AQUATIC LIFE LAB

Project number: 2017-1-IT02-KA201-036817

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Area 5:
Marine biodiversity conservation

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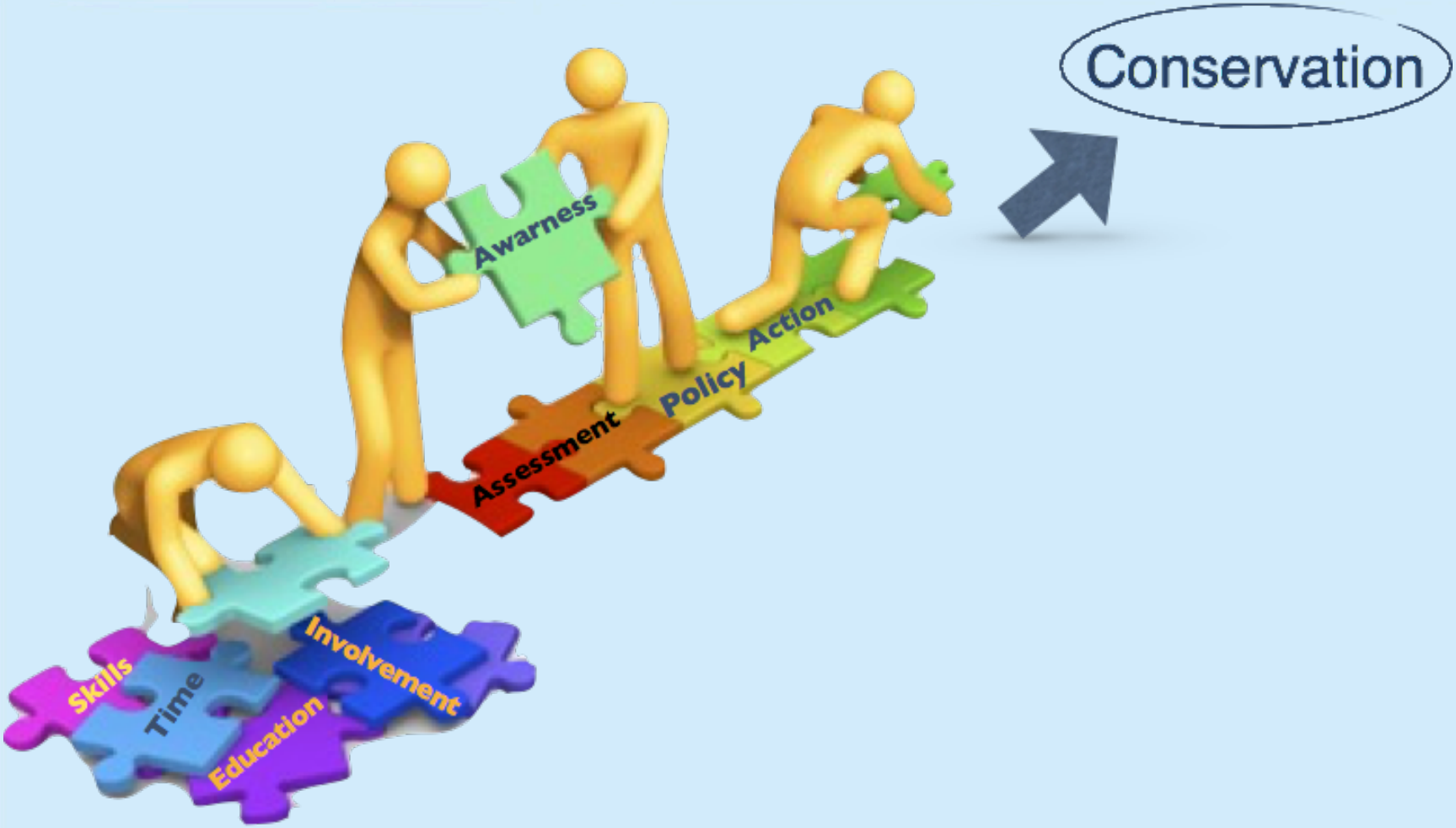
Marine Biodiversity Conservation



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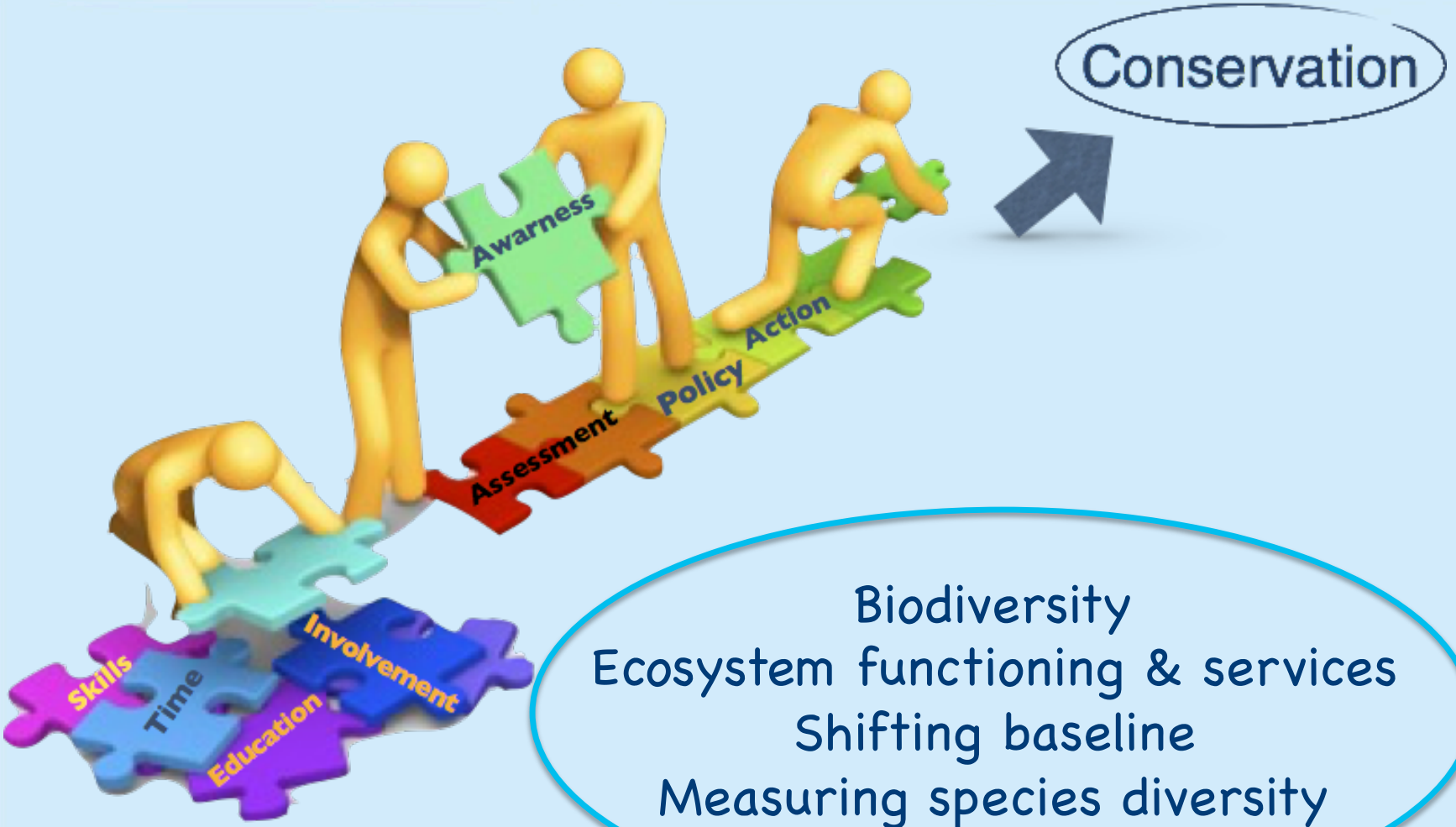
Marine Biodiversity Conservation



Biodiversity
Ecosystem functioning & services
Shifting baseline
Measuring species diversity

