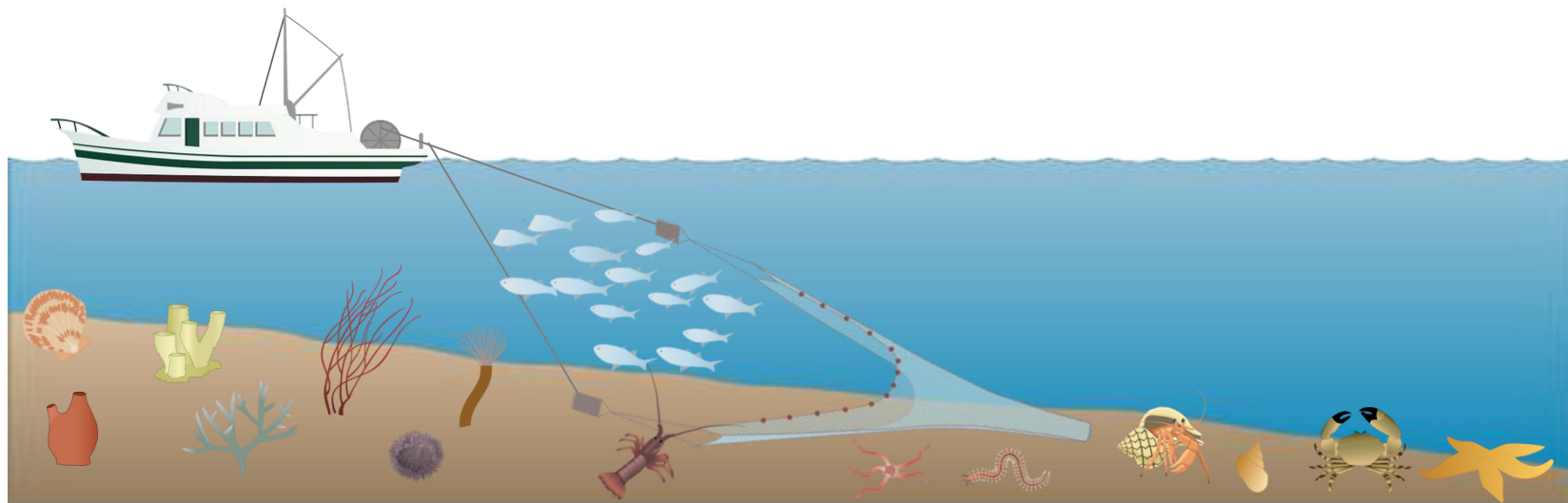
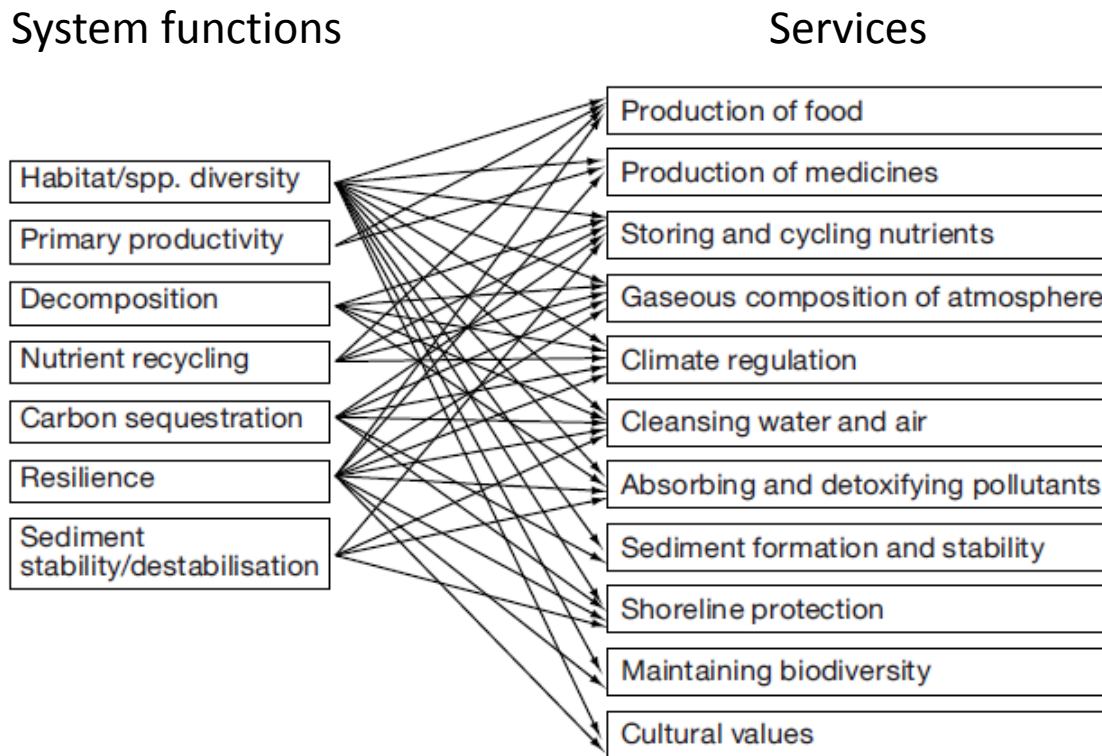


