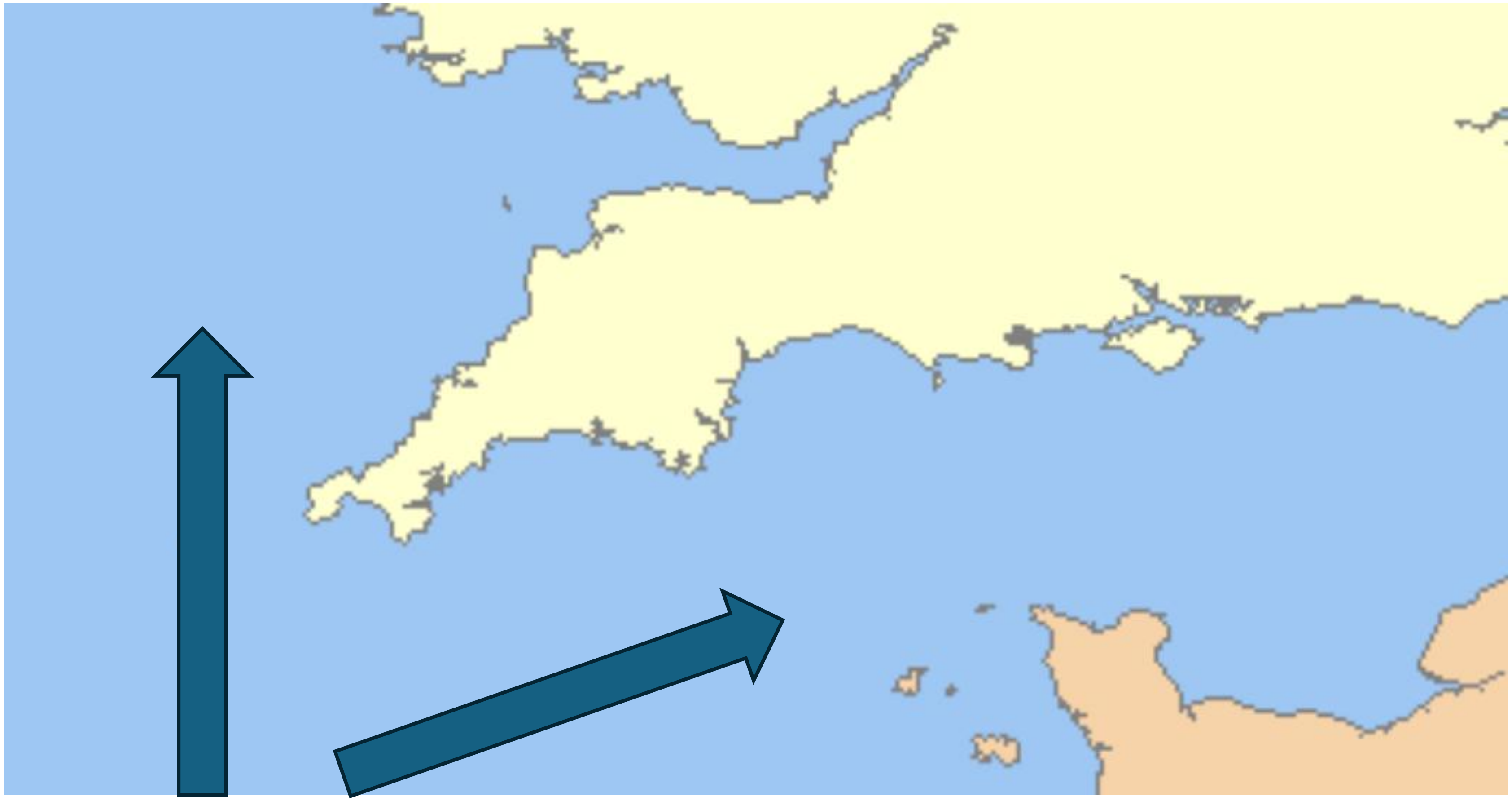
Adapting to Warming Seas in the South West: Challenges and Possibilities

