

Status of pelagic habitats in Scottish coastal waters: an application of the UK plankton index (PI)



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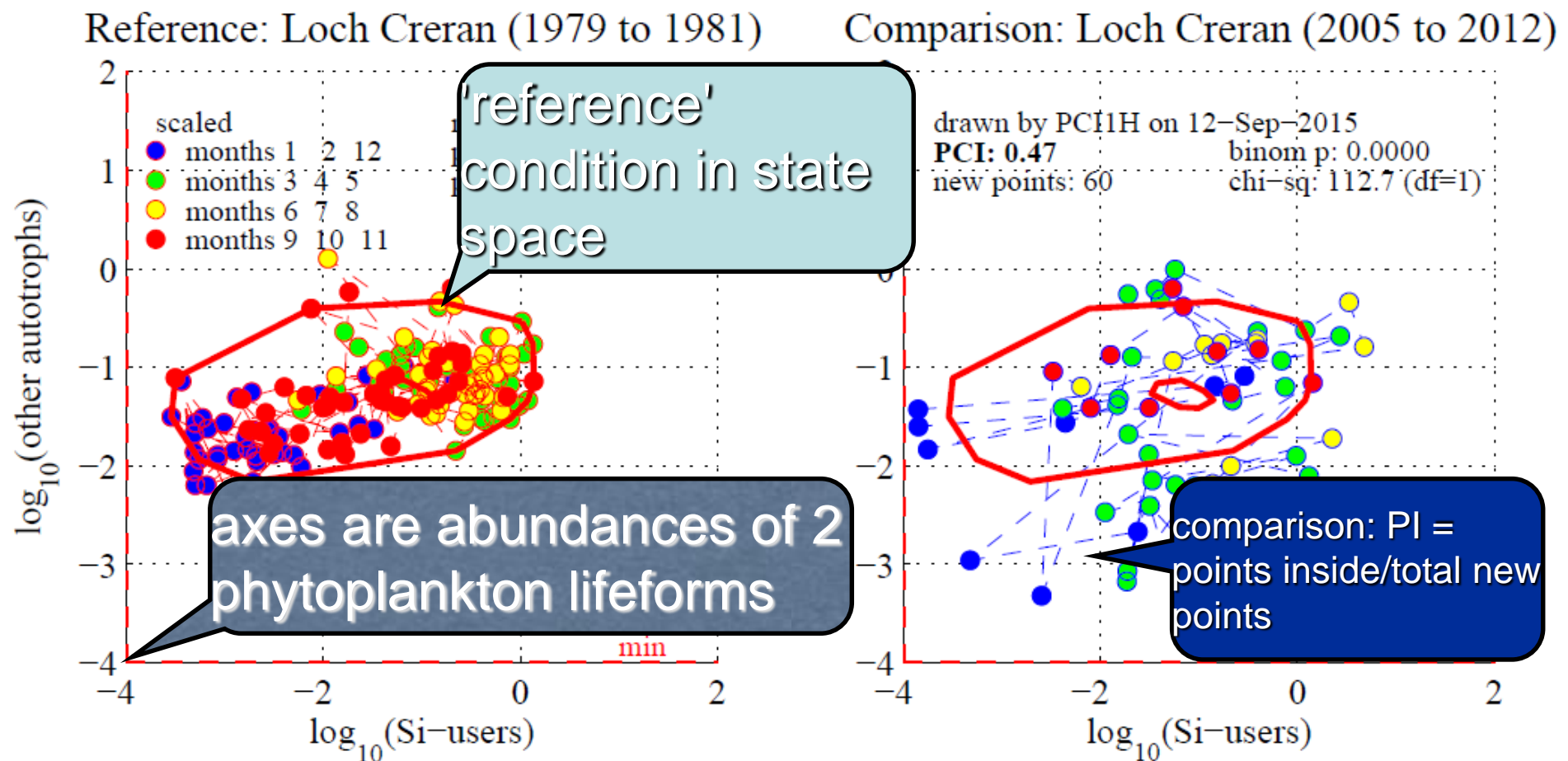
And Paul Tett (SAMS)

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UK Plankton Index- Background

- No single species of the plankton represents the plankton as a whole
- A species important in one region, or under one set of conditions, may be rare in another region
- A healthy ecosystem needs to have ‘adequate functional diversity’ (Tett et al. 2013)
- Assigning groups of species to plankton life forms summarises large amounts of information without losing seasonal fluctuations
- Seasonal cycles are part of the structure of the pelagic community (Tett et al. 2008)
- The Plankton Index - a method or tool based on the ideas of State Space and Life Forms

The Plankton Index - a method or tool based on the ideas of *State Space* and *Life Forms*