# An approach to link changes in benthic community structure with the delivery of ecosystem services in trawling grounds

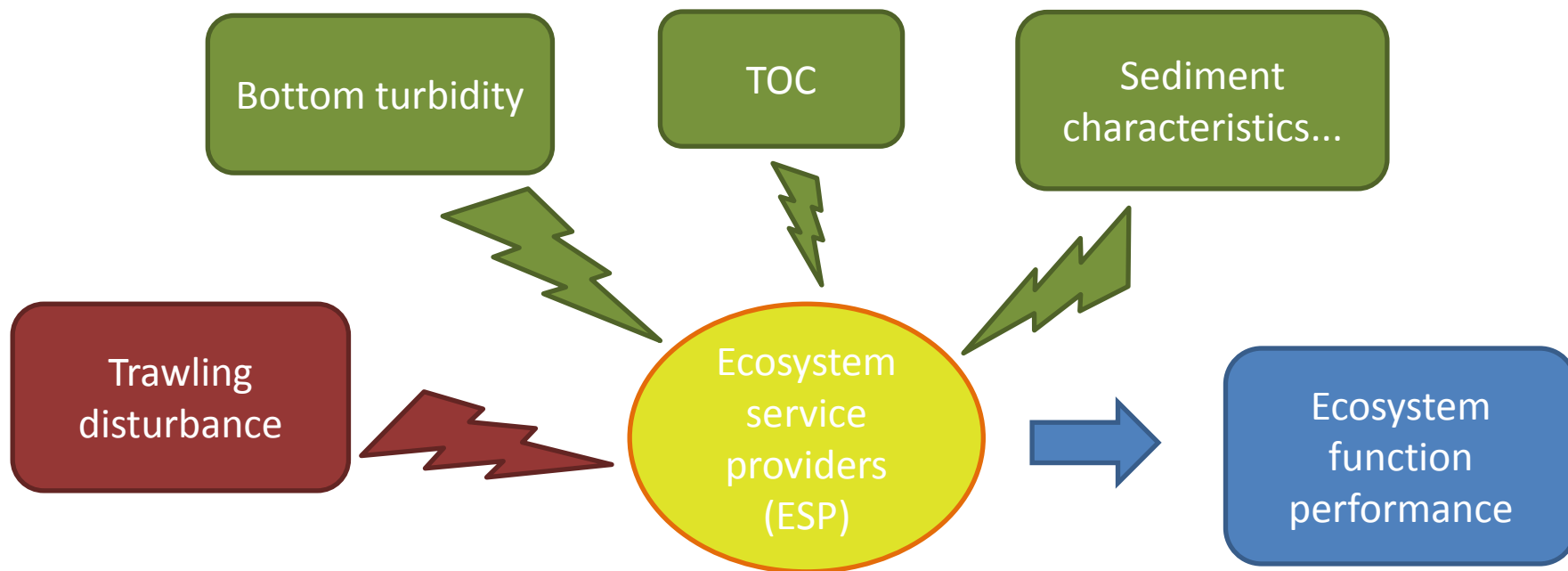
Alba Muntadas, Silvia de Juan and Montserrat Demestre