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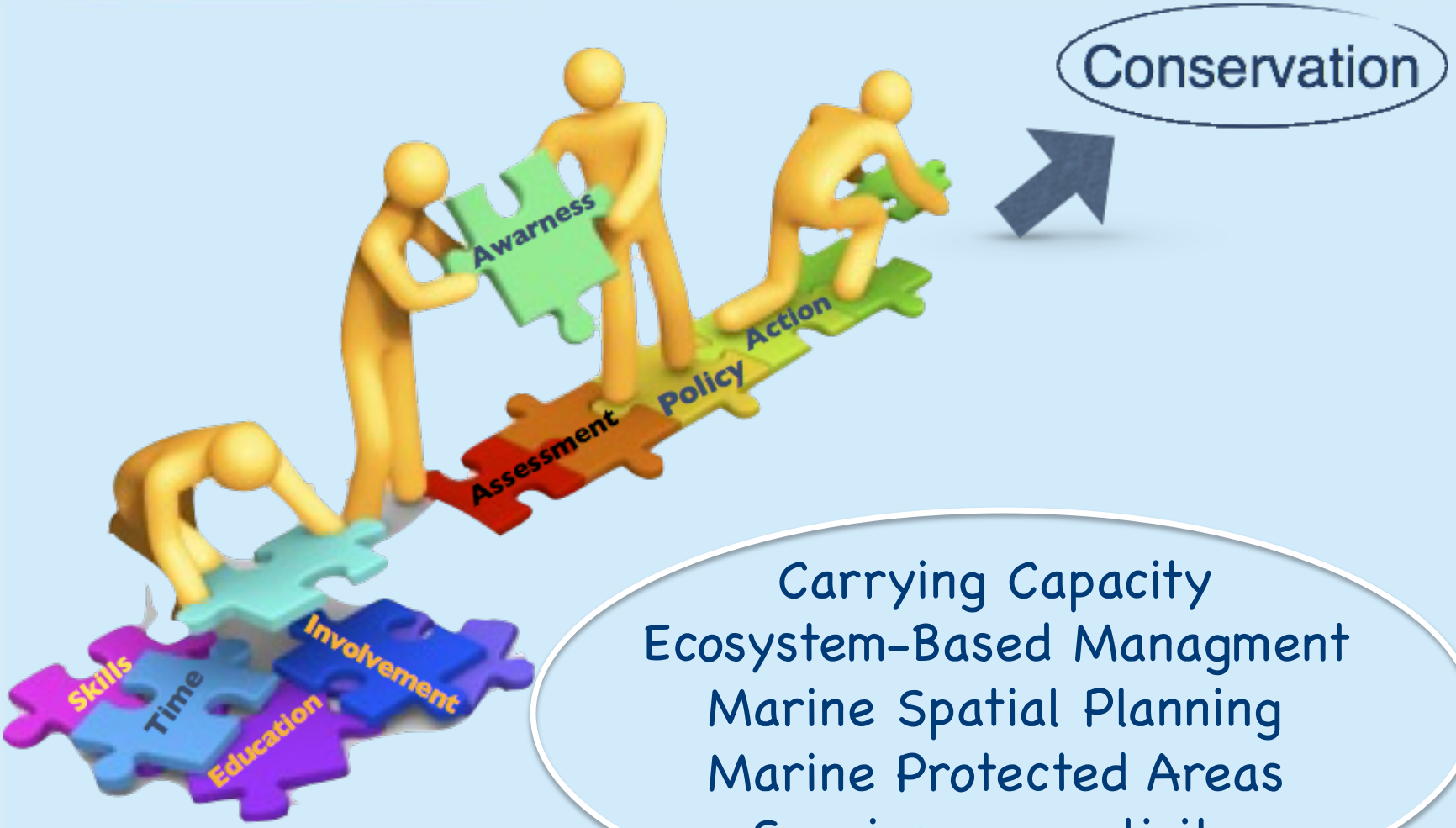
Marine Biodiversity Conservation



Carrying Capacity
Ecosystem-Based Managment
Marine Spatial Planning
Marine Protected Areas
Species connectivity

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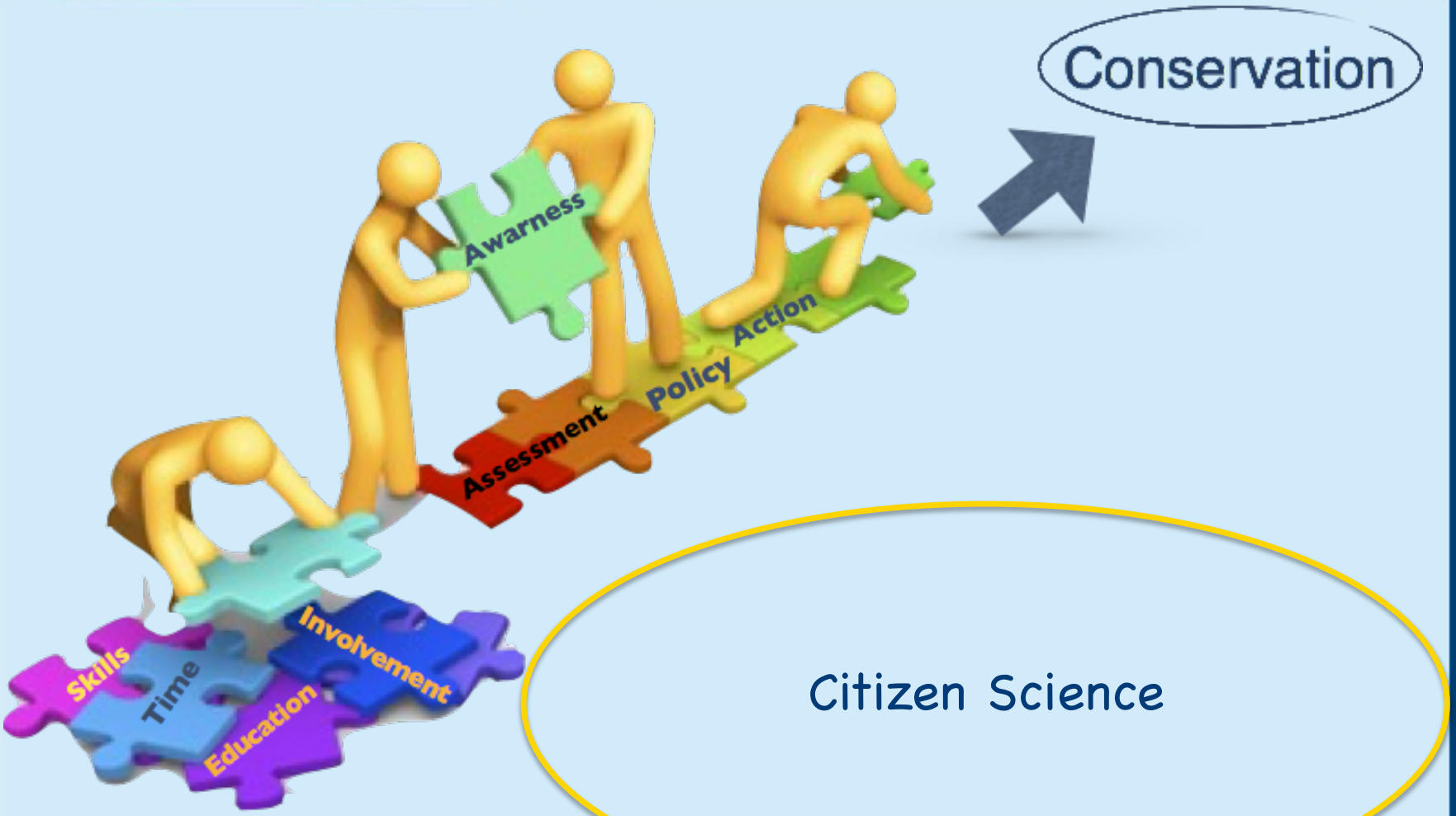
Marine Biodiversity Conservation



Citizen Science

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Marine Biodiversity

Wikimedia commons

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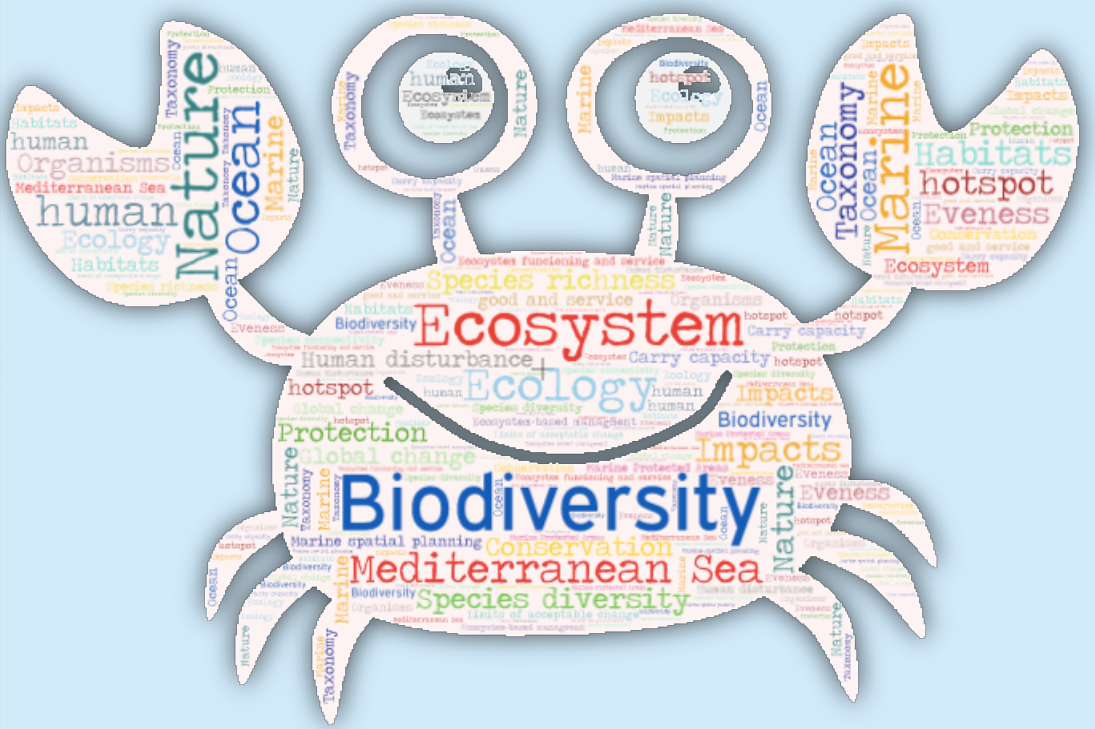
Marine Biodiversity