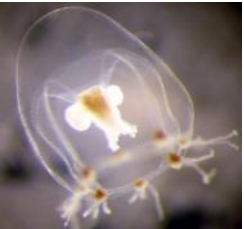


Lifeform pairs

- **D1 Biodiversity**

Diatoms & Dinoflagellates

Gelatinous zooplankton & Ichthyoplankton



Crustacean holoplankton & Other holoplankton



- **D5 Eutrophication**

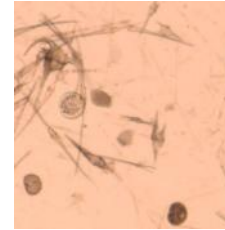
Diatoms & Dinoflagellates

Ciliates & Microflagellates

Potentially toxin producing diatoms &
Toxin producing dinoflagellates

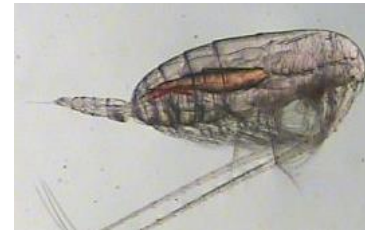
- **D4 Foodwebs**

Phytoplankton & Zooplankton



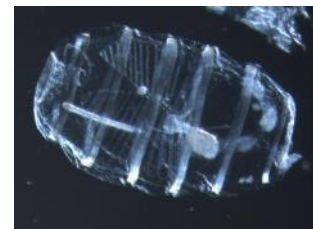
Large phytoplankton & Small phytoplankton