## ECOSYSTEM SERVICES DELIVERED BY BENTHIC COMMUNITIES:



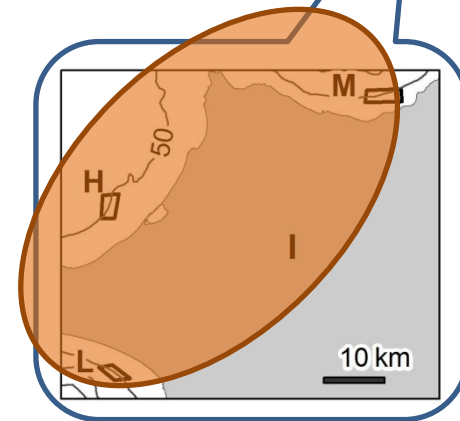
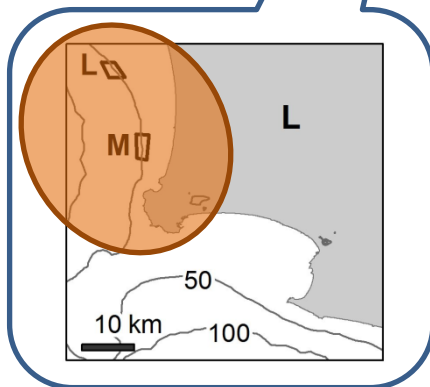
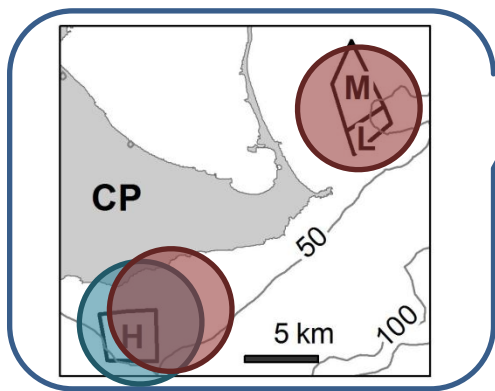
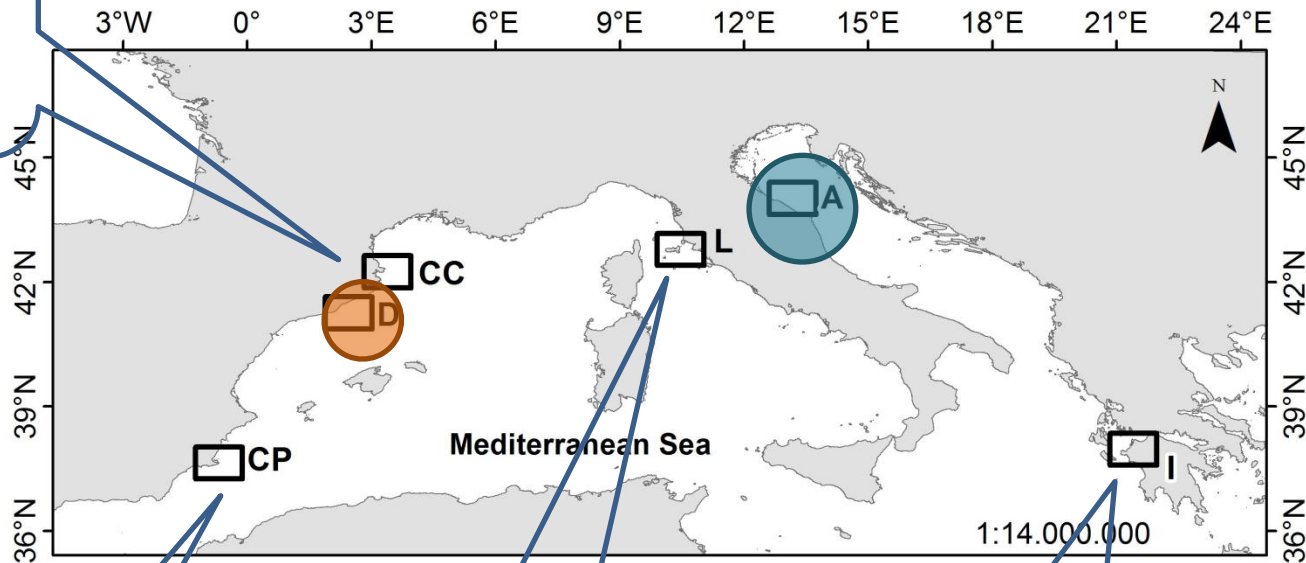
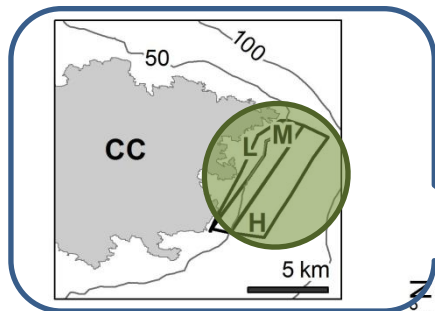
(From Townsend et al. 2011)



**AIM:** Estimate biomass/abundance of ESPs and assess how trawling effort and other environmental variables affect them

**HYPOTESIS:** ESP variability is a response to the combined effects of fishing effort and environmental drivers

# STUDY AREA



## BIOLOGICAL TRAITS' TABLE

Environmental position	Fragility
Habit	Regeneration potential
Growth form	Asexual reproduction
Mobility	Reproductive frequency
Bioturbation	Type of larvae
Feeding mode	Life span
Size	Sexual maturity

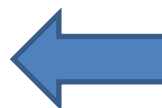


### Ecosystem Service Provider

- Very fast turnover
- High bioturbators
- Large filter feeders
- Large carbon sequestrators
- Large 3D structure....



Classified as High, Medium or Low “producers” depending on their relative contribution to the ecosystem functions



### ECOSYSTEM FUNCTIONS

- Production
- Nutrient Cycling
- Benthopelagic coupling
- Carbon sequestration
- Habitat structure