Prof Rick Stafford

Faculty of Health, Environment and Medical Sciences

Bournemouth University



Species move northwards and eastwards with increasing temperatures

Warmer species ‘win’
Cooler species ‘lose’

Mobile species fair better

Connectivity is important for resilience

Summarised from Couce et al. (2025) Marine Biology

- SW at forefront for ‘new’ species from warmer waters
- Octopus in huge numbers in SW in 2025
- Consumed large numbers of crabs / lobster
- Initially major problems for local fishers
- But big export market for octopus

- *Laminaria ochroleuca* – warm water kelp in SW England

- Invasive species – but through climate
- movement

- Highly productive but lower biodiversity

- Habitat forming, so affects other species

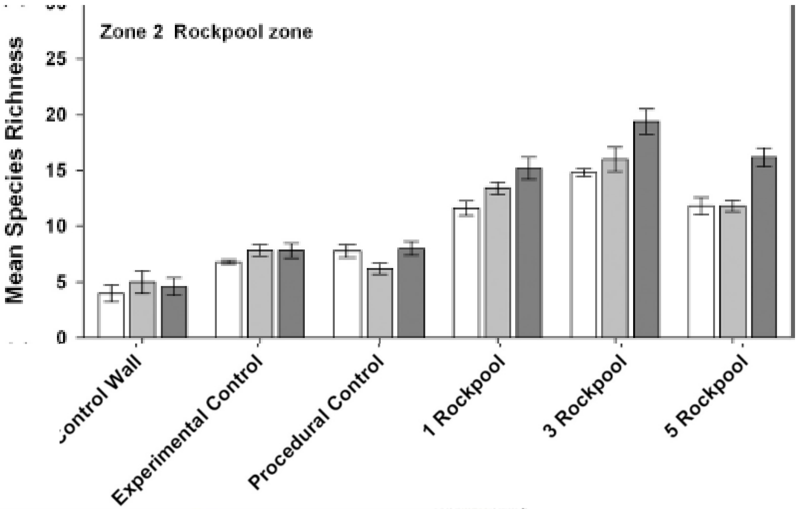
Pessarrodona et al. 2018 – J Ecology

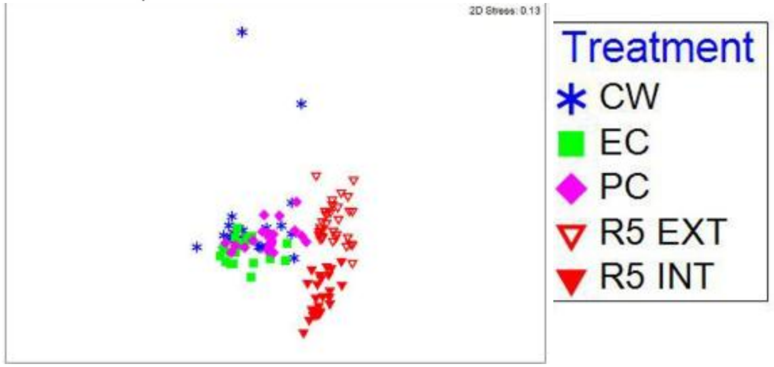
Conservation focussing on function and resilience

- Conservation typically associated with protected ‘features’ – species or broad scale habitats
- Function is mentioned – but poorly understood
- Species will change
- Adaptive management may be needed

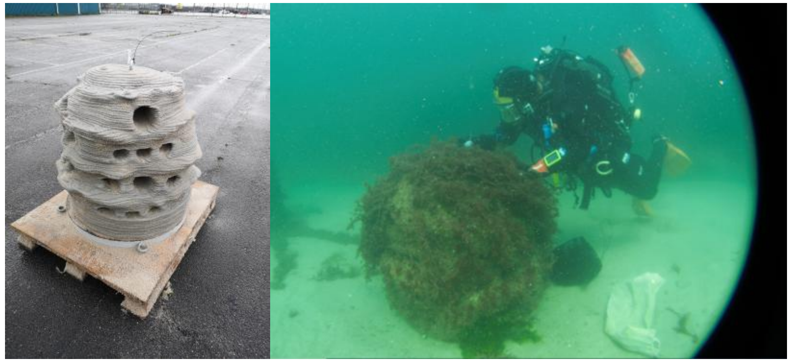
Ecological Resilience

- Linked to:
  - Function
  - Biodiversity
  - Movement
  - Habitat complexity
  - Habitat connectivity
  - Removal of disturbances