Large copepods & Small copepods



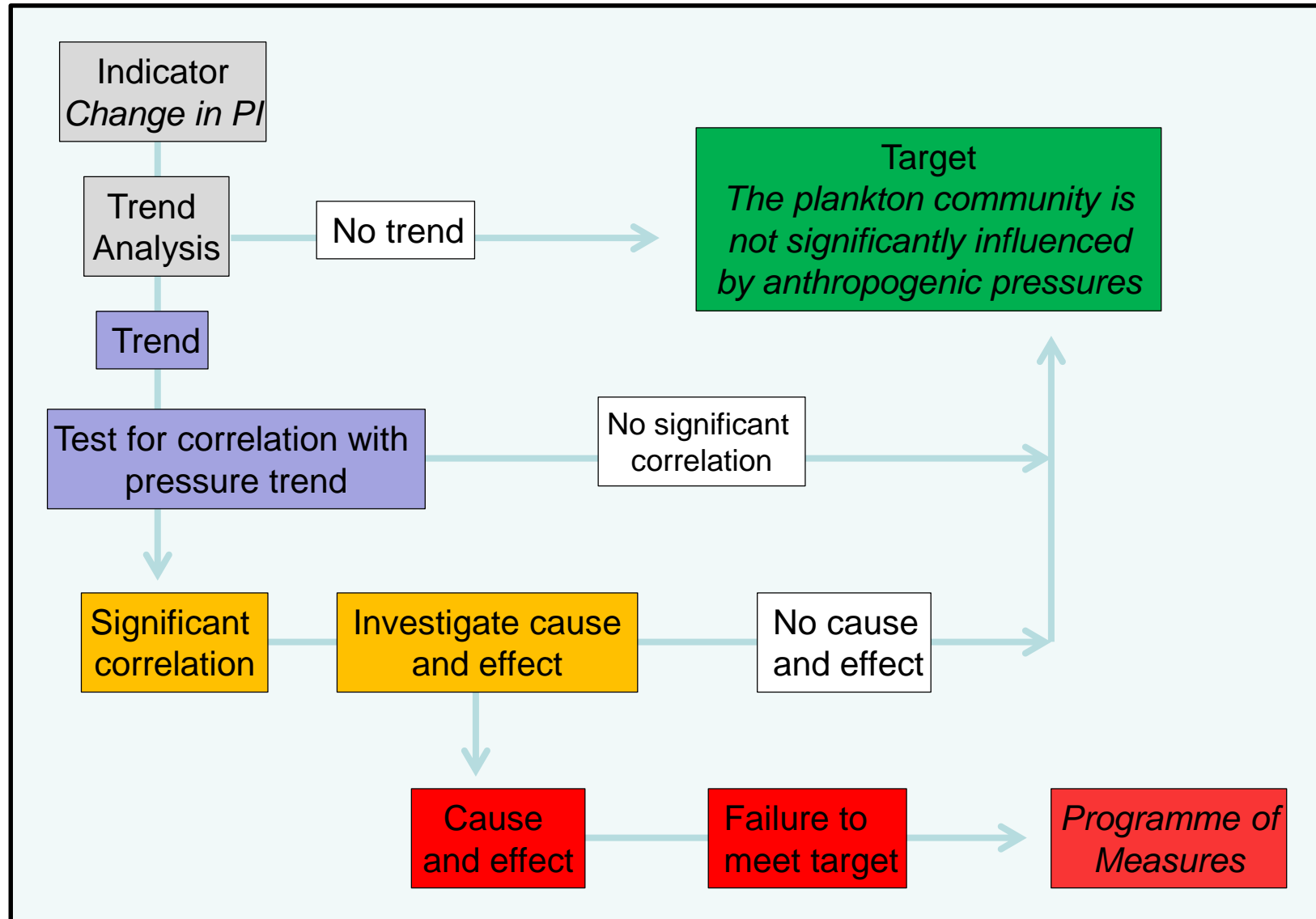
- **D6 Seafloor integrity**

Holoplankton & Meroplankton