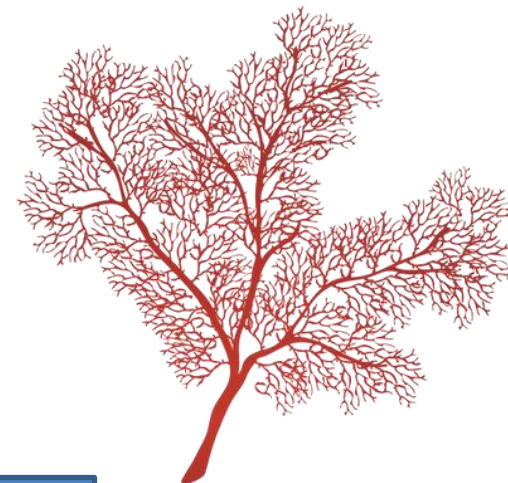


## ECOSYSTEM SERVICES

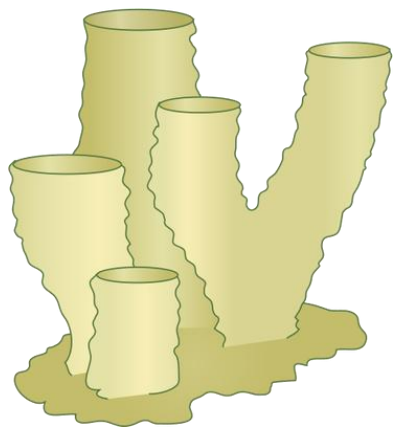
## EXAMPLE:

ECOSYSTEM FUNCTION:

**HABITAT STRUCTURE**



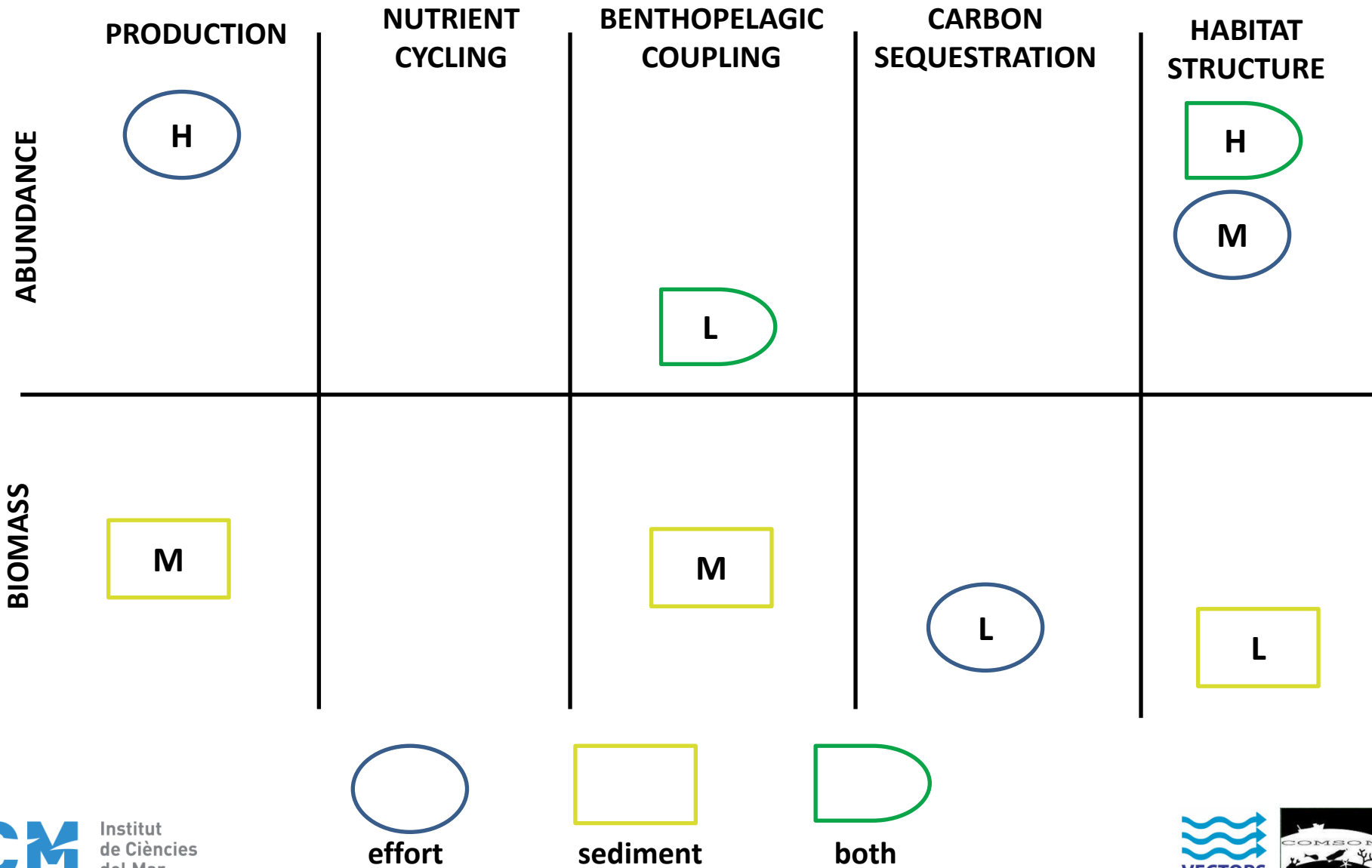
Related biological traits → Size  
→ Life span  
→ Habit