Herbert et al. 2024



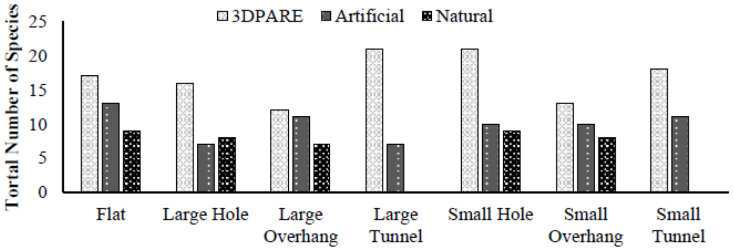
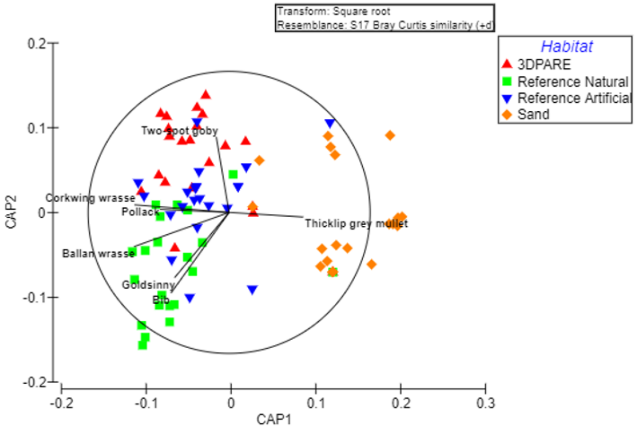
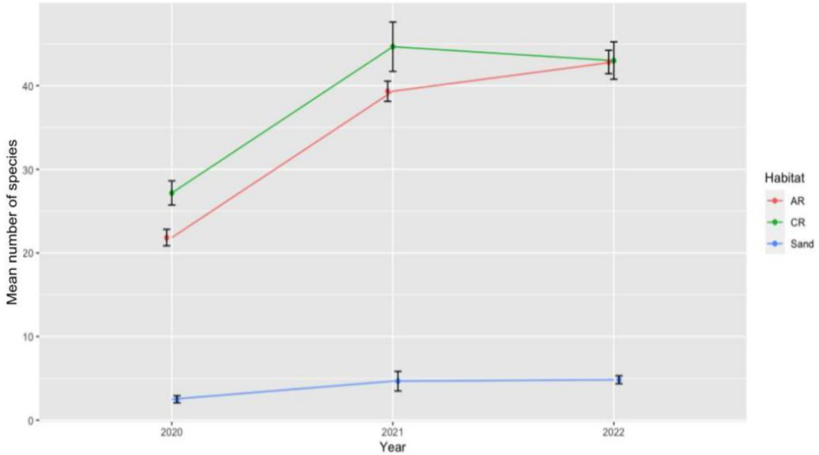