Biological diversity means the variability among living organisms from all sources including, inter alia, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species and of ecosystems (CBD, Rio 1992)

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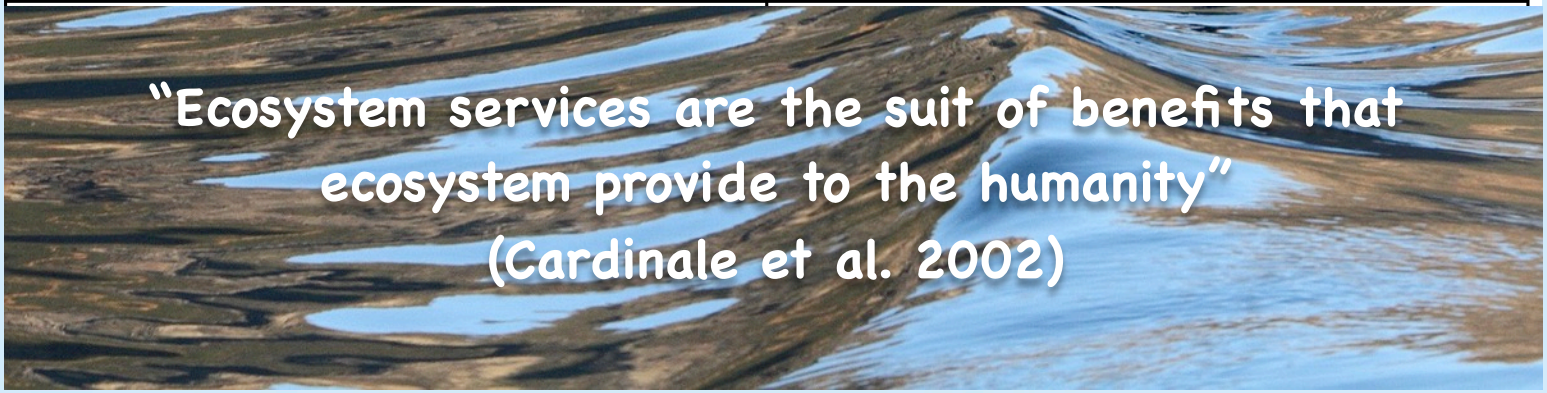
Ecosystem functioning & services

Ecosystem service	Example
Gas regulation	Oceans balacing CO2/O2 content in atmosphere, thus regolating atmospheric chemical composition
Provision of natural refugia	Habitats such as seagrasess and coral reefs as nursery grounds for fisheries
Food production	Coastal water as generators of fishery products
Provision of recreation	Offer opportunities for ecoturism
Provision of cultural assets	Offer resources for aesthetic, educational and scientific purposes



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Marine biodiversity threats

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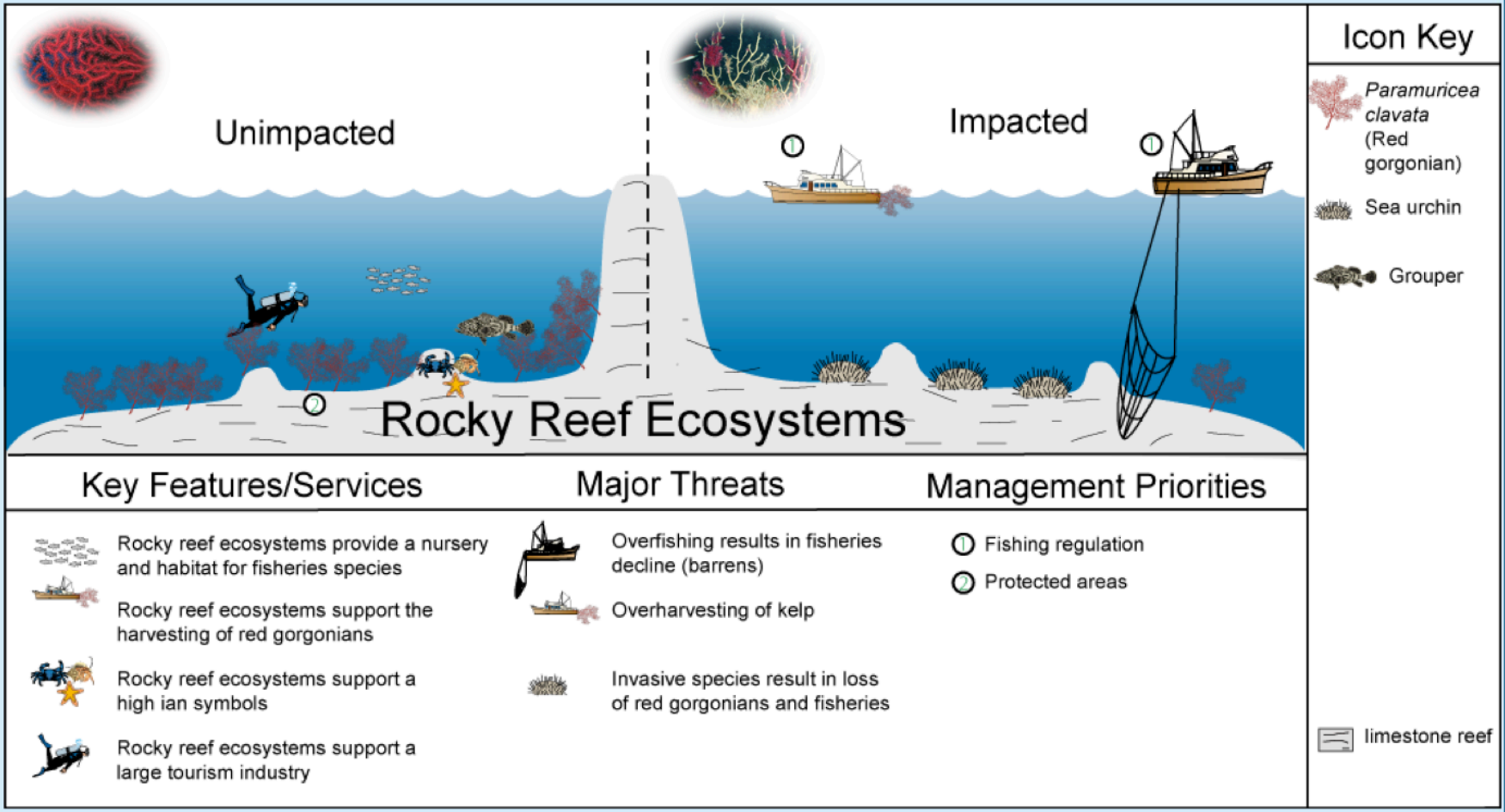
Marine biodiversity threats