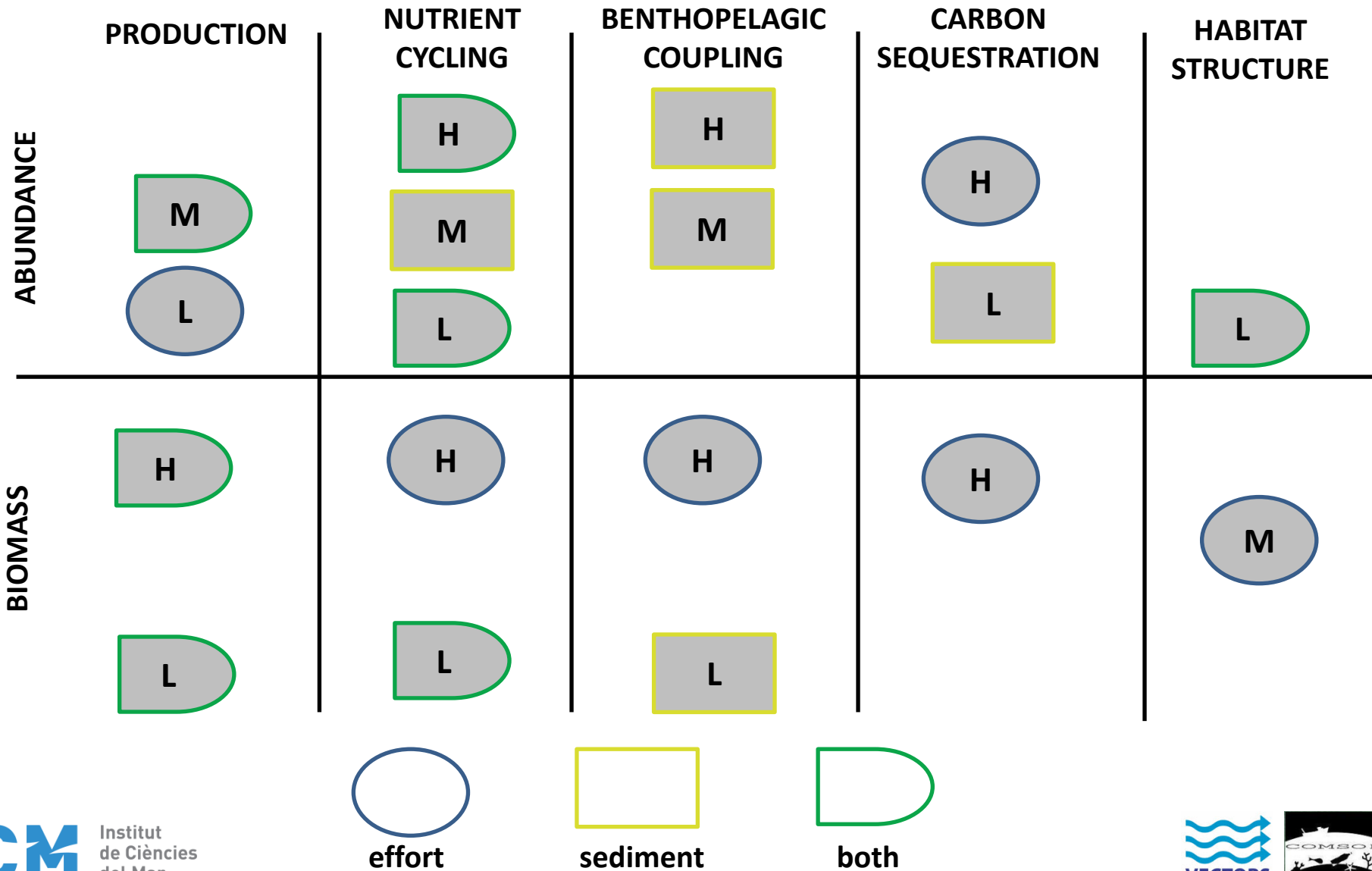
**ESP:**

**LARGE 3D STRUCTURE:** Large, long lived attached or erect organism