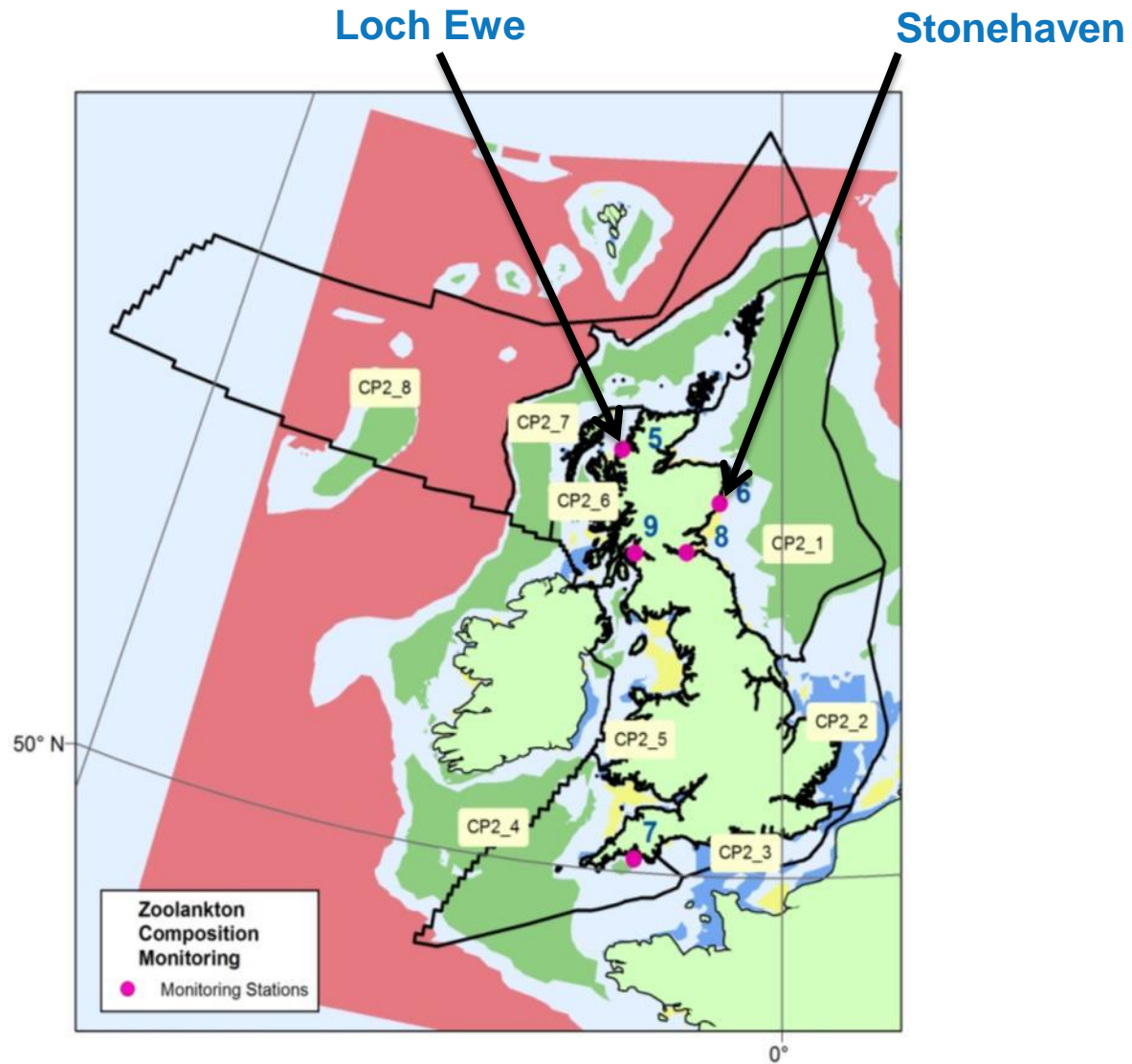


Pelagic diatoms & Tychoipelagic diatoms

Assessment process



Sampling