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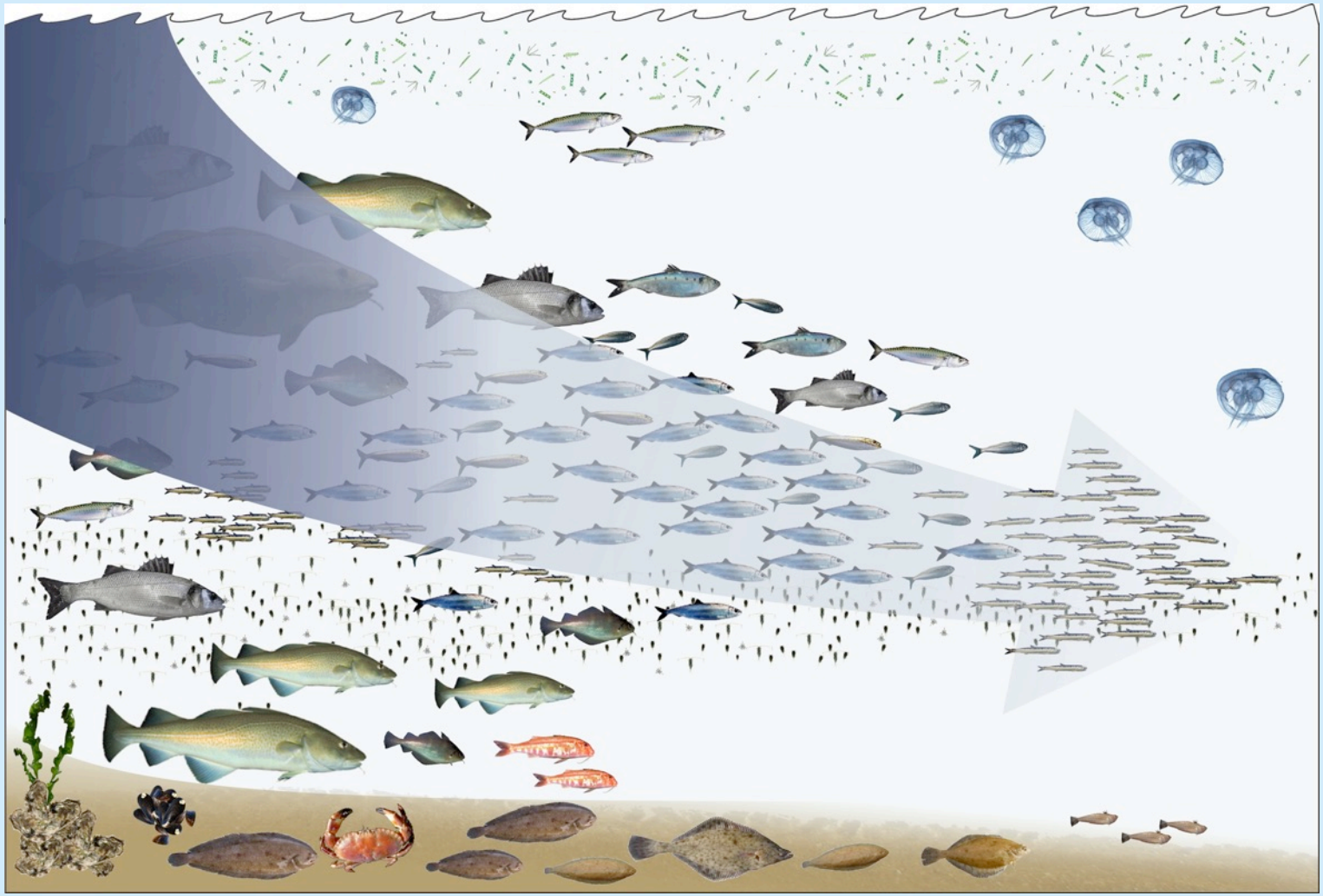
Overfishing trophic cascade effects



Pauly, 1998

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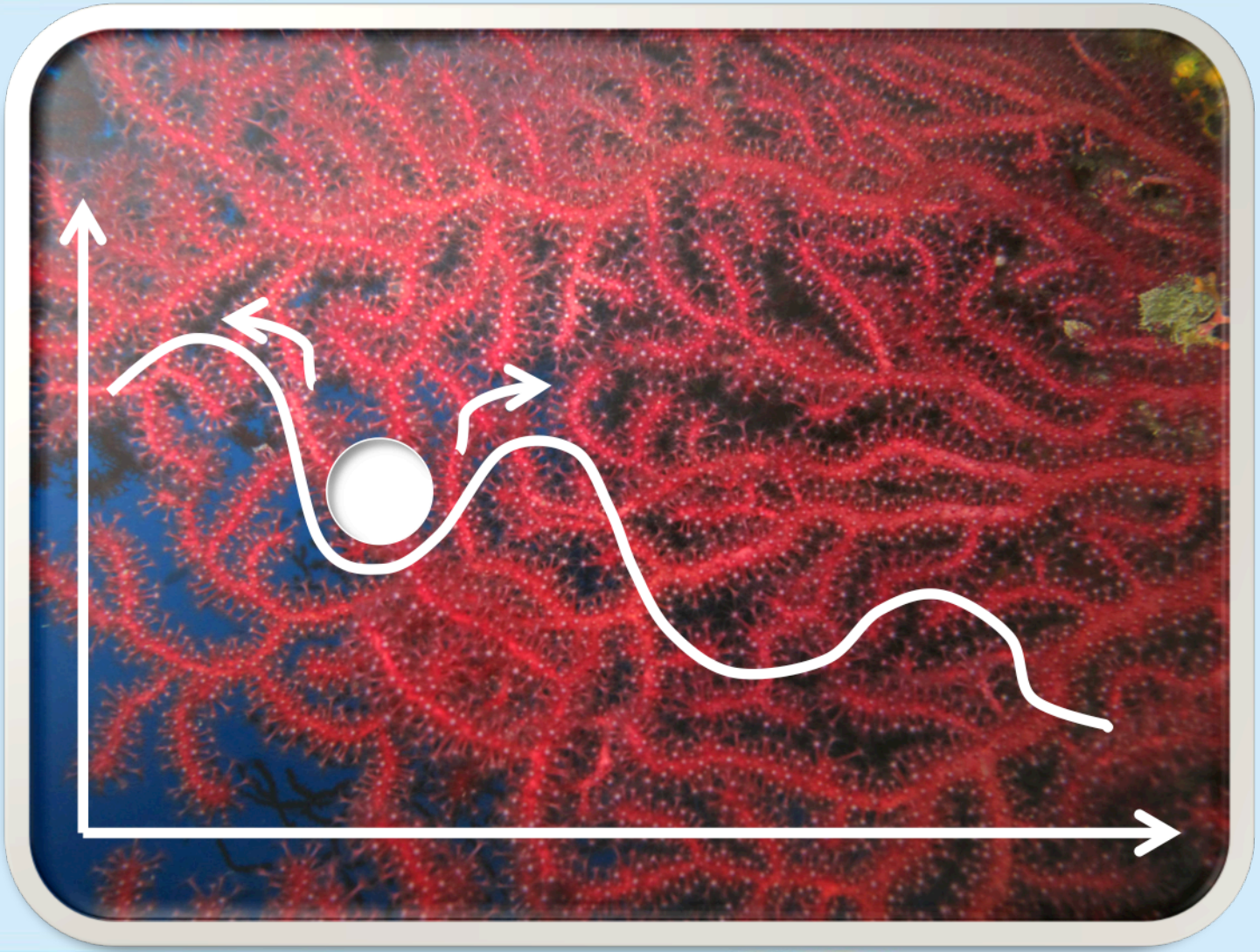
Shifting baseline



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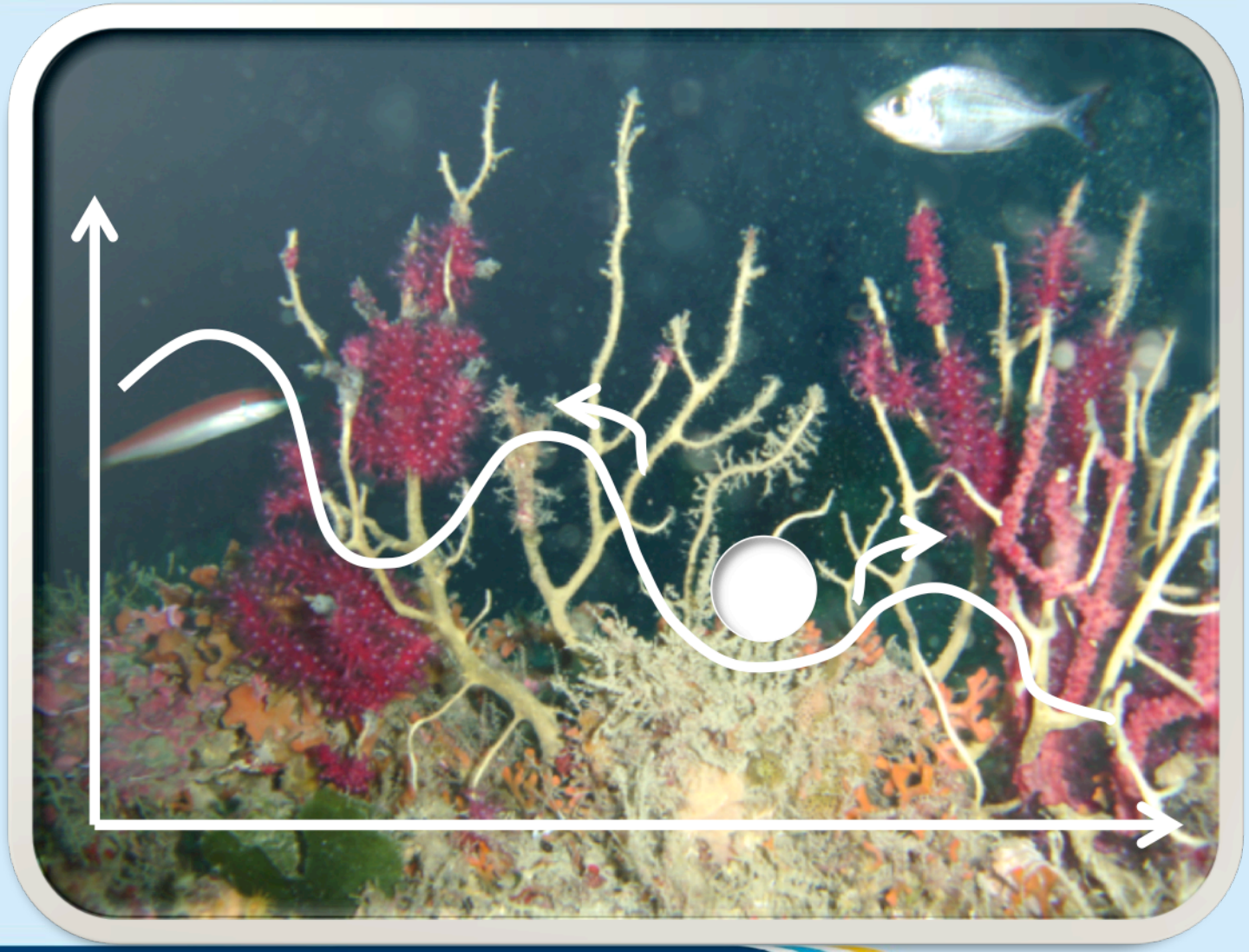
Shifting baseline