## ENVIRONMENTAL EFFECTS ON ESP

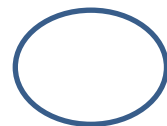
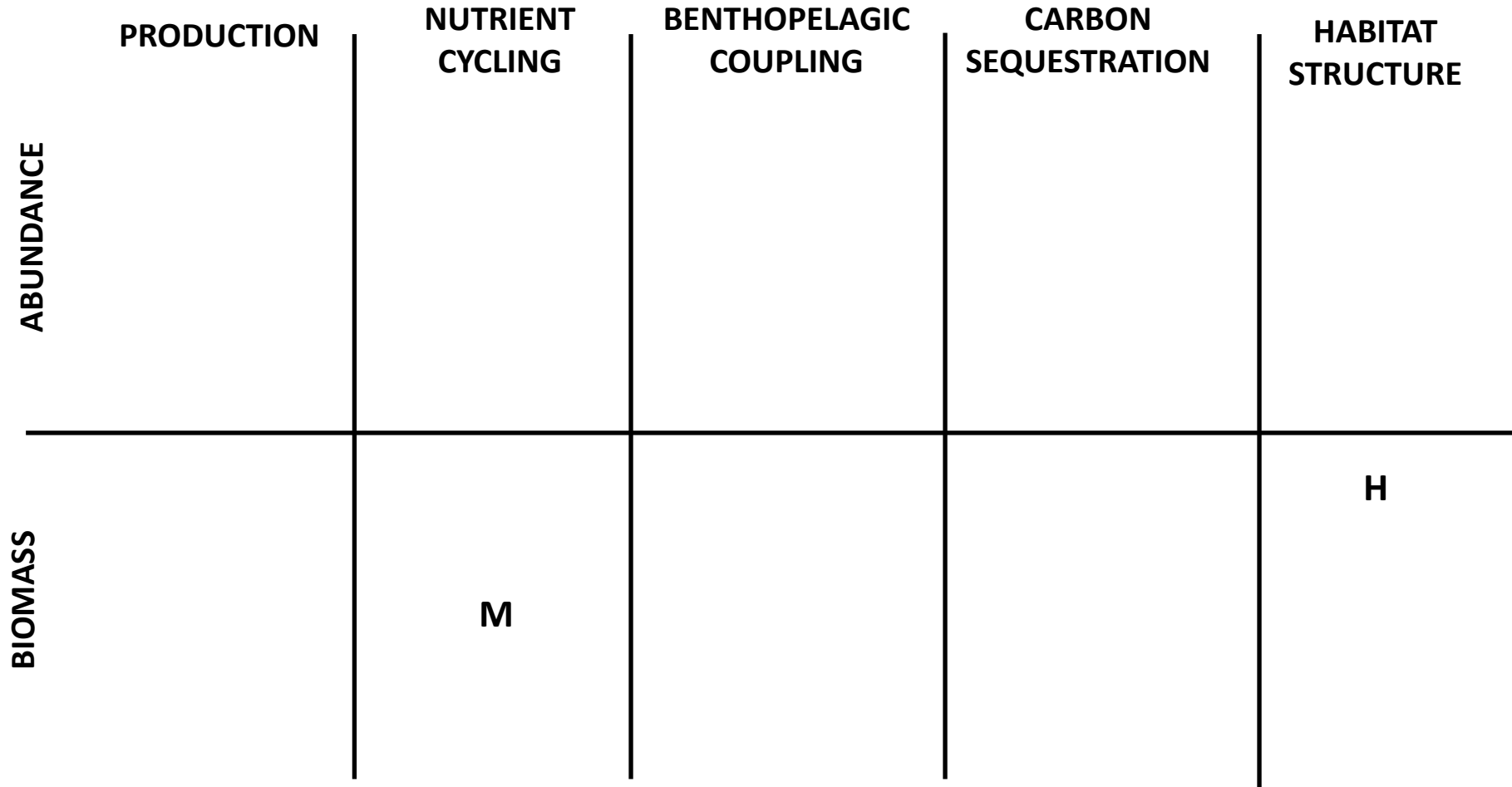