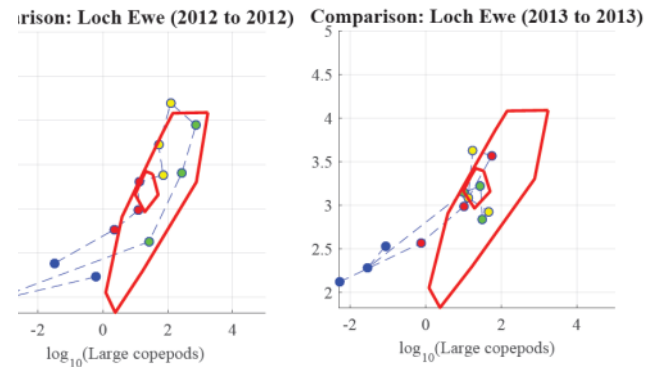
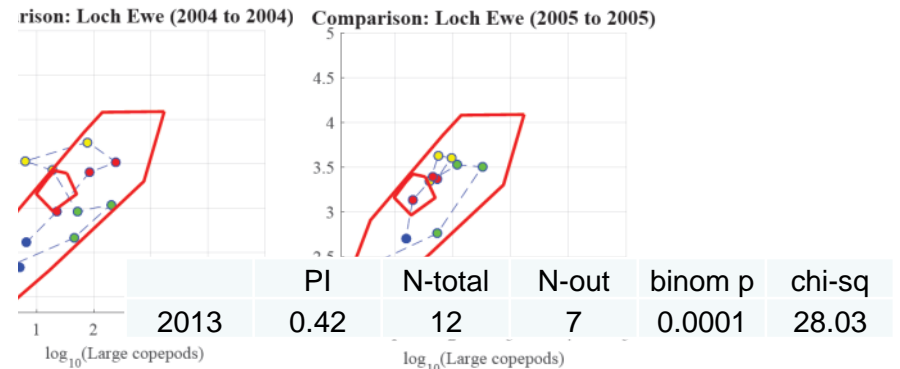
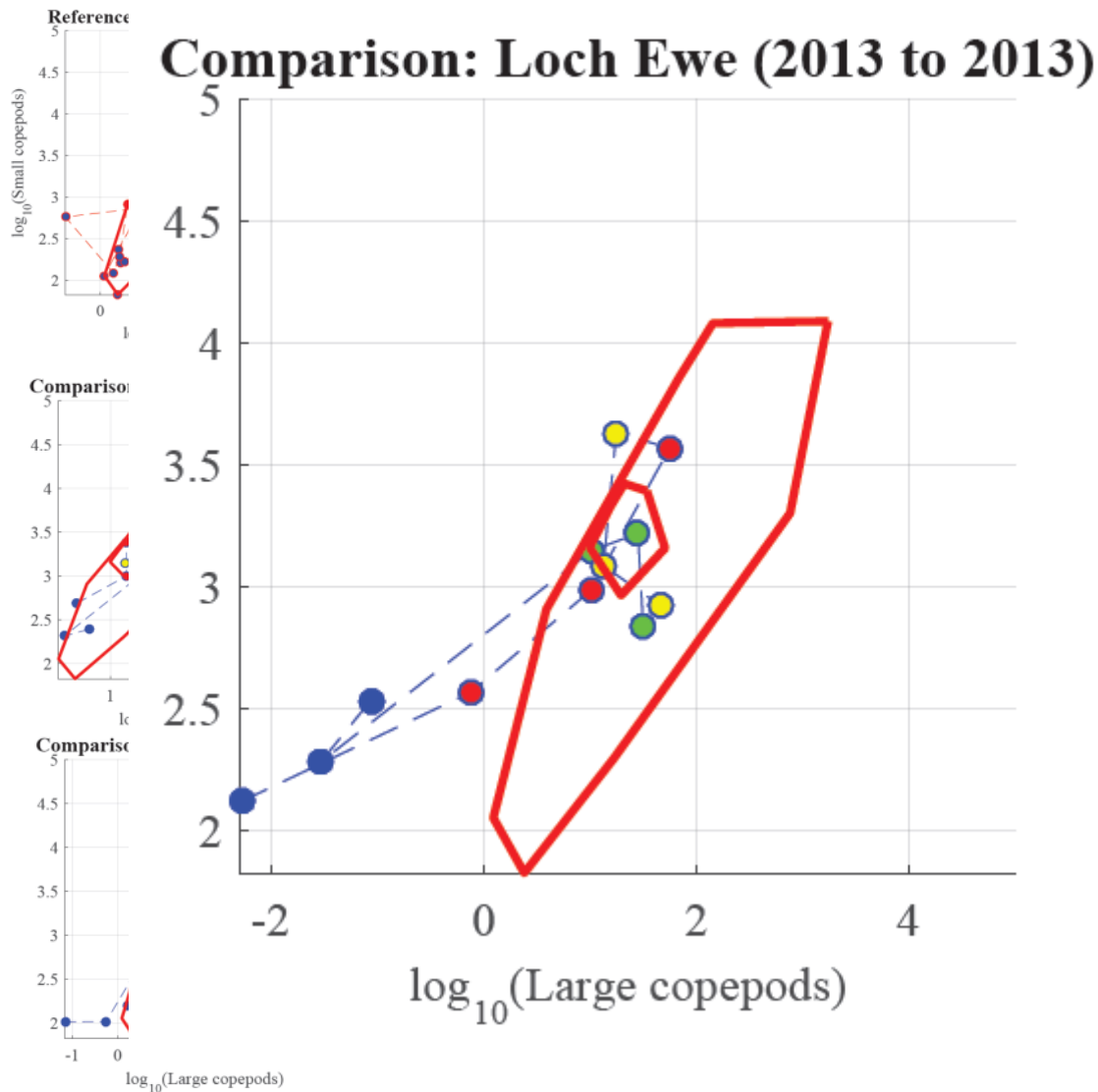