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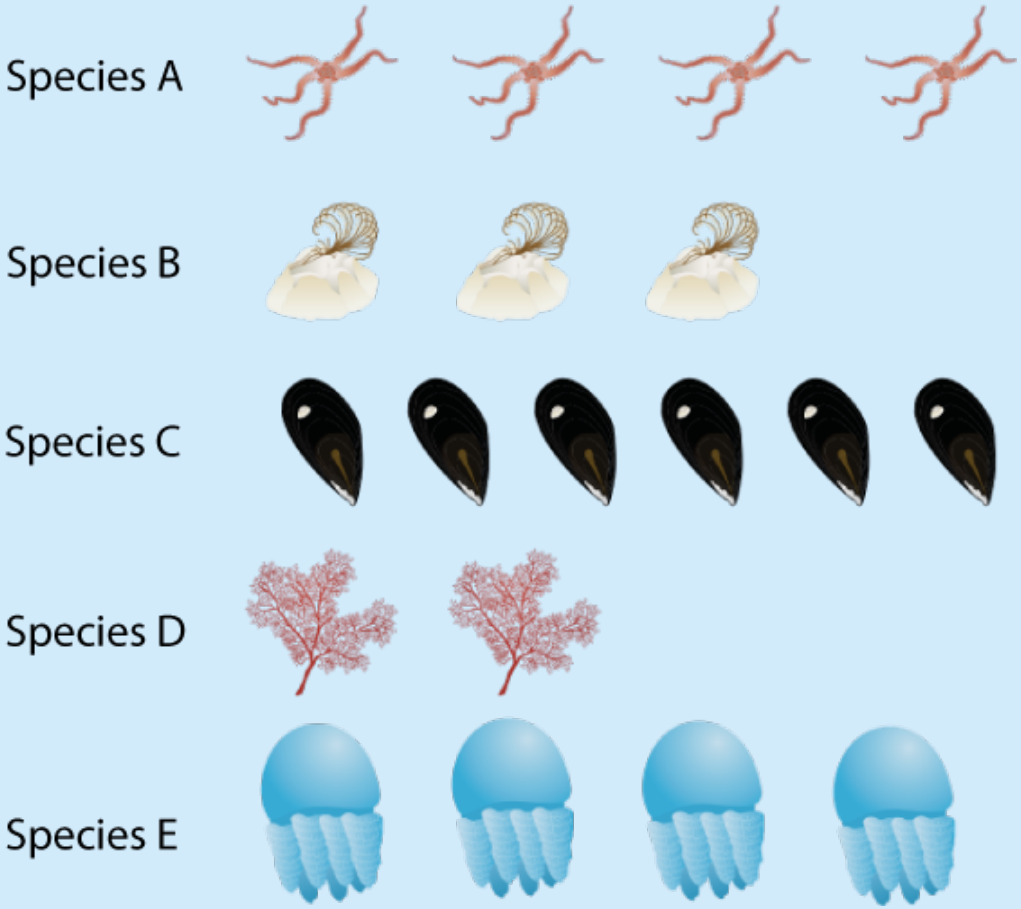
Measuring biodiversity

Species richness = S = 5



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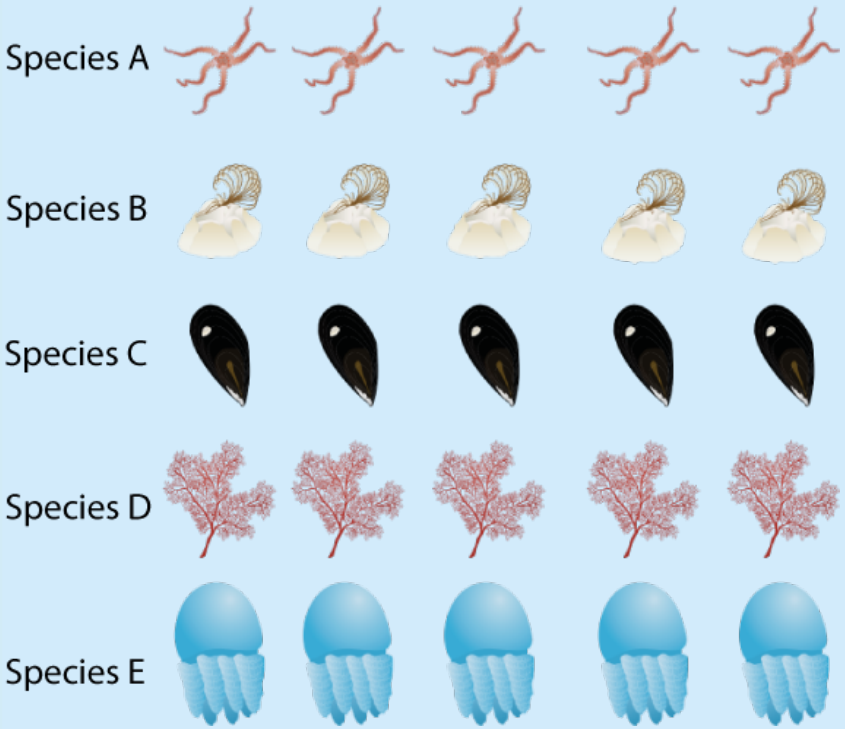
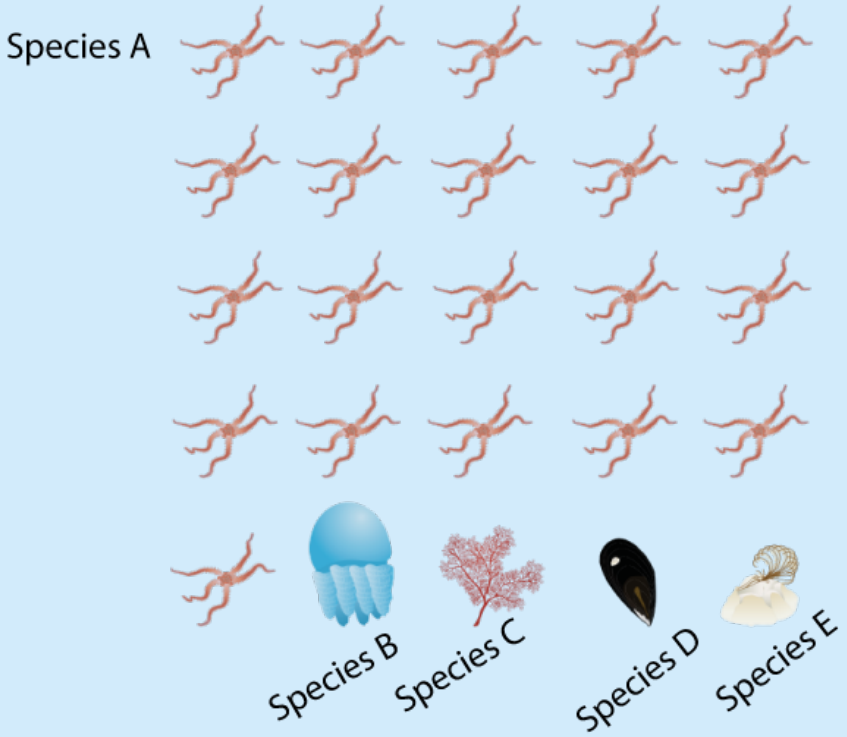
Measuring biodiversity

