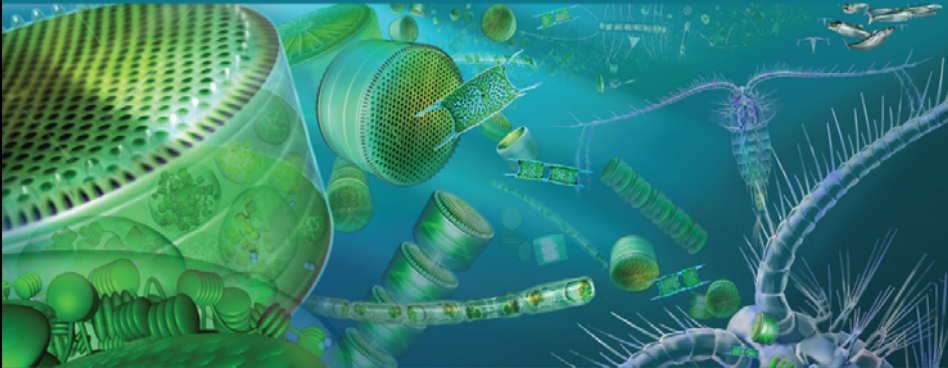



Providing the big picture
Sir Alister Hardy Foundation for Ocean Science

Monitoring the health of the oceans since 1931



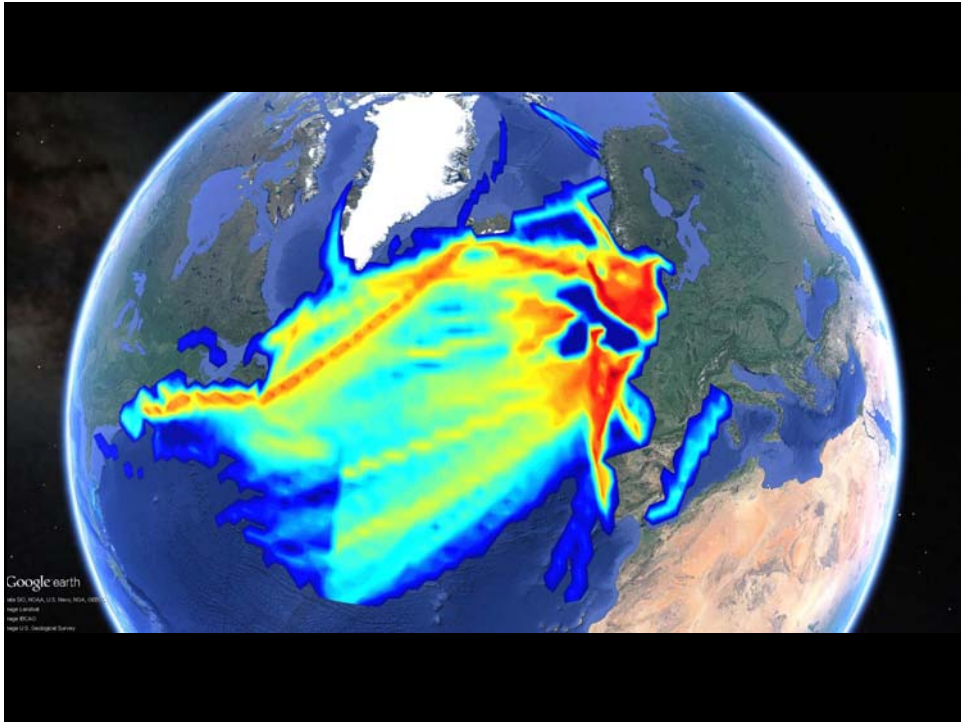
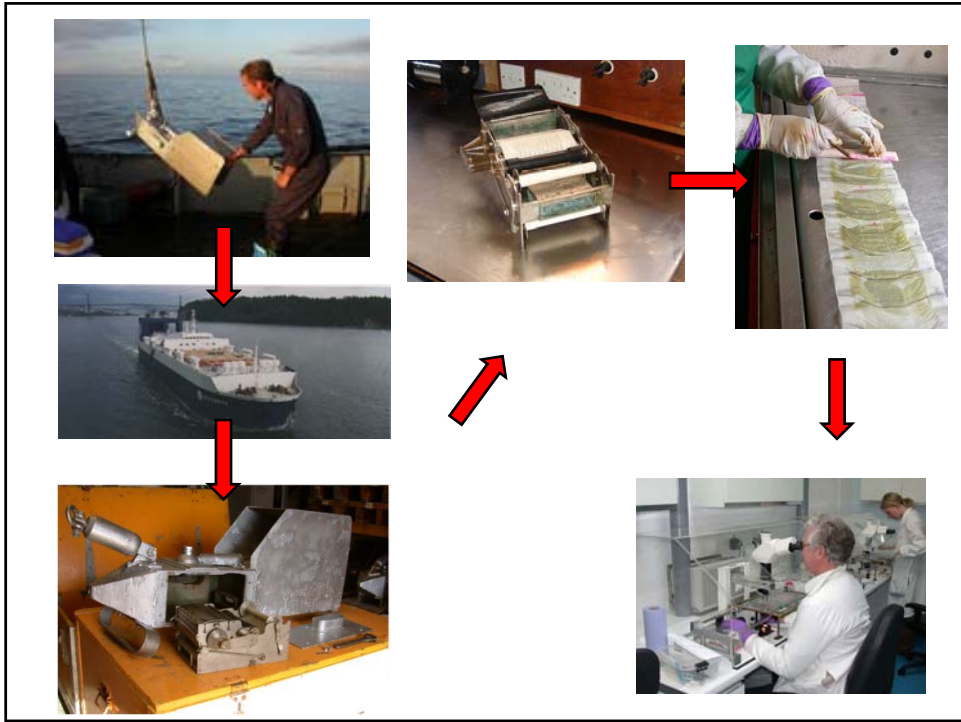
Professor Nicholas J P Owens
Director



Continuous Plankton Recorder

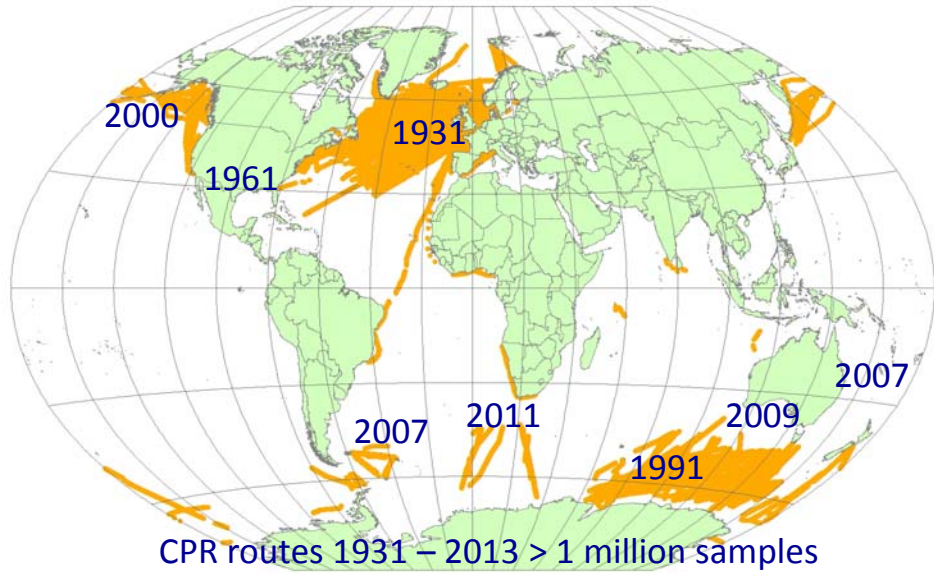
Designed by Alister Hardy in the 1920's





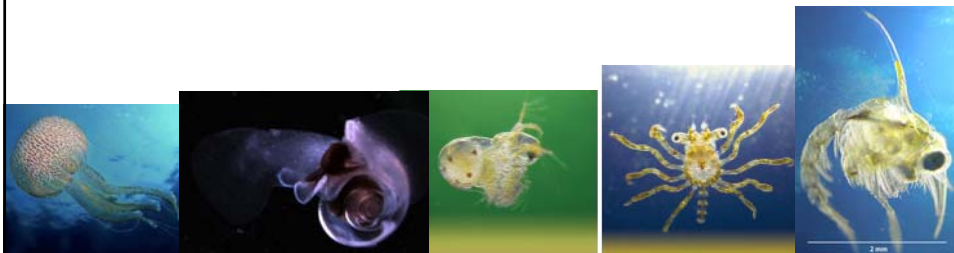


A Commonwealth of CPR Surveys



CPR research has revealed...

- Major ecosystem changes
- Climate change responses
- Links between plankton and anthropogenic pressures (nutrients, fishing, etc)
- Changes in marine food web

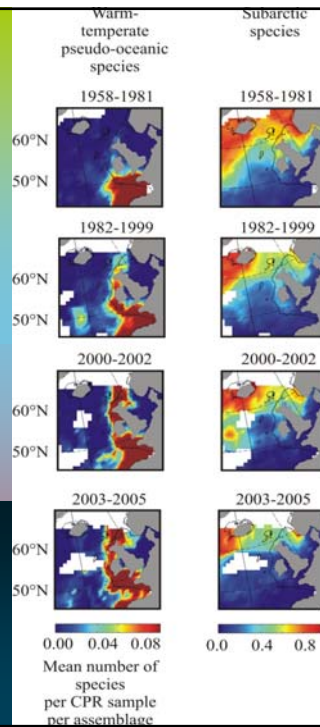


Marine Strategy Framework Directive (MSFD): Good Environmental Status (GES)



Biogeographical shifts

1000 km Northward shift!



Calanus spp

C. helgolandicus

Lipid-poor

Warm water



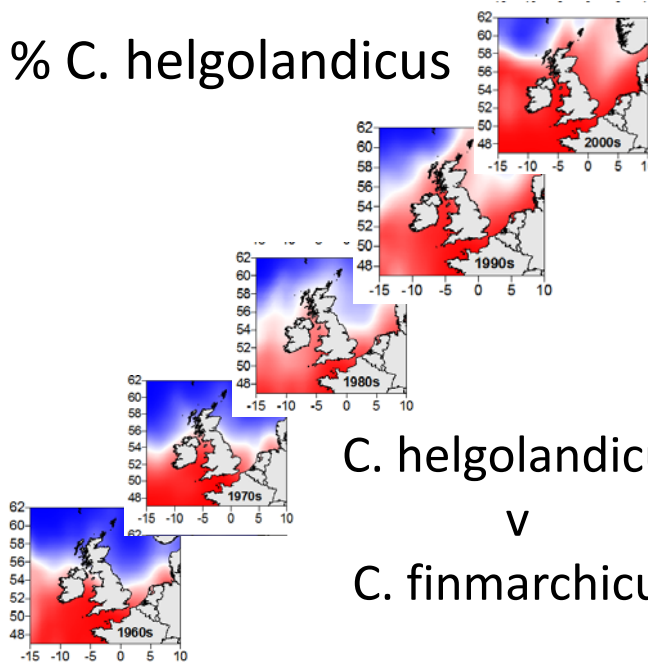
C. finmarchicus

Lipid-rich

Cold water



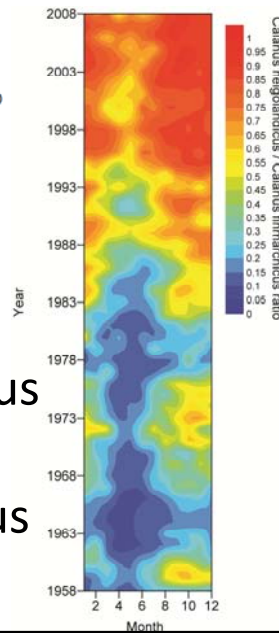
% *C. helgolandicus*

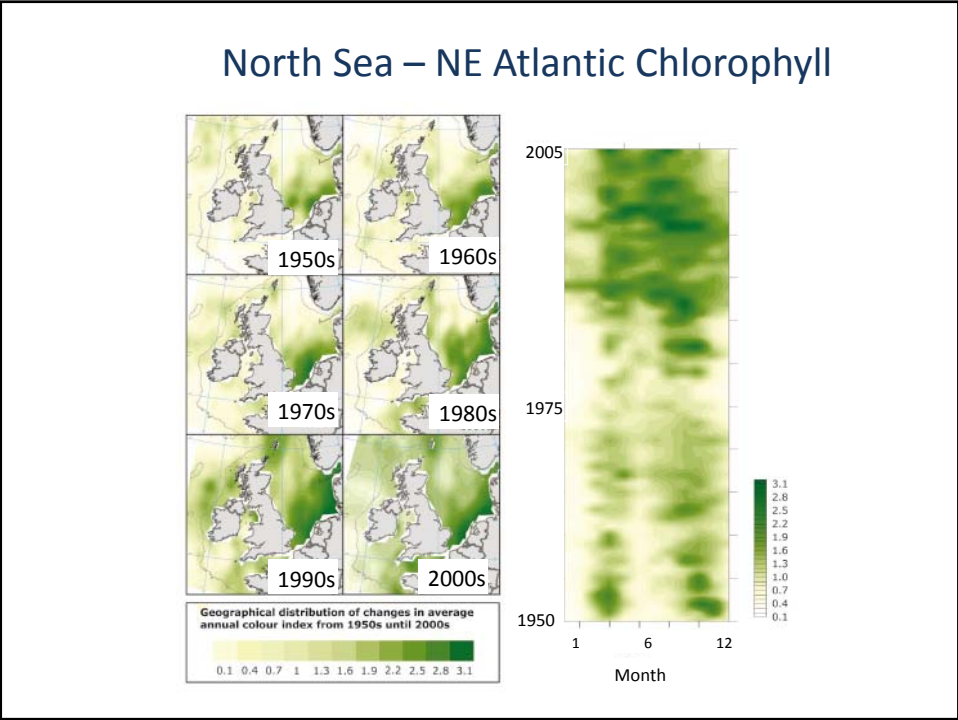
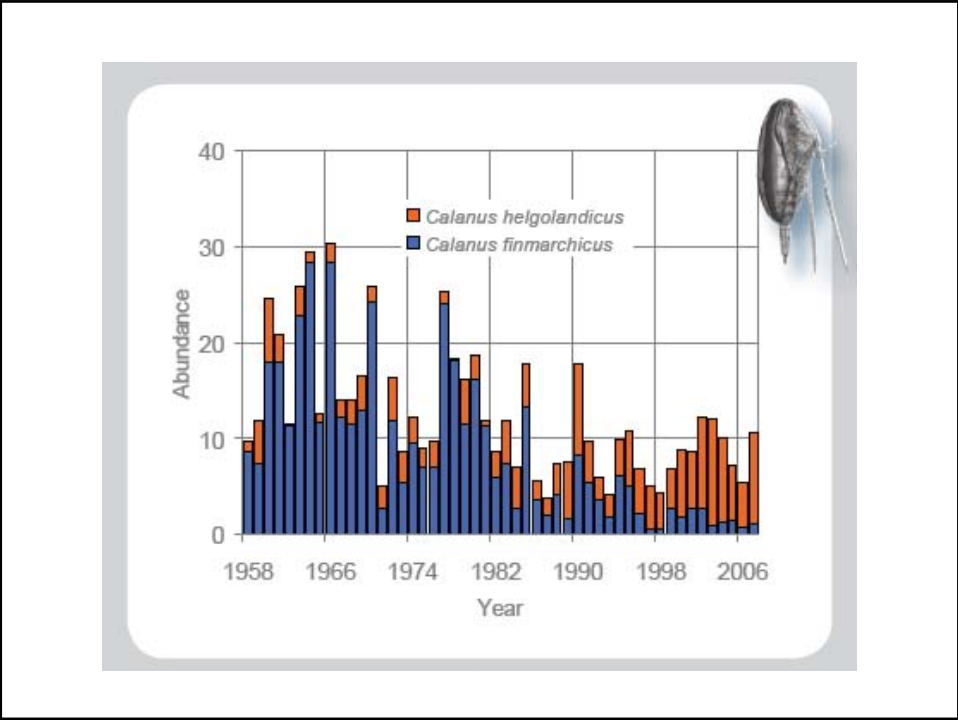


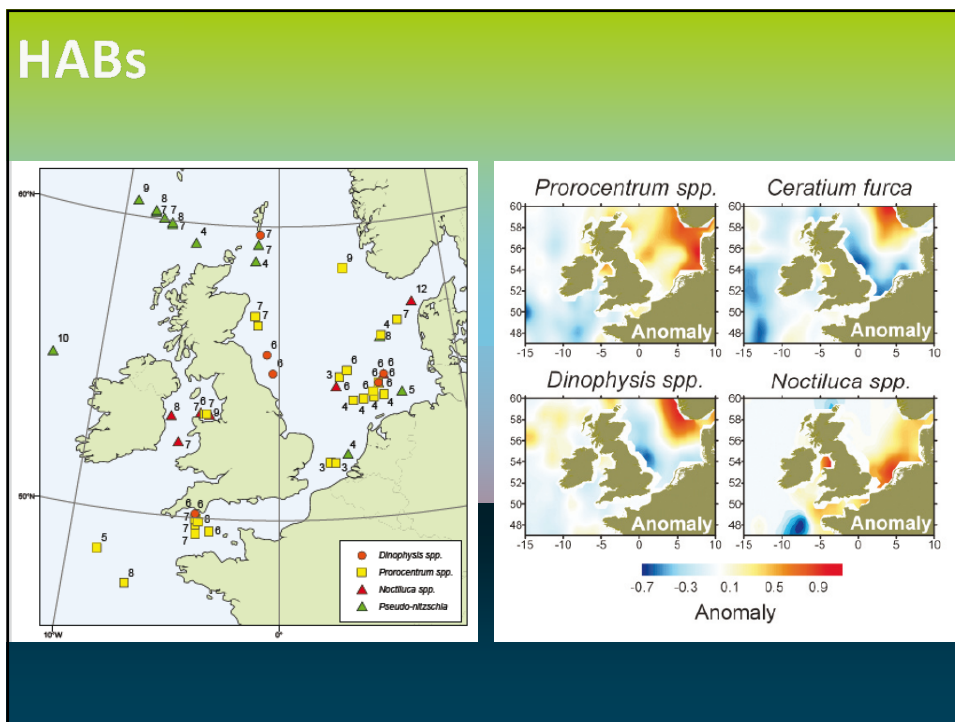
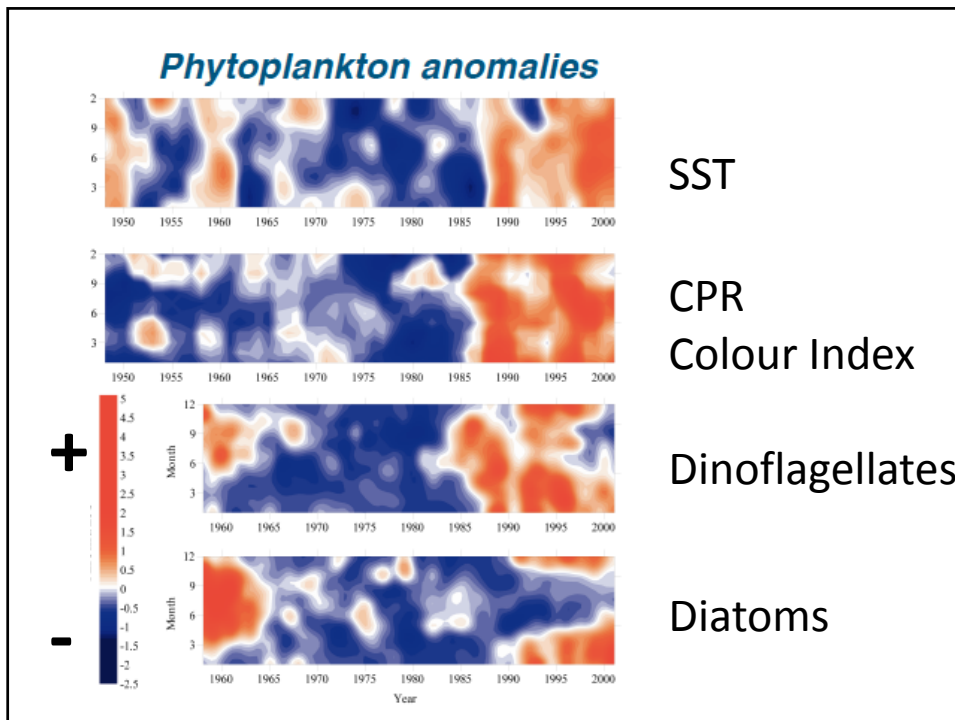
C. helgolandicus

v

C. finmarchicus



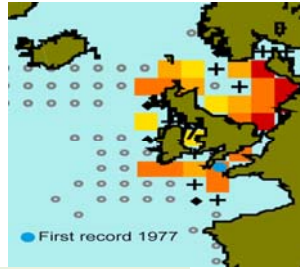
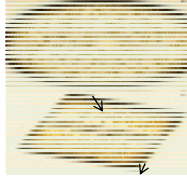




Monitoring alien species: *Coscinodiscus walesii*

Large Diatom (175µm-500µm)

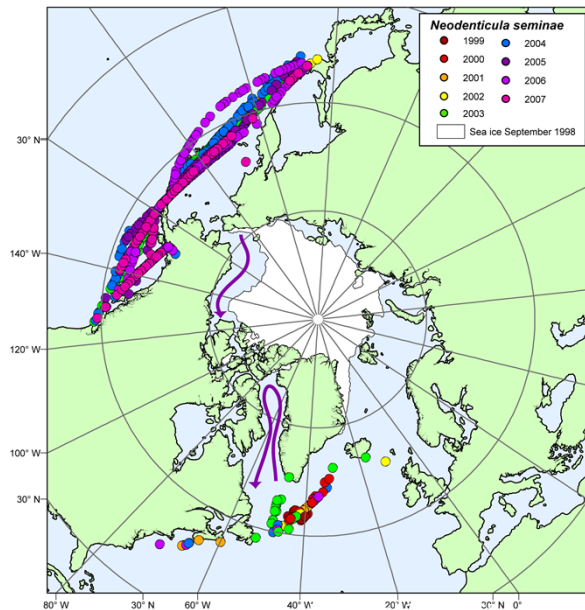
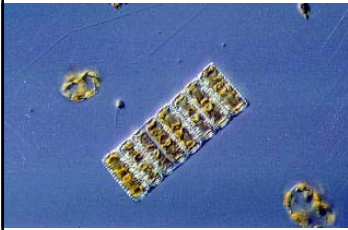
Originally recorded from coastal Pacific waters of America, Canada and Japan.

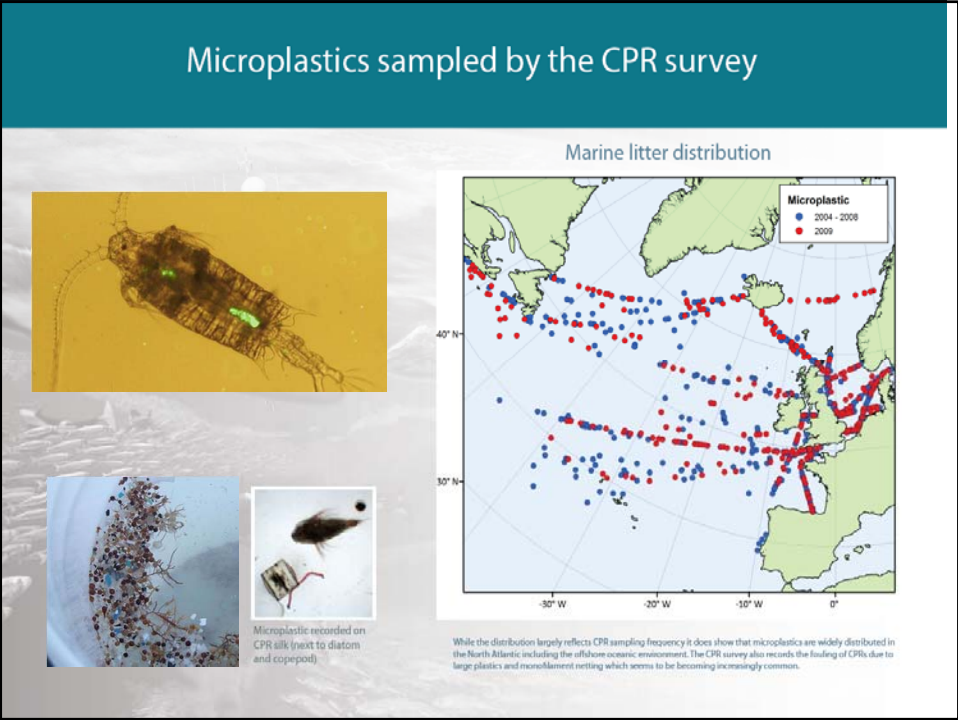
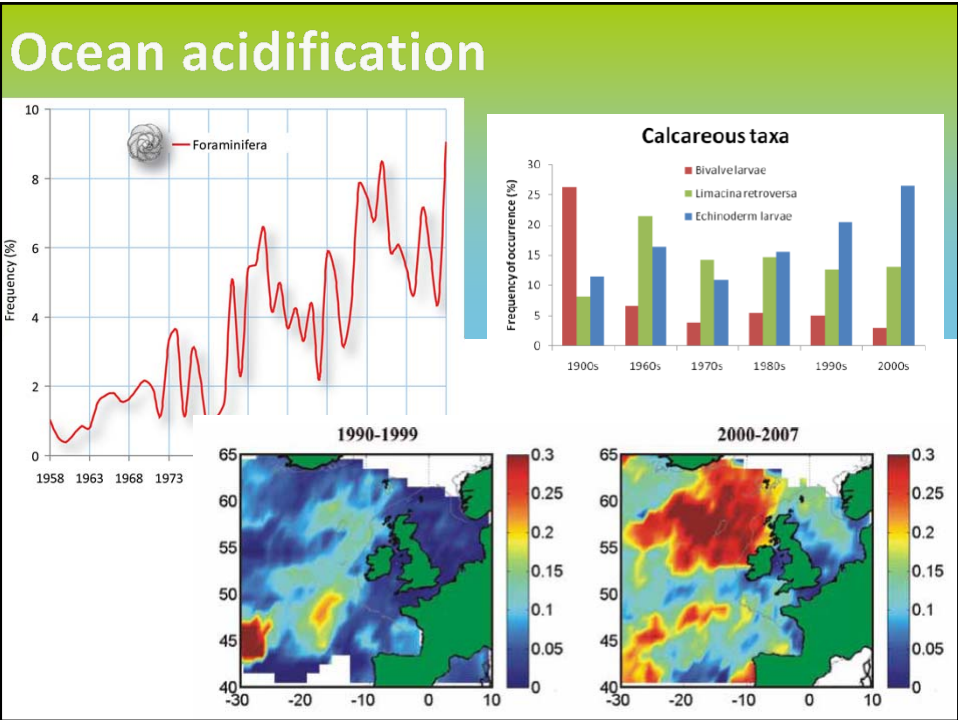


1977: First identified in the Channel, by the CPR survey.

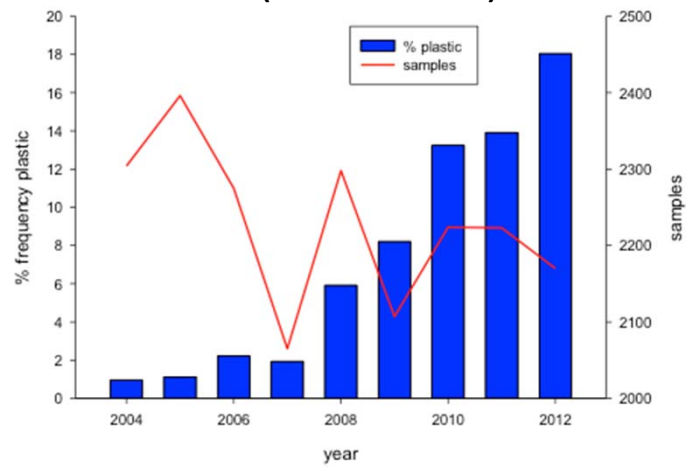
2014: Still routinely identified in CPR samples. Introduction likely a consequence of ballast water transportation.

Pacific diatom *Neodenticula seminae*





Frequency of plastics in CPR samples (NE Atlantic)



Where to next?

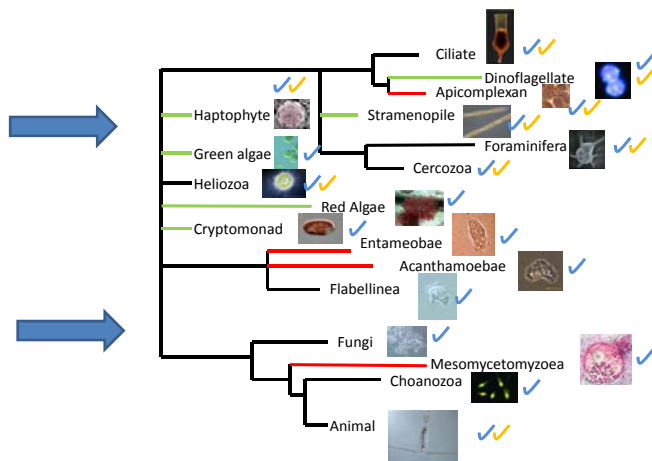
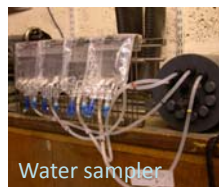
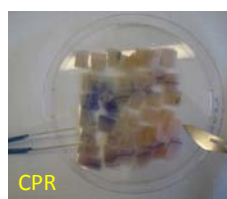


Water and Microplankton Sampler (WaMS).

Aimed at smaller size-fraction (nano and pico) plankton community.
Flow cytometry, Molecular probes and barcoding, Harmful Algal Bloom microarrays



Molecular species identification

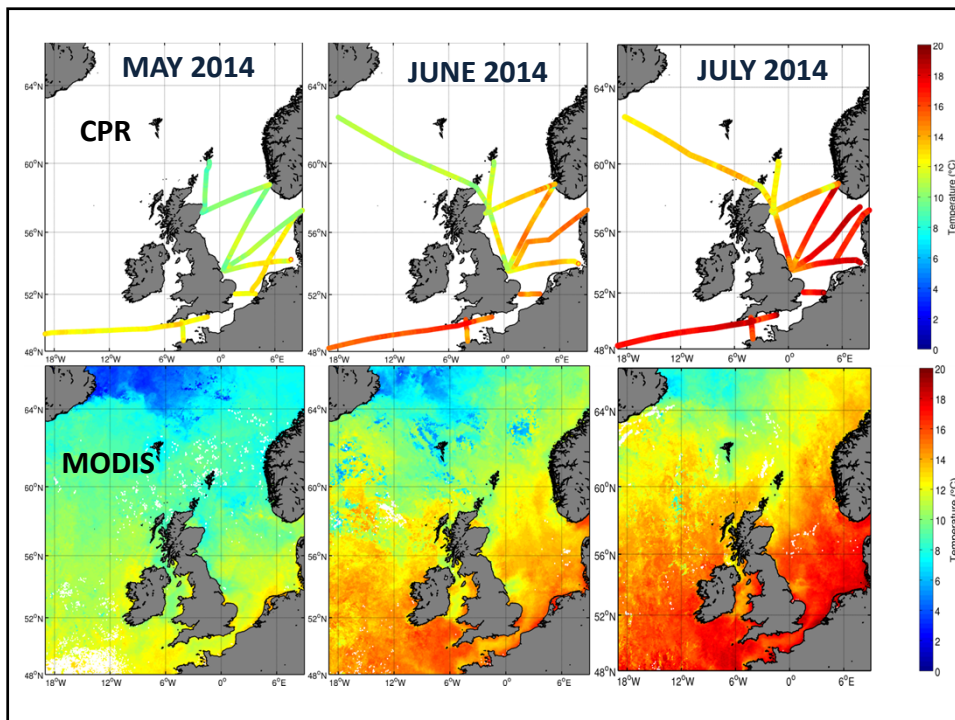
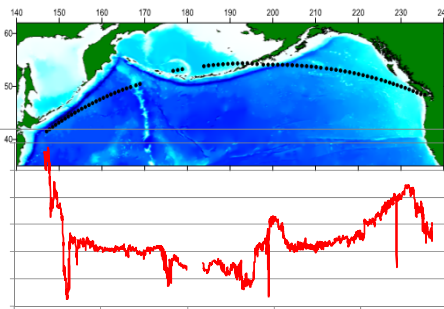
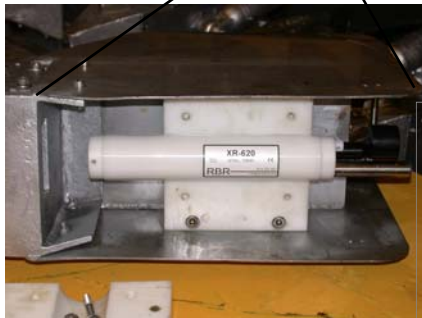
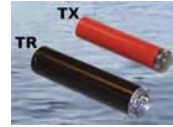


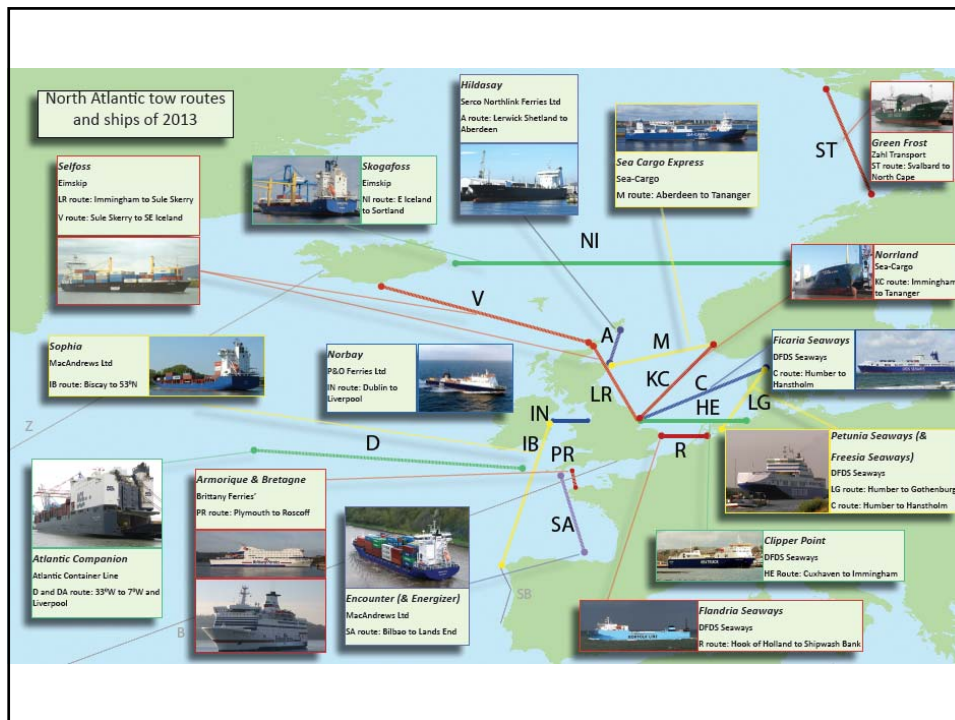
— Photosynthetic ✓ CPR: biodiversity (morphology)
— Parasitic ✓ Water sampler (molecular)

The CPR as a platform – adding instrumentation

Temperature loggers (most basic)

CTD-F (more expensive)





Continuous Plankton Recorder Conclusions and Questions

- Regional (EU – wide), consistent biological assessment tool.
 - Excellent for MSFD – capable of integration.
 - Duration – resolving anthropogenic v climate.
- BUT
- How to support it?
 - No EU support other than UK (Norway).
 - Tension between open access and reality.

Thank You