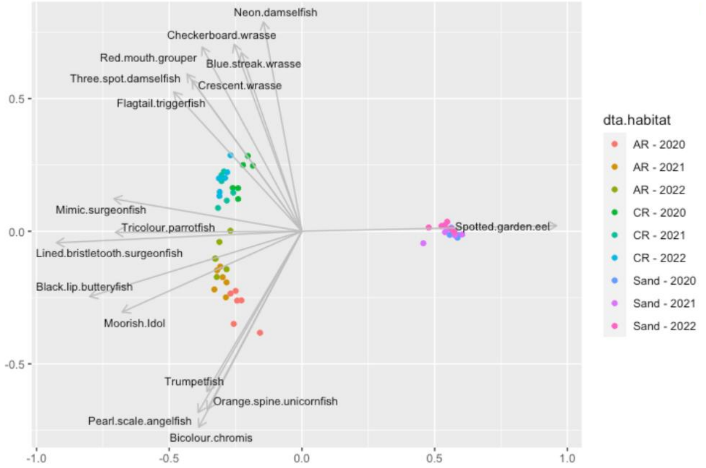
Figure 6: Total number of species recorded on seven features of the 3DPARE reefs in the UK after 6 months compared to the artificial and natural reference sites.

Hall et al. Coasts, Marine Structures and Breakwaters 2023.