Species evenness

Species equally distributed



Species not equally distributed



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Measuring biodiversity

Simpson's index $1-D = \Sigma\, n(n-1) / N(N-1)$

Species	n	(n-1)	n(n-1)
Species A	5	4	20
Species B	12	11	132
Species C	7	6	42
Species D	4	3	12
Species E	10	9	90
Σ n(n-1)			296

N	(N-1)	N(N-1)
38	37	1406

1-D = 1 – (296/1406) = 0.8

0 means NO diversity

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Carrying capacity

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Carrying capacity

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Carrying capacity

The levels of suistanable use for fisheries, for tourism or for others activities above which detrimental changes can occur

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Carrying capacity

5,000 - 6,000 dives*site*yr overall capacity of a protected area to support recreational diving
(Hawkins and Roberts, 1997)

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Management

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Ecosystem-Based Management

EBM is an integrated approach to conserve ecosystems that includes components of environmental protection, the social community that interacts with the ecosystem, and economic considerations

Current Practice: Conventional Management

- Individual Species
- Individual Human Activities Evaluated
- Management by Individual Sectors
- Narrowly Focused Scientific Monitoring Programs
- Observations Serving a Single Use and Purpose

The Goal: Ecosystem-Based Management

- Multiple Species
- Humans Integral Part of Ecosystem
- Multi-Sector Resource Management
- Adaptive Management Based
- on Scientific Monitoring
- Shared and Standardized Observations

Developed by NOAA Fisheries

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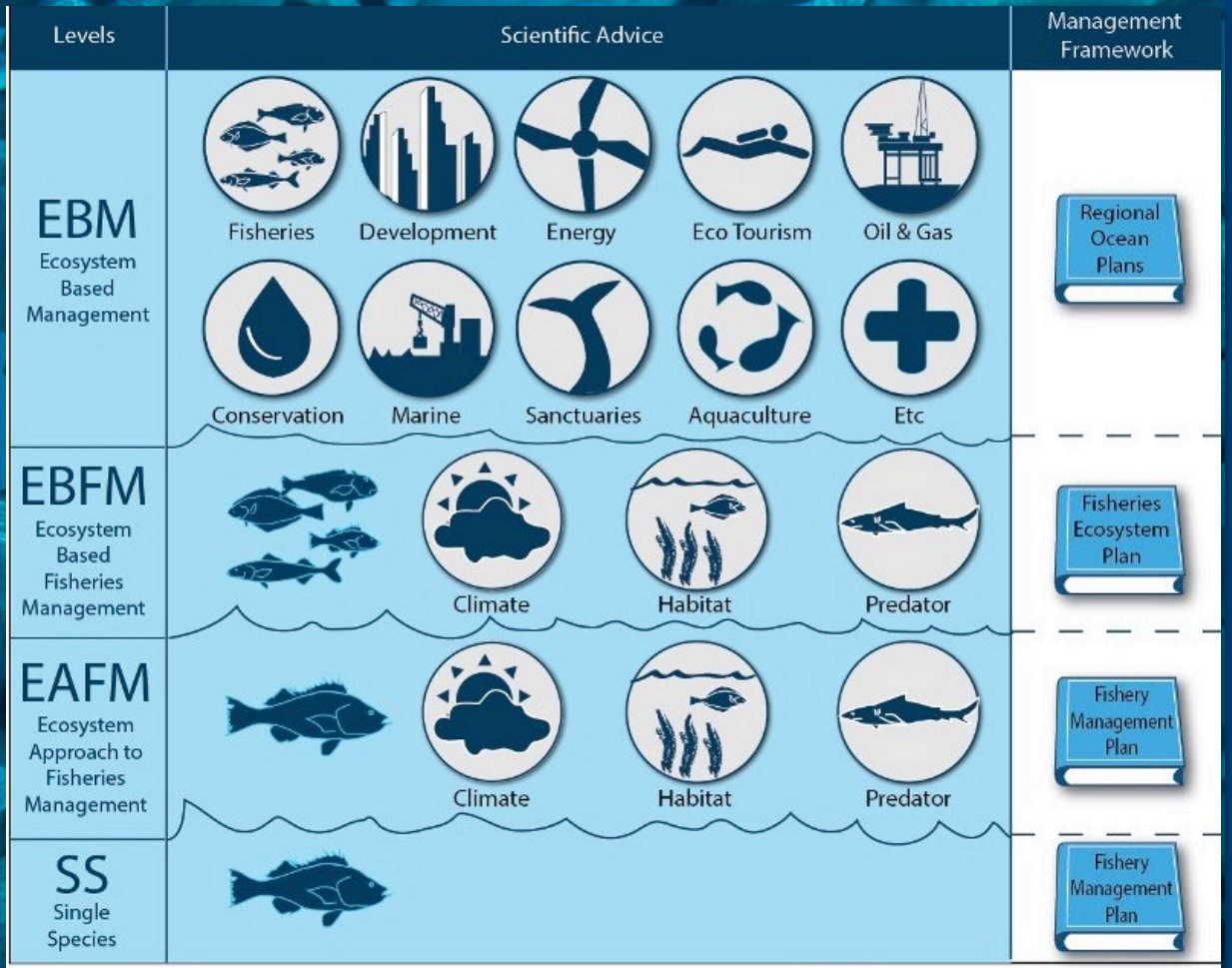
Ecosystem-Based Management



NOAA FISHERIES

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Ecosystem-Based Management

Turtle Excluder Device

EAFM

Wikimedia commons

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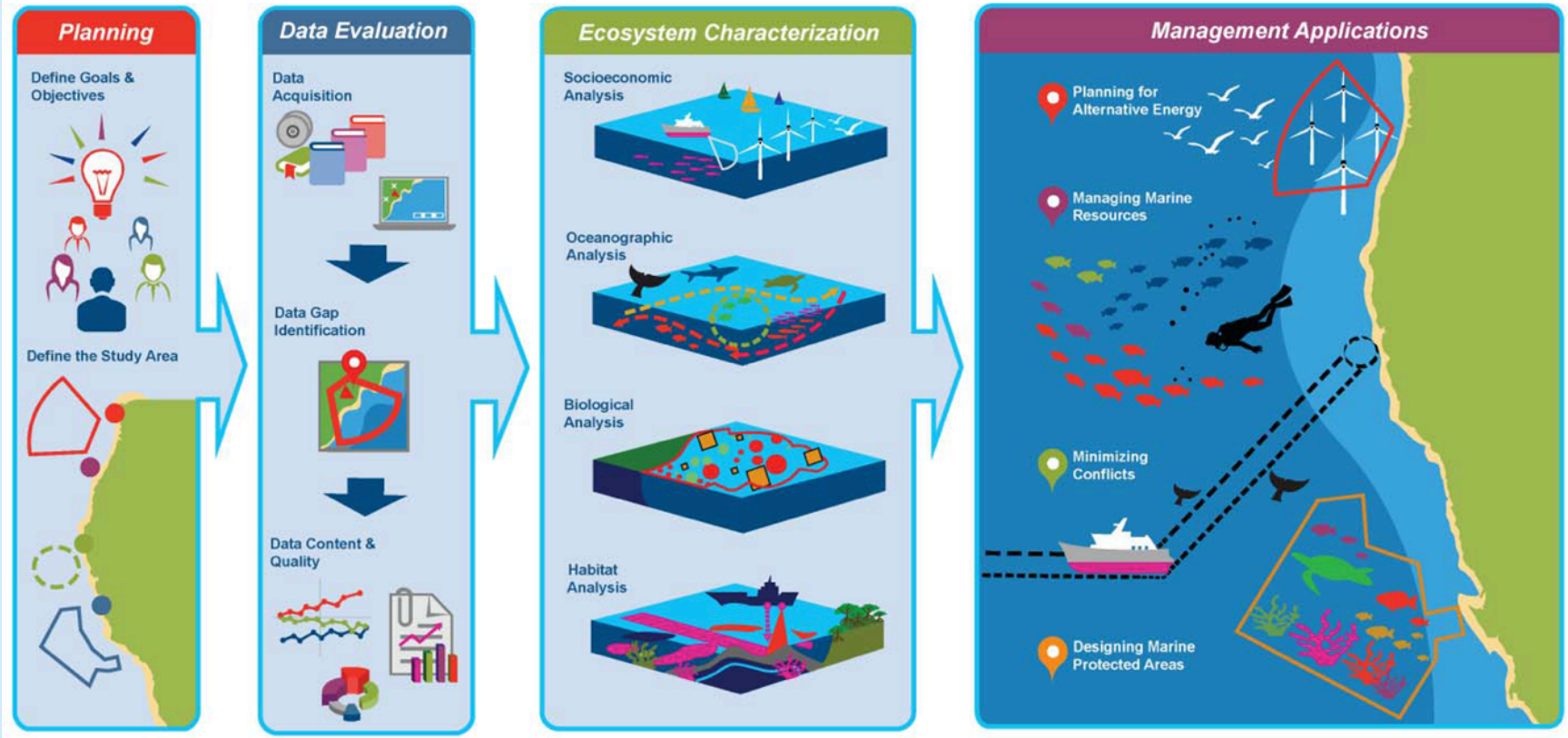
Marine Spatial Planning