State space plots- Example

Loch Ewe

- D4 Foodwebs

Large copepods & Small copepods

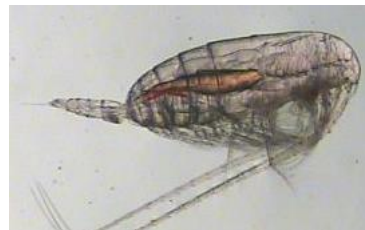
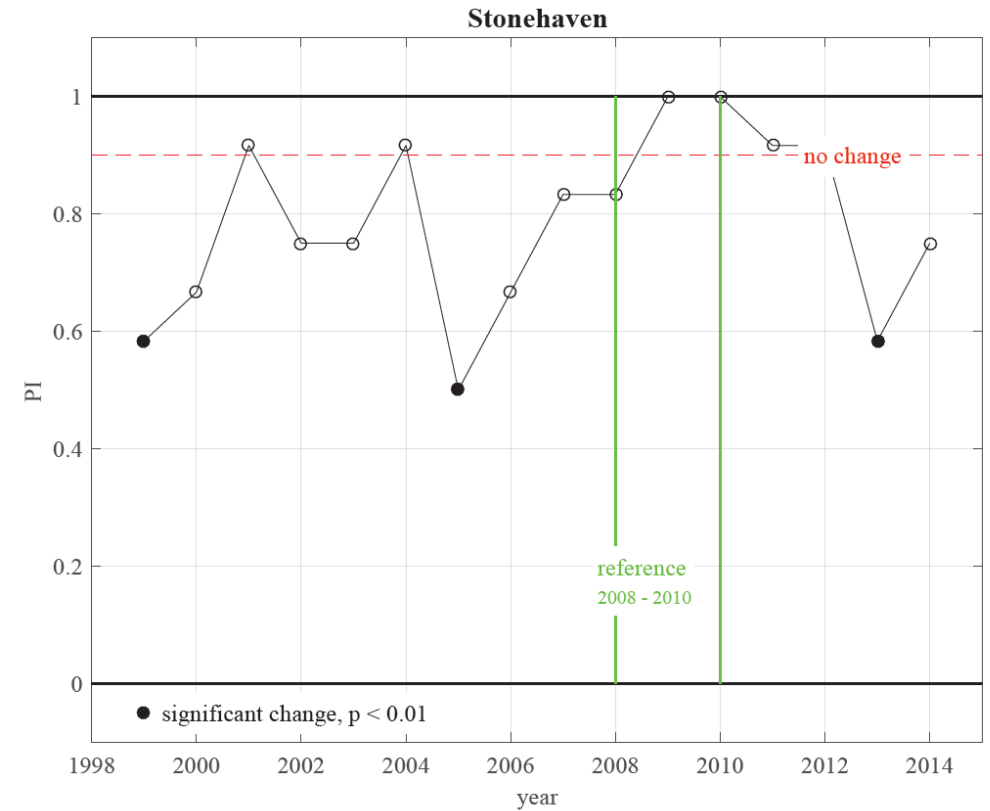
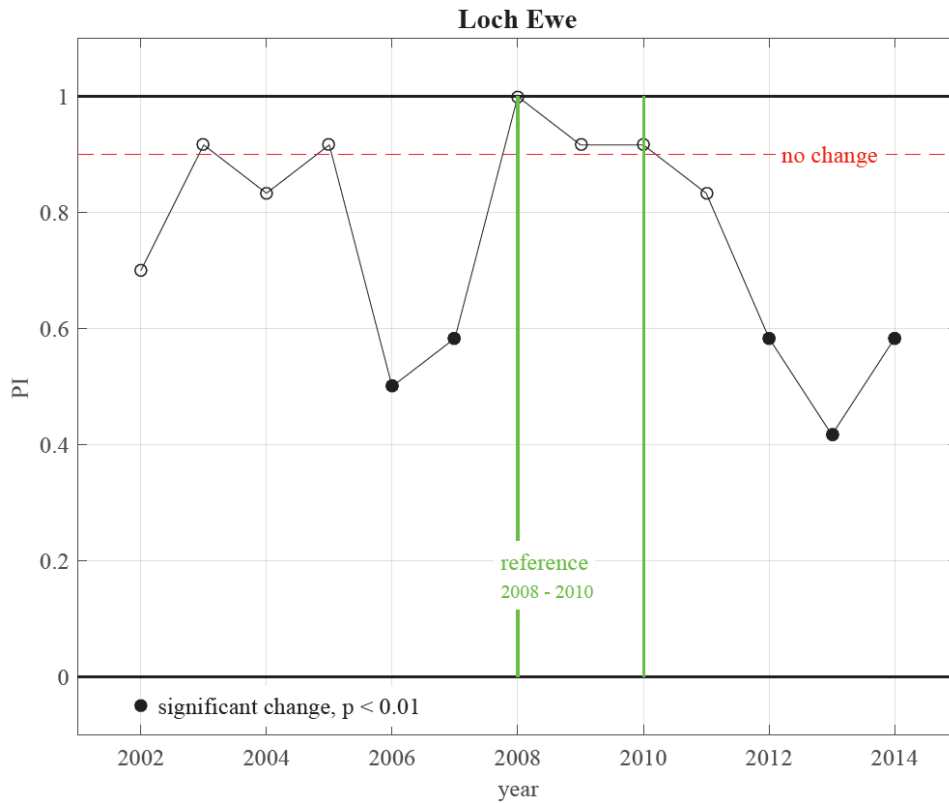