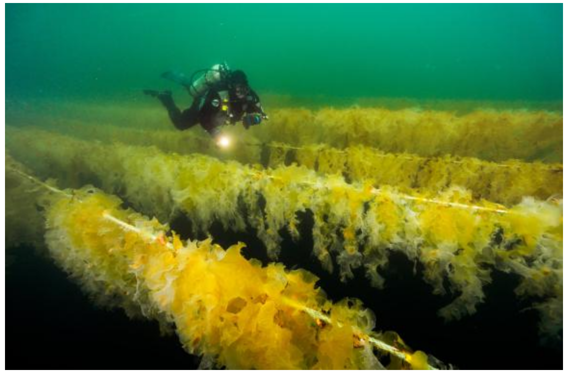


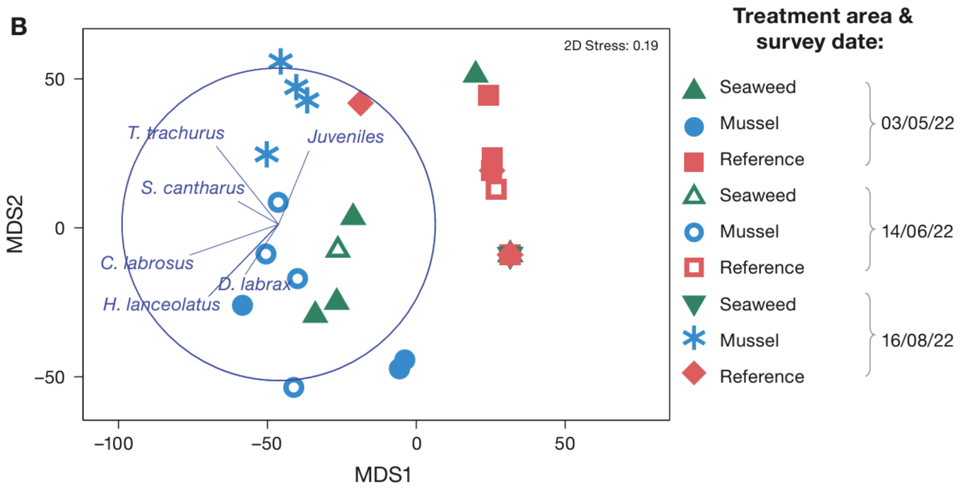
Greenhill et al., in prep

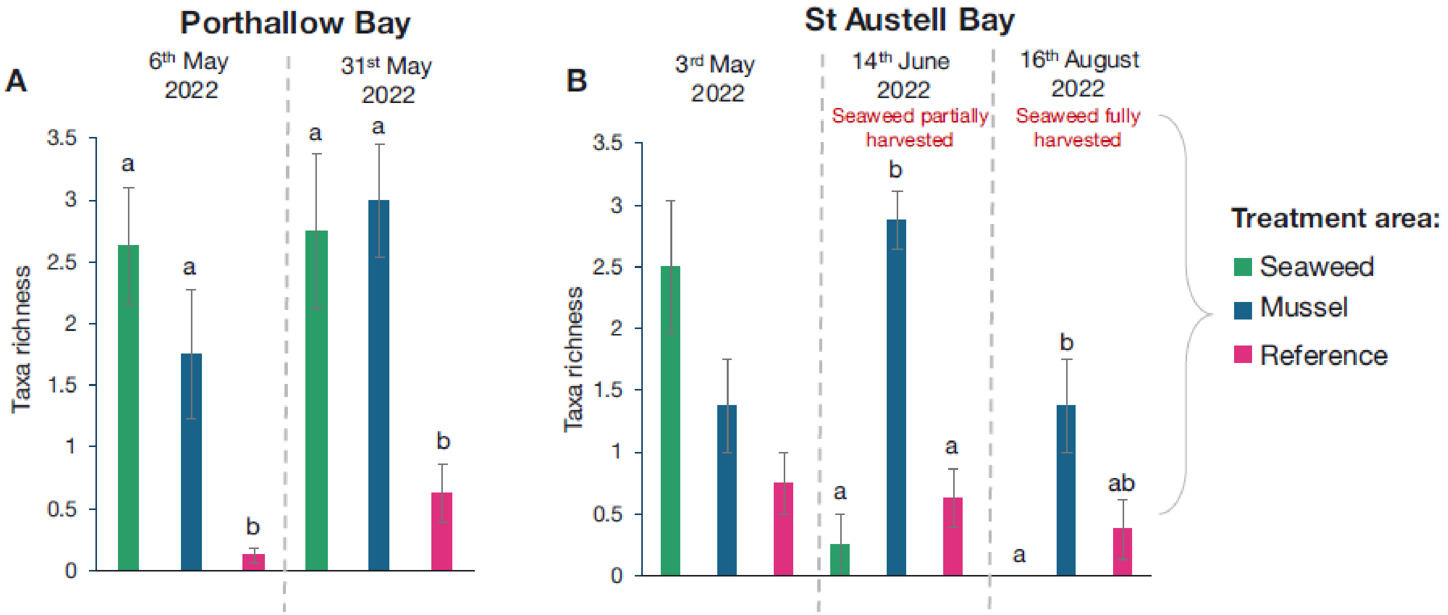


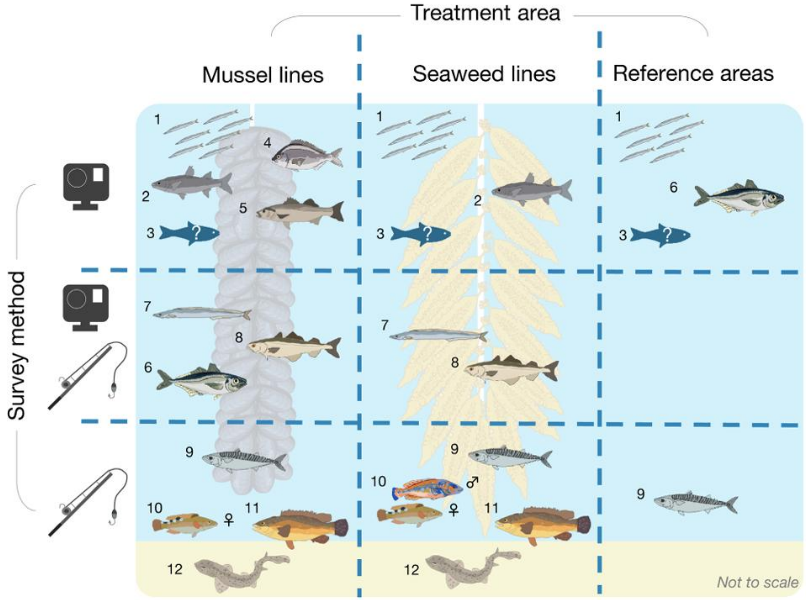


Boakes et al. 2024









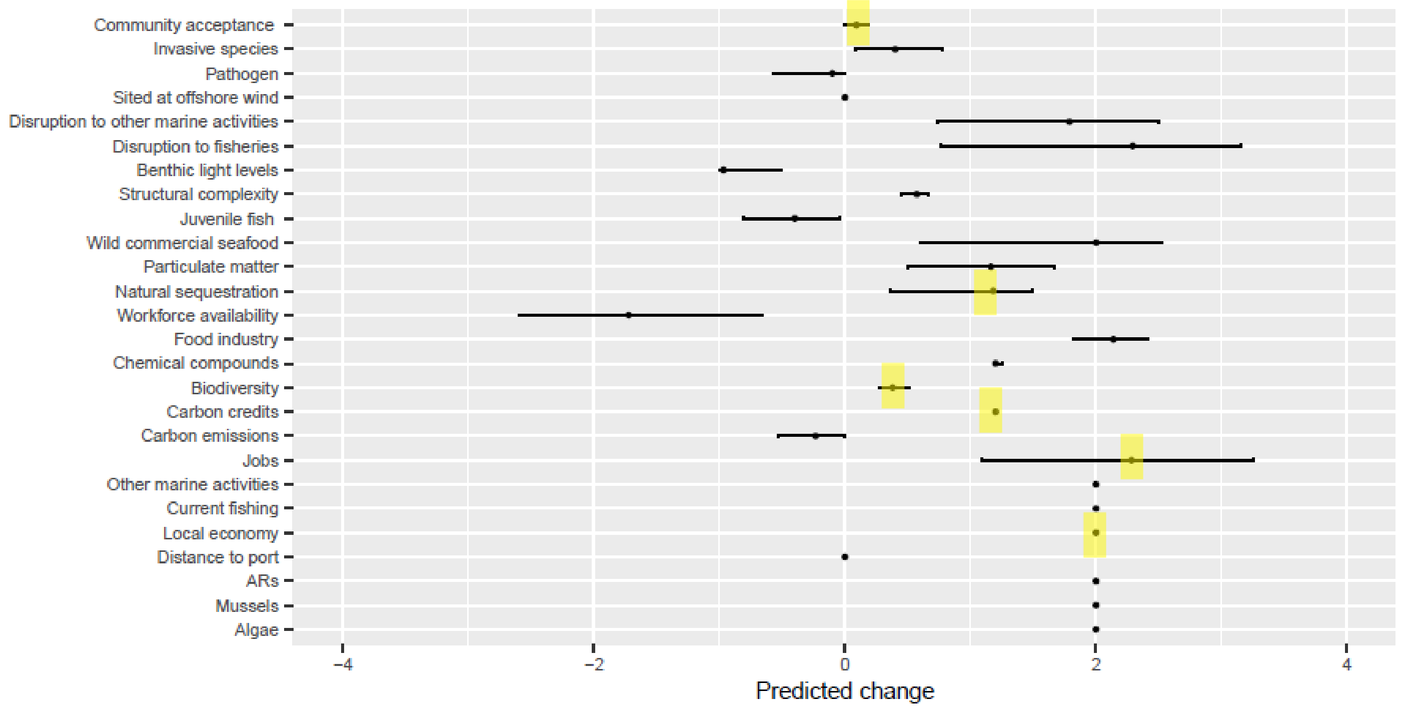
1) Lesser sand eels (*Ammodytes* spp.). 2) Grey mullet (*Chelon labrosus*). 3) Unidentified juveniles.
4) Black sea bream (*Spondyliosoma cantharus*). 5) European seabass (*Dicentrarchus labrax*).
6) Atlantic horsemackerel (*Trachurus trachurus*). 7) Greater sand eel (*Hyperoplus lanceolatus*).
8) Atlantic pollack (*Pollachius pollachius*). 9) Atlantic mackerel (*Scomber scombrus*). 10) Cuckoo wrasse (*Labrus mixtus*). 11) Ballan wrasse (*Labrus bergylta*). 12) Nursehound (*Scyliorhinus stellaris*)

Corrigan et al. 2024 https://doi.org/10.3354/aei00478

Figure 4. Offshore Shellfish Mussel Farm in Lyme Bay, from the surface (photo credit Emma Sheehan https://sheehanresearchgroup.com/offshore-mussels/#jp-carousel-640 *- used with permission.*