MSP uses maps to give a picture of the marine area and its possible uses more comprehensive. Through the maps it visualizes where and how an ocean area is being used and what habitats exist. Thus, to be effective the MSP needs to be multi-objective, spatially focused and integrated



NOAA

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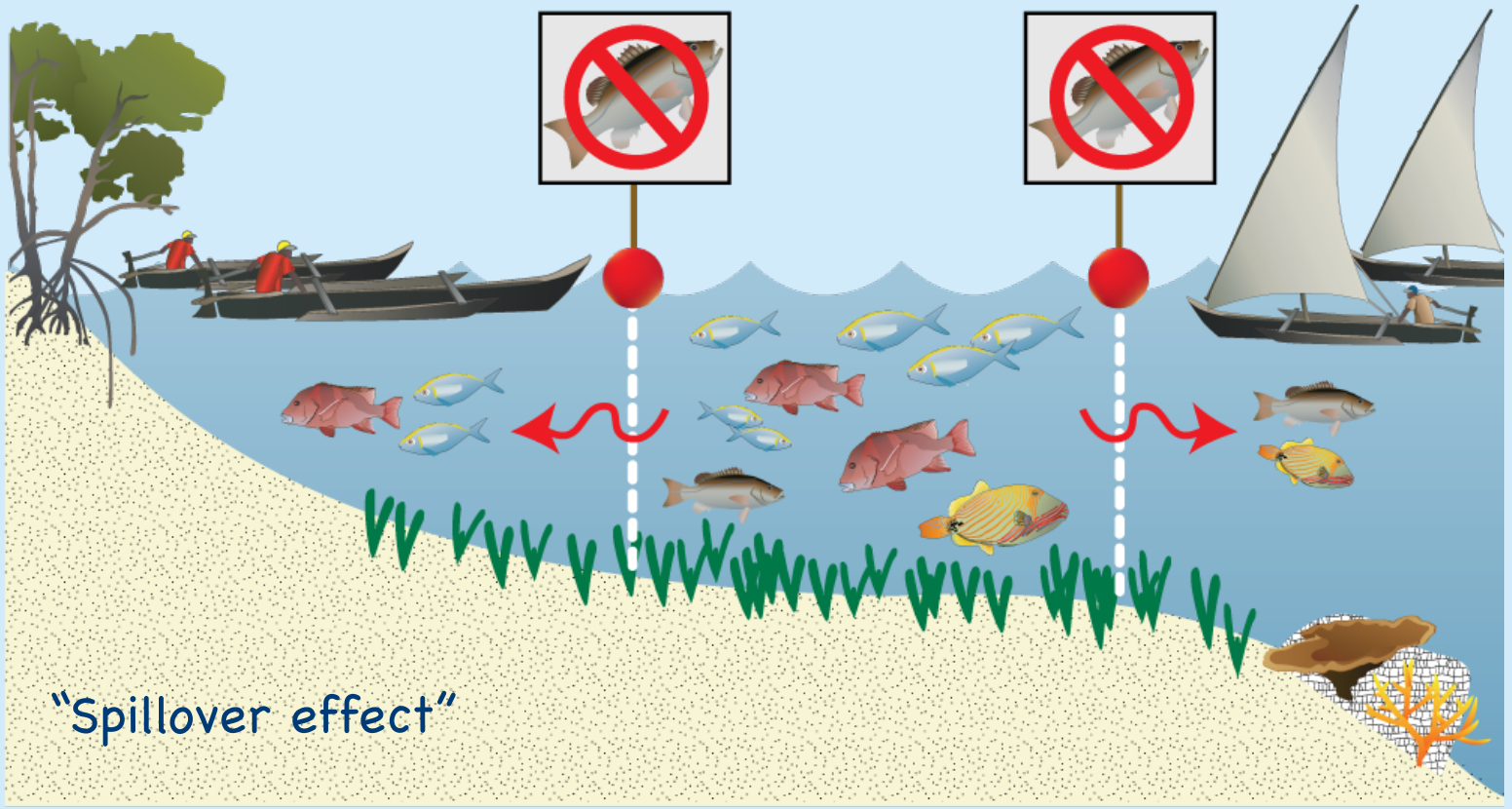
Marine Protected Areas

A clearly defined geographical space, recognised, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values (IUNC)



Conceptual diagram illustrating the benefits of a participatory-planned marine protected area. Called the "spillover effect", it describes the net movement of fishes to 'outside' the marine protected area, thus benefiting the fishery and the local fishermen overall.
Diagram courtesy of the Integration and Application Network (ian.umces.edu), University of Maryland Center for Environmental Science.

ian.umces.edu

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Marine Protected Areas

Win-Win the Marine Protected Areas story- MMMPA (FP7/2007-2013) Grant Agreem. 290056

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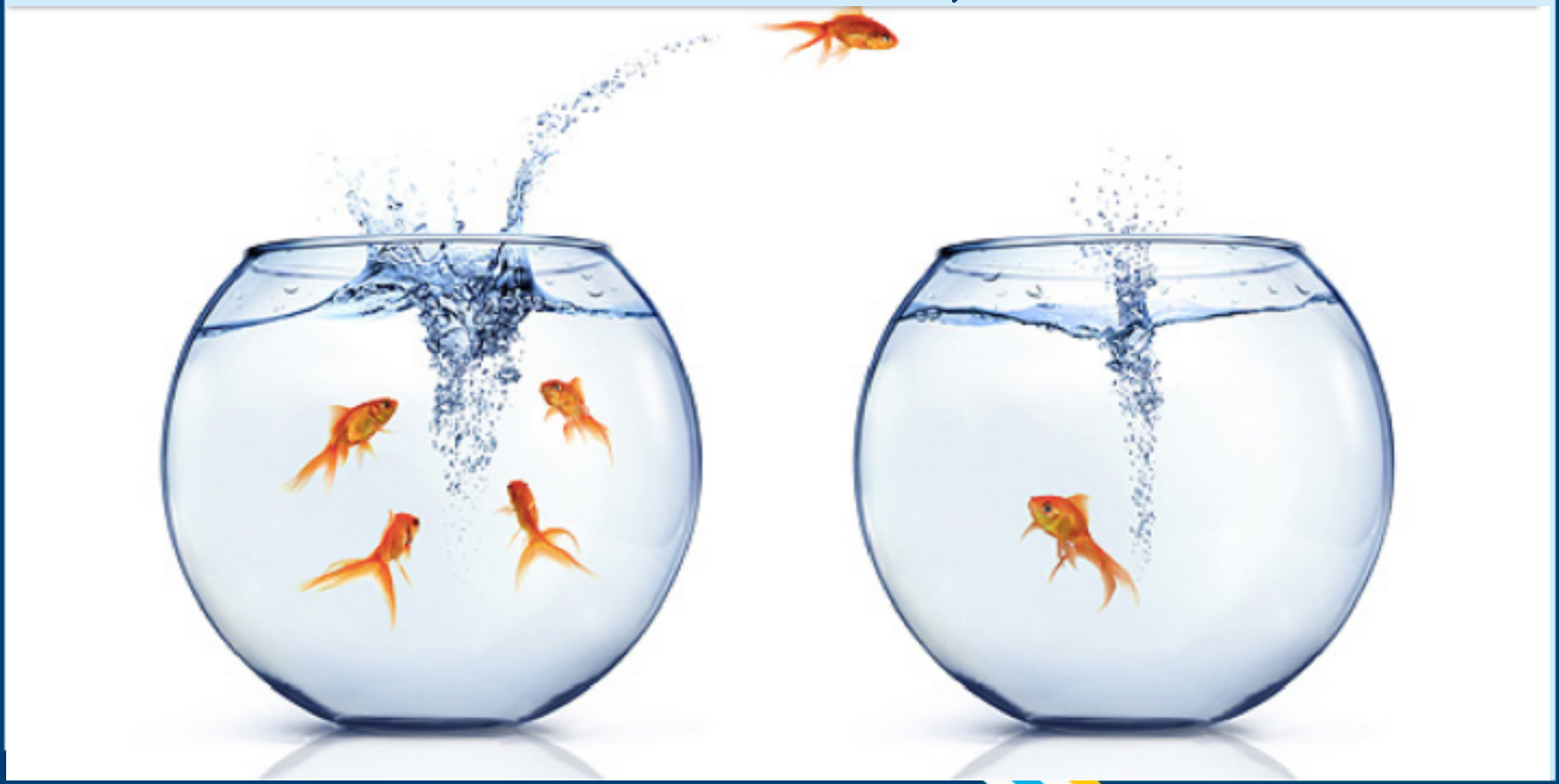
Species Connectivity