- Winter
- Spring
- Summer
- Autumn

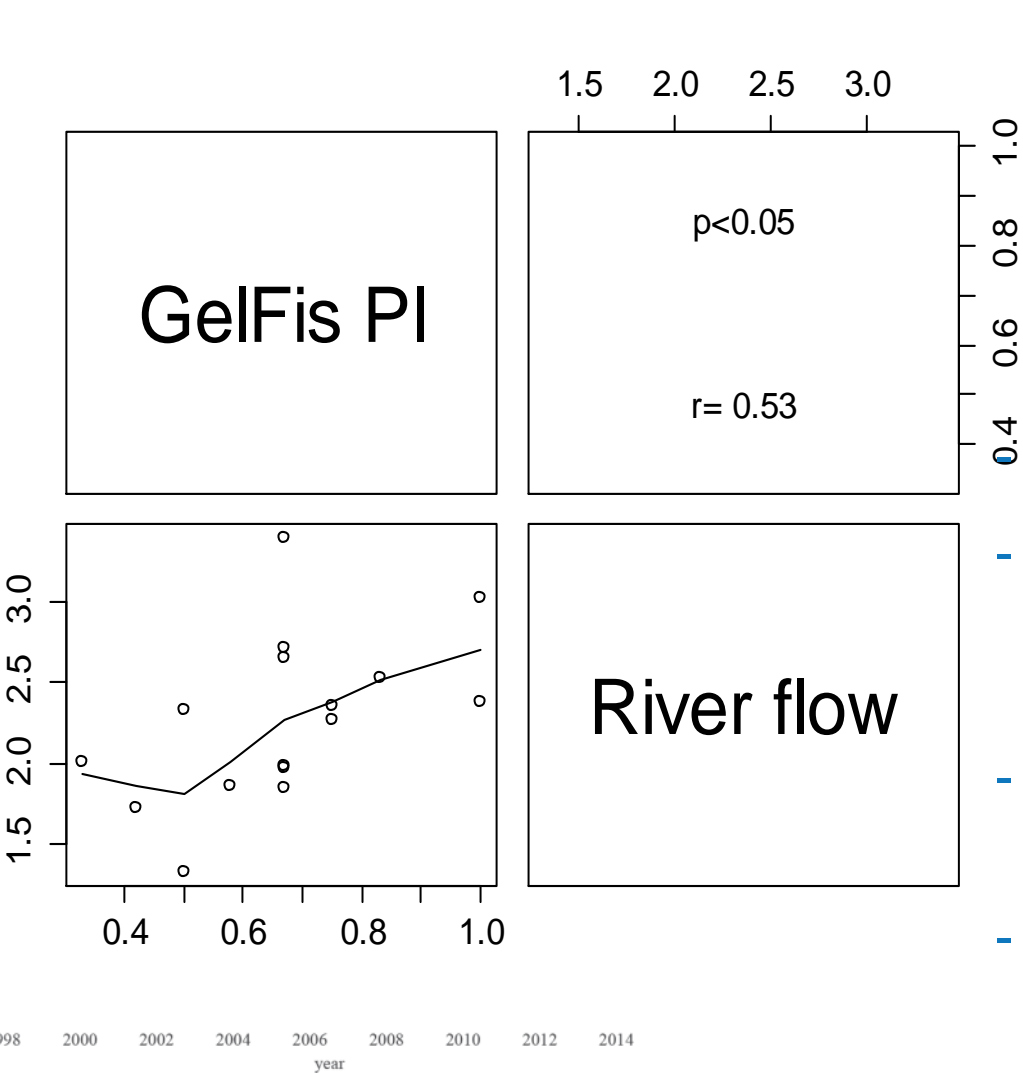
PI Trends- Example

- D4 Foodwebs

Large copepods & Small copepods



Trend Analysis

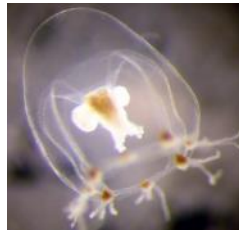


0.57
0.07
0.62
0.49
0.73
0.49
0.29
0.23
0.17
0.96

Winter NAO

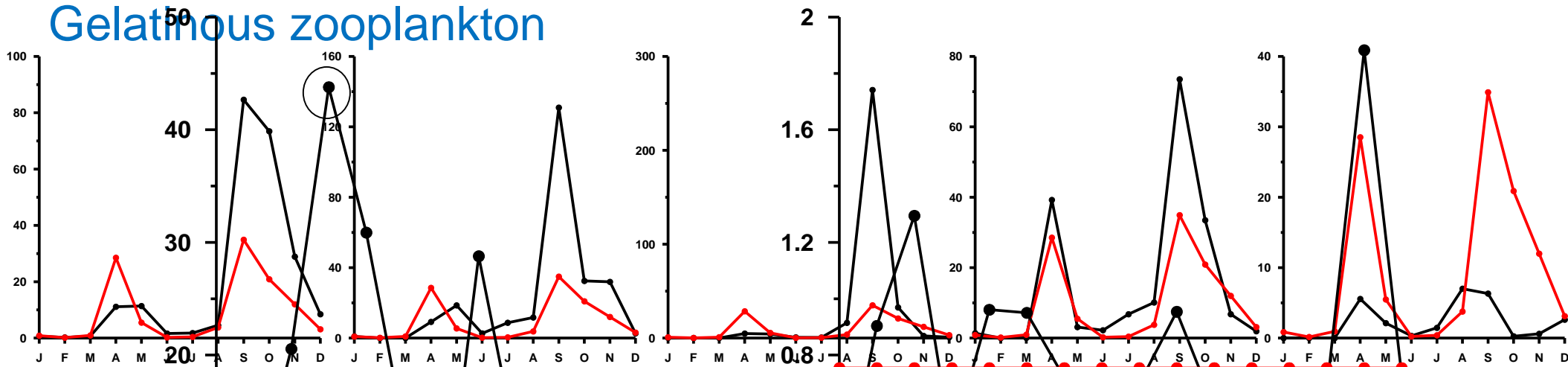
- North Sea Inflow
 - Fair Isle Current T & S anomalies
- Fishing
 - Total catch from ICES IVb
- River flow
 - Bervie
- Local T, S, DIN

What are the changes?

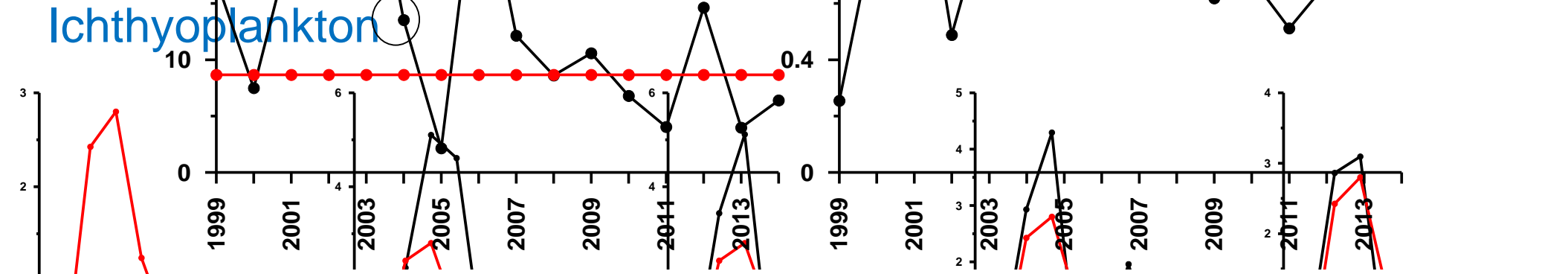


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Gelatinous zooplankton

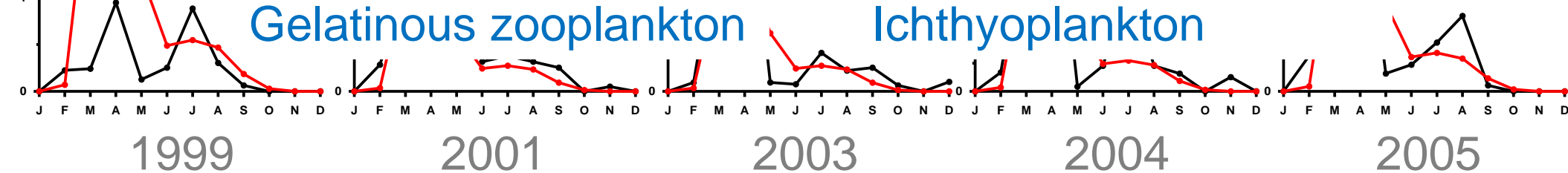


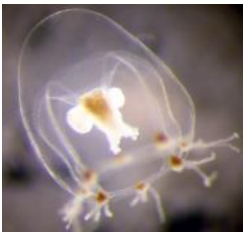
Ichthyoplankton



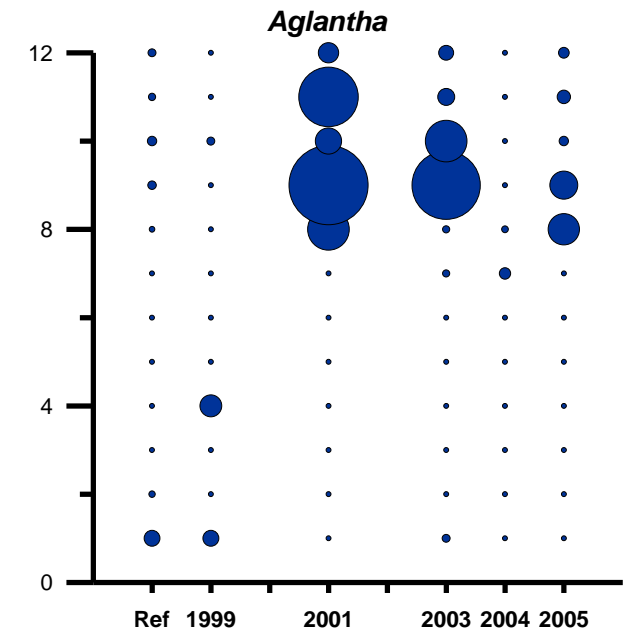
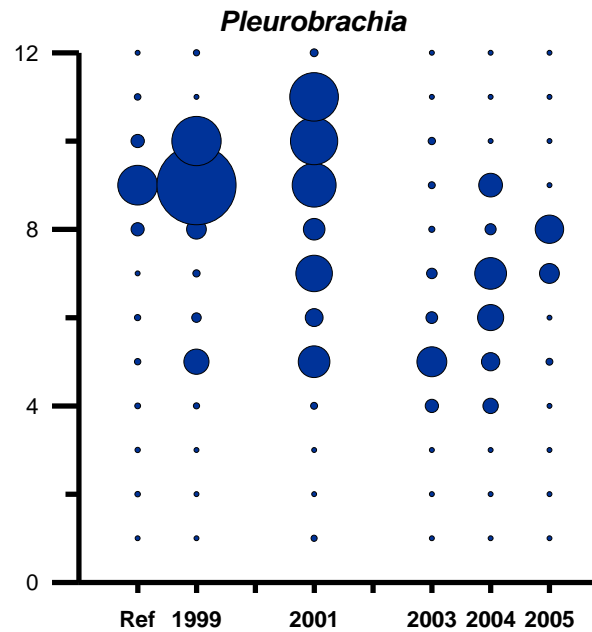
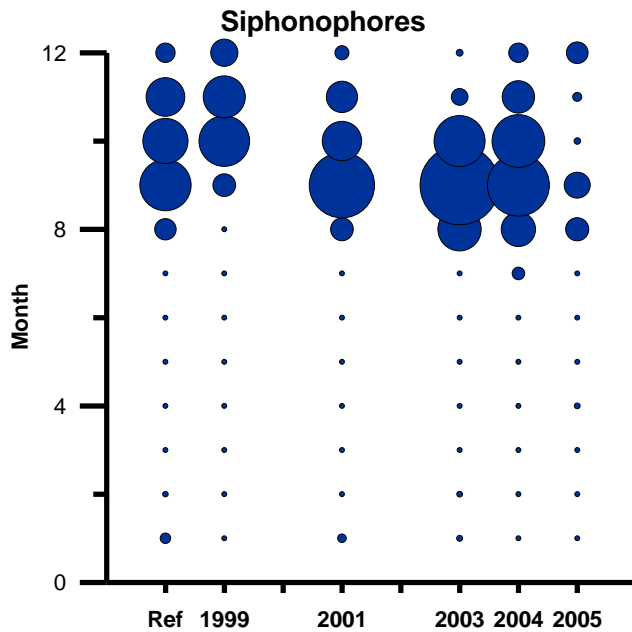
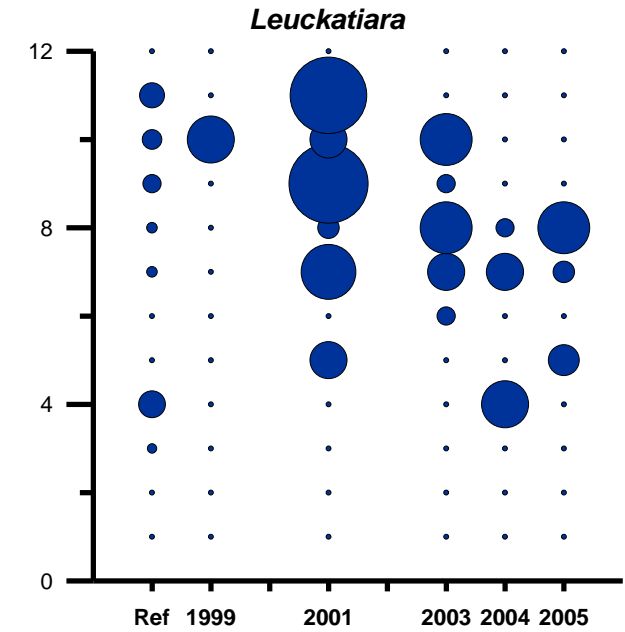