Despite limited visual impact, opposition is strong for low impact aquaculture

Co-location at offshore wind maybe key

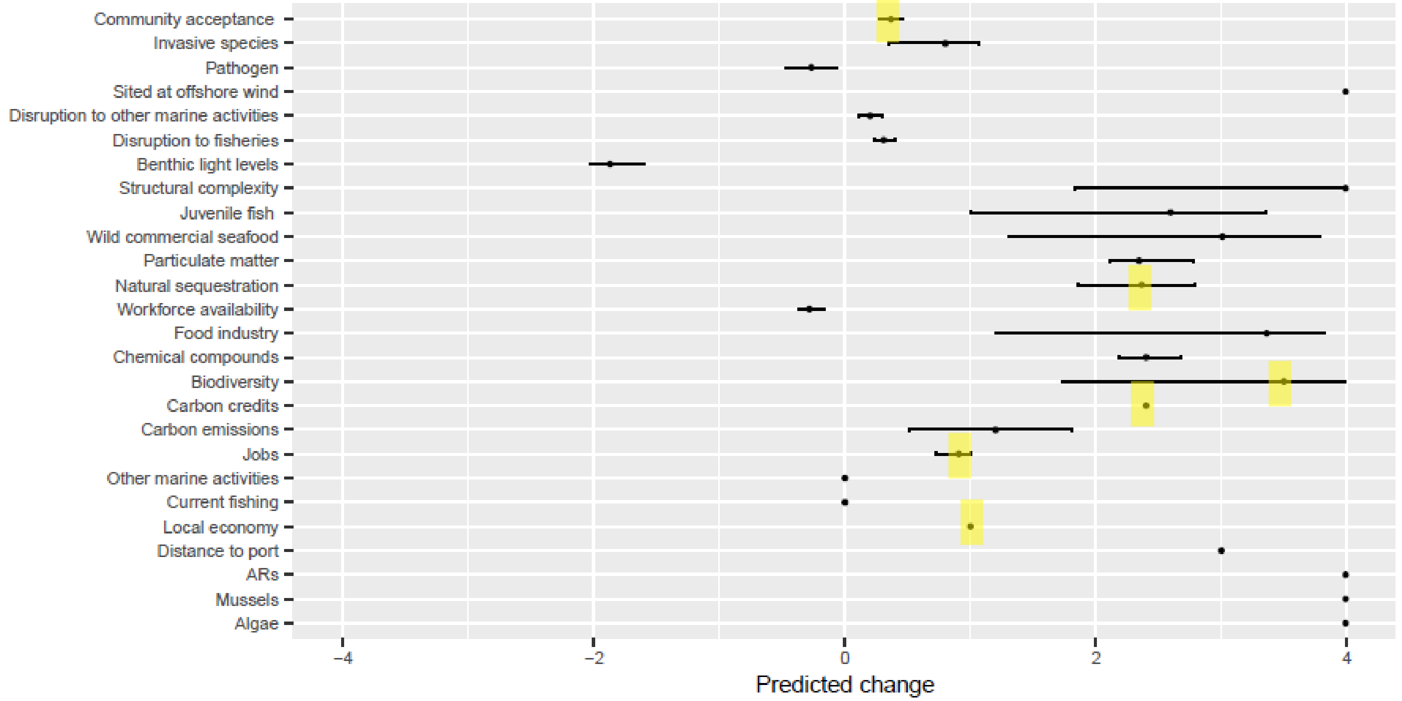


Small near shore mixed aquaculture + AR

Benefits to employment, some biodiversity Benefits and natural and semi-natural carbon sequestration

No negative perception of installation

Potential disruption to fisheries/ other sectors



Large offshore co-located mixed aquaculture +AR

Potentially large biodiversity benefits and C sequestration

Fewer jobs, as shared between multiple ports

Stafford et al. in prep

Social Resilience

- Able to adapt to change
- Accept new ideas
- Need suitable policy and economic frameworks to do this