The connectivity, terrestrial or marine, is the exchange of individuals among populations through the passive transport and/or active movement of individuals at whatever life stage (i.e. gametes, larvae, juveniles, sub-adults and adults)



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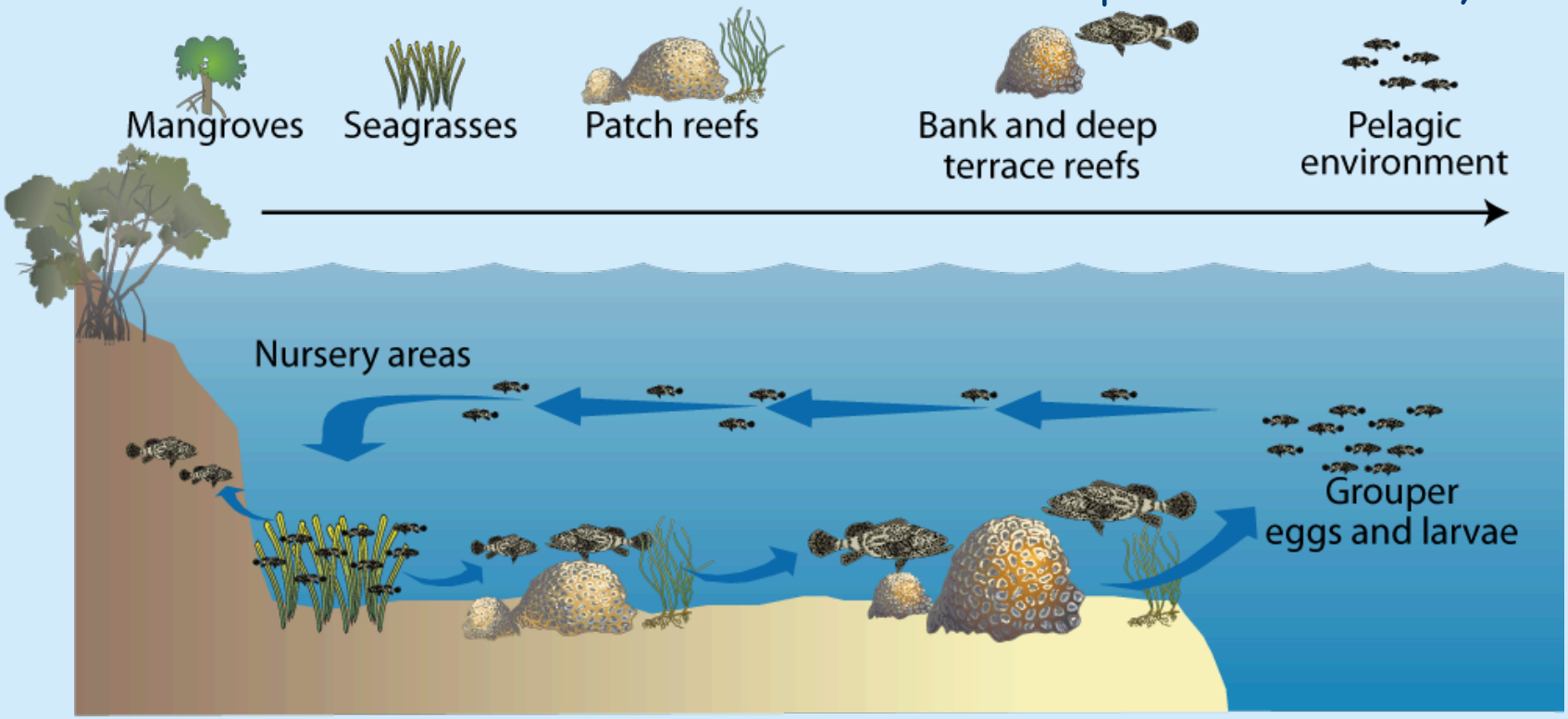
Species Connectivity

In healthy ecosystems, many habitat patches are connected by larval dispersal of species . Connectivity is important to maintain population resilience, to reduce the extinction risk and to preserve diversity



Conceptual diagram illustrating a schematic view of south Florida, including Miami and Biscayne Bay, showing physical connectivity of marine habitats and movement of life stages of grouper amoung habitat types.

Diagram courtesy of the Integration and Application Network (ian.umces.edu), University of Maryland Center for Environmental Science. Source: Kruczynski, W.L. and P.J. Fletcher (eds.). 2012. Tropical Connections: South Florida's marine environment. IAN Press, University of Maryland Center for Environmental Science, Cambridge, Maryland. 492 pp.

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Citizen Science

The involvement of amateur and non-professional scientist in making observation and collecting data

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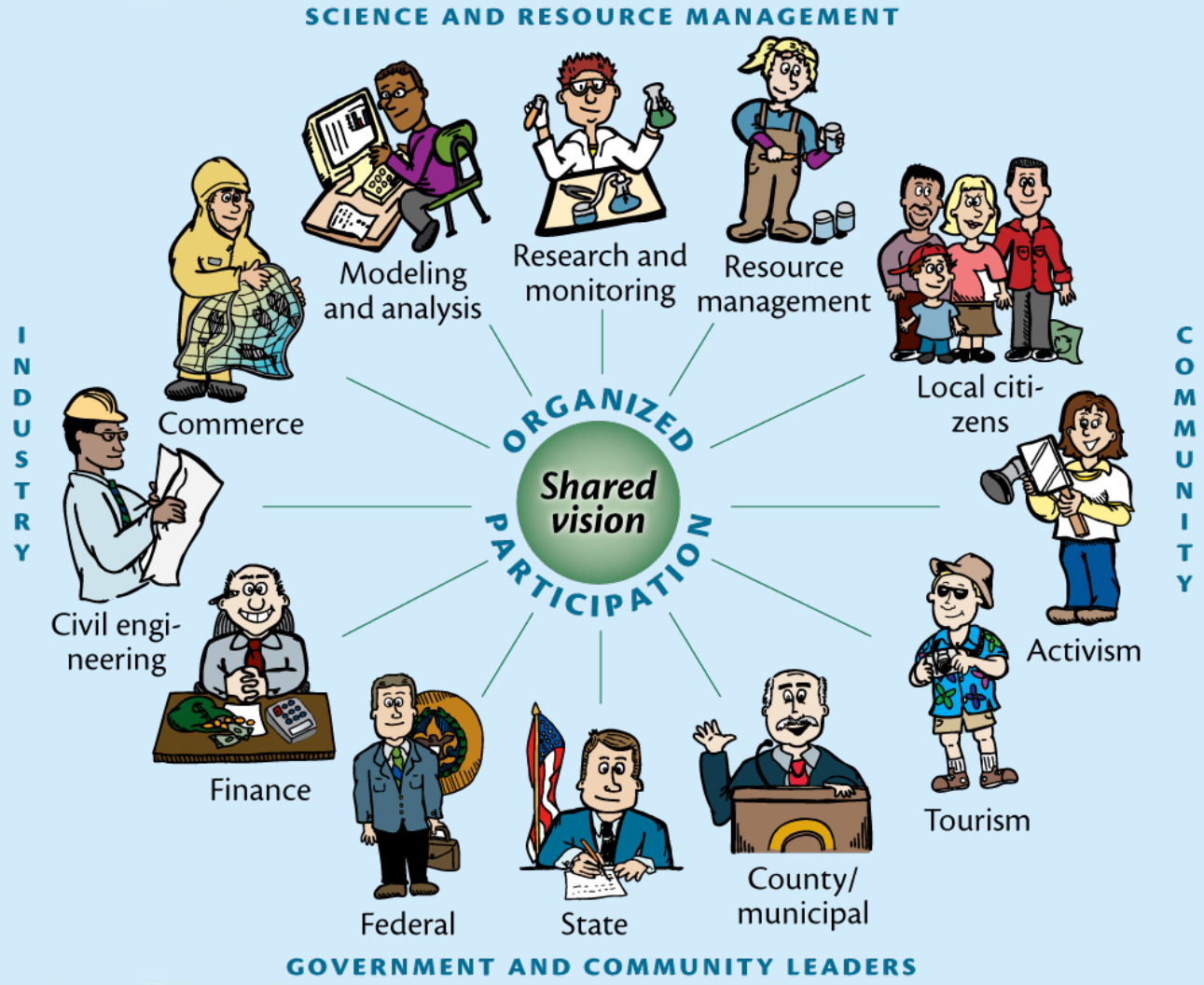
Citizen Science



Jane Thomas,IAN Image Library

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Thank you for your attention