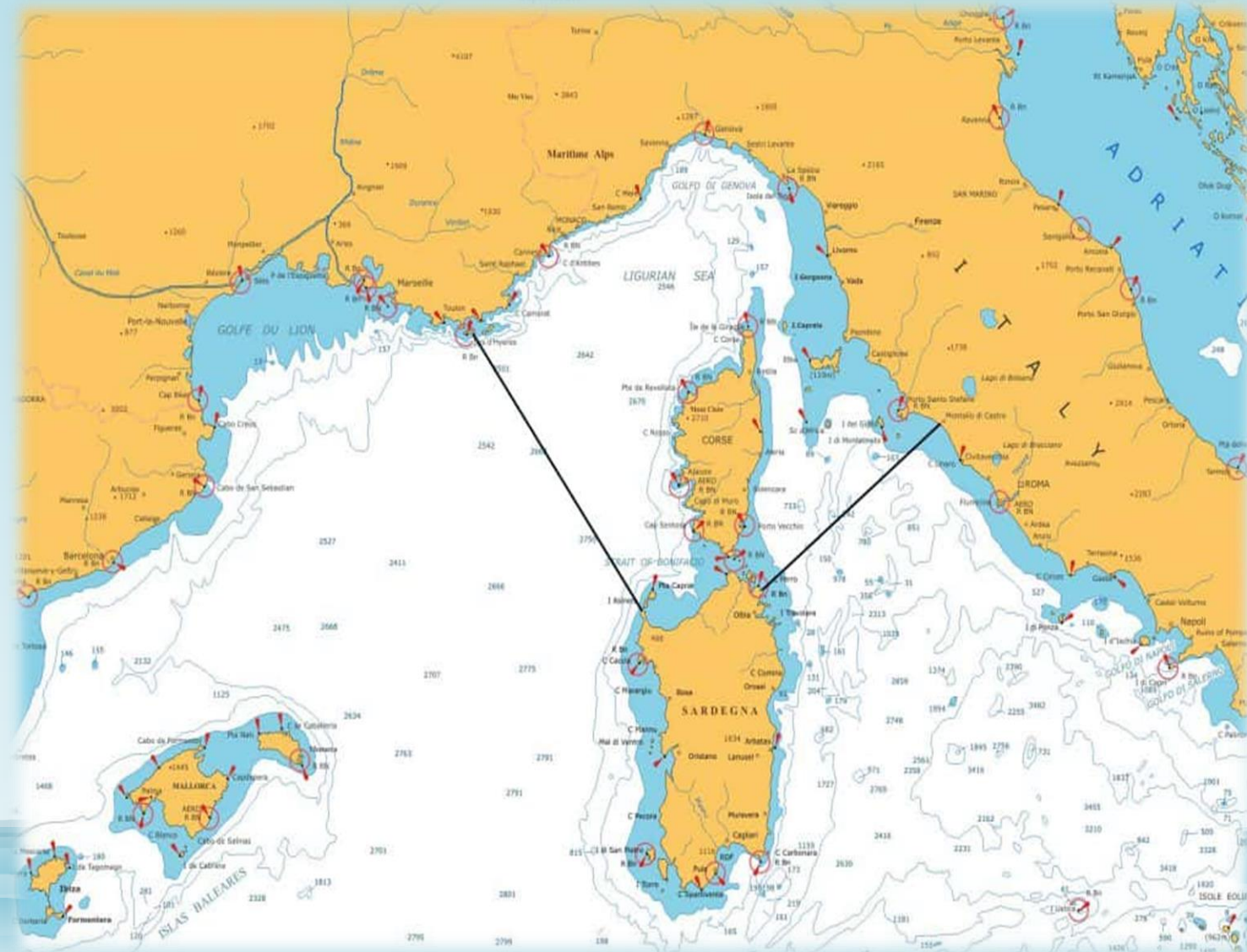
# New Zealand's example of BMAPA

- A third of New Zealand's Exclusive Economic Zone has been closed since 2007 to bottom trawling by law. These areas, known as *Benthic Protection Areas*, protect at least 10 percent of each of the different seabed habitat types found within New Zealand waters. New Zealand's Benthic Protection Area network makes up one of the largest marine conservation areas in the world and covers an area four times the landmass of New Zealand



# Pelagos Sanctuary – Mediterranean Sea

- The Pelagos Sanctuary for Mediterranean Marine Mammals is a special marine protected area extending about 90.000 km<sup>2</sup> in the north-western Mediterranean Sea between Italy, France and the Island of Sardinia, encompassing Corsica and the Archipelago Toscano.



*“How inappropriate to call this planet, Earth, when it is quite clearly Ocean.”*

*- Arthur C. Clarke*



Thank you!



**KEEP  
CALM  
AND STOP  
OVER  
FISHING**