## ENVIRONMENTAL EFFECTS ON ESP





## ENVIRONMENTAL EFFECTS ON ESP



effort

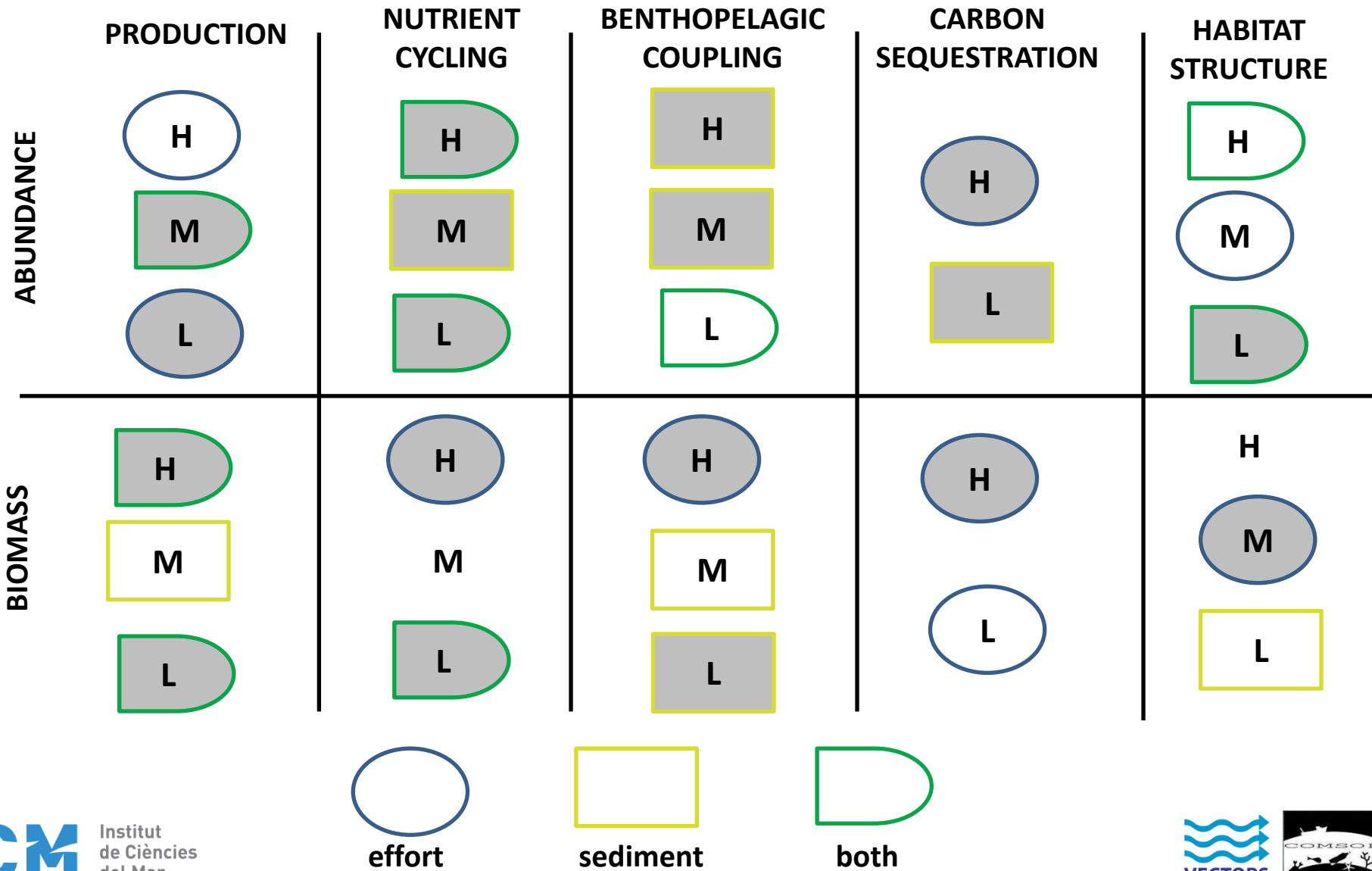


sediment



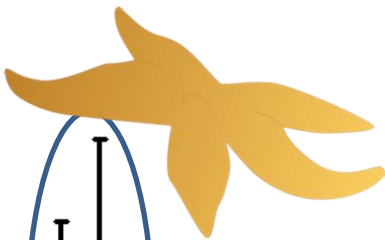
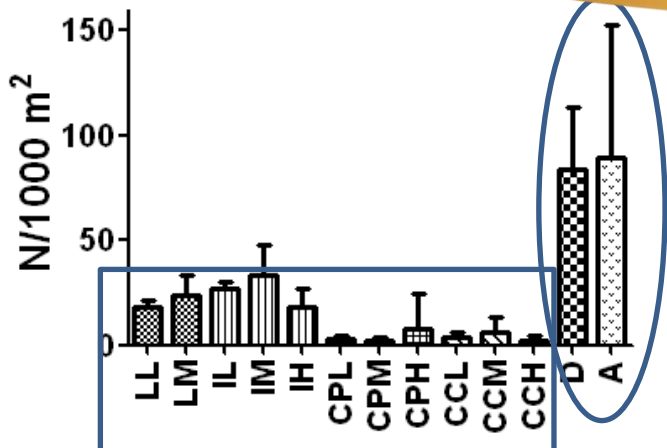
both

## ENVIRONMENTAL EFFECTS ON ESP

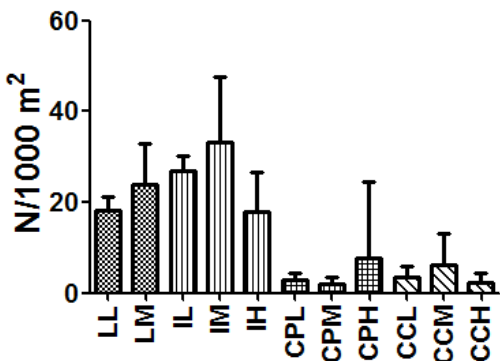
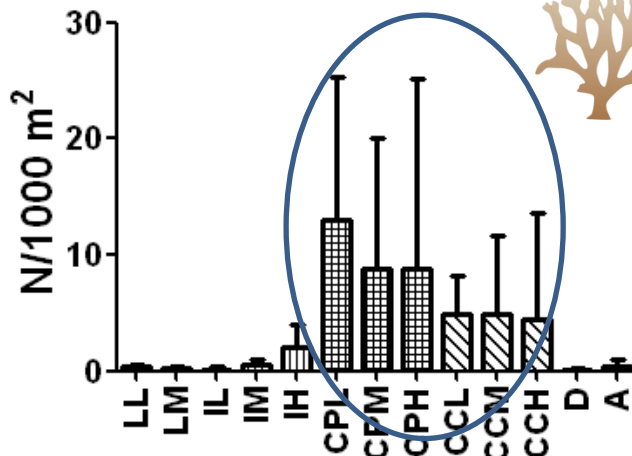


Some examples of abundance variability across sites :

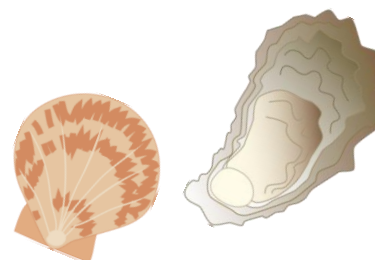
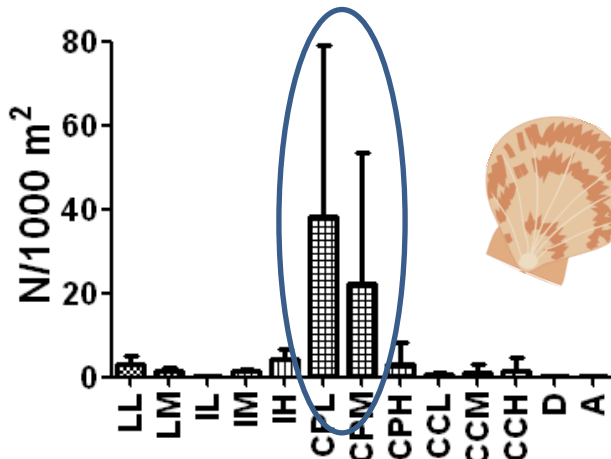
High bioturbators



Large 3D structure



Large carbon sequestrators



Fishing grounds deliver other ecosystem services than merely “fish for food”.

Furthermore, the “fish for food” service relies on the other ecosystem services as e.g. nutrient cycling



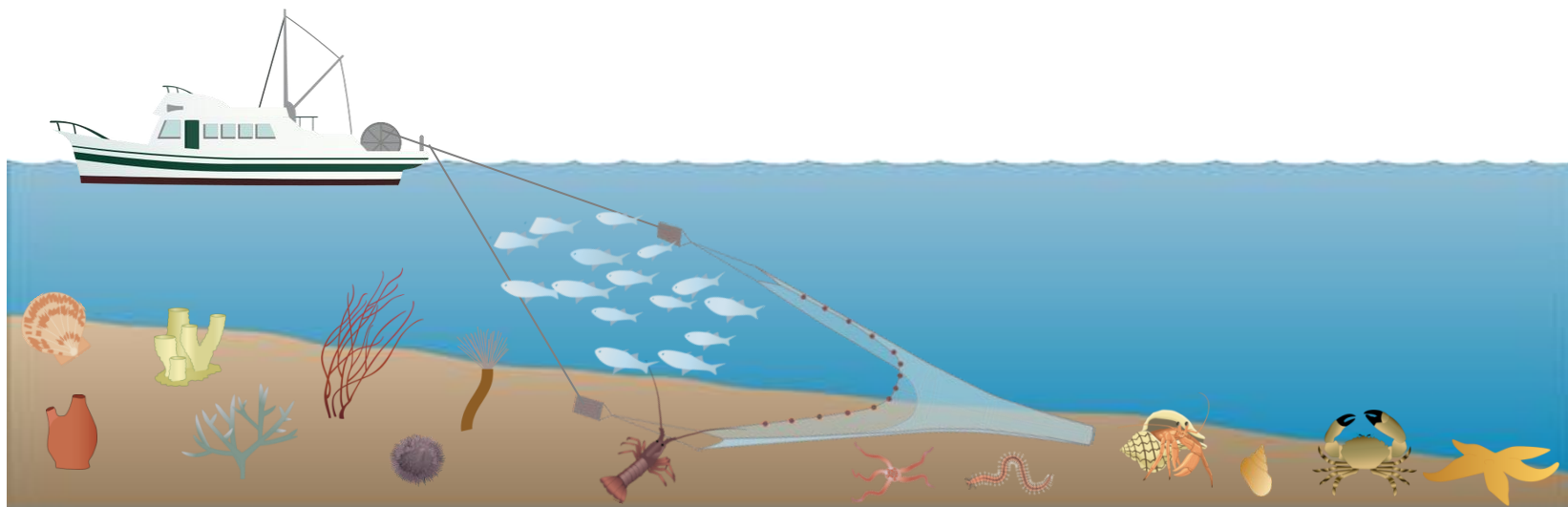
The chosen metric influences the function estimation → importance of assessing each function separately

Whatever metric is chosen fishing effort and sediment characteristics are the most important variables affecting ESP variability → fishing effort is susceptible to be managed.



ESP composition depends on the habitat type → ESP response to trawling depends on the habitat type.

# THANK YOU FOR YOUR ATTENTION!



For more information: [amuntadas@icm.csic.es](mailto:amuntadas@icm.csic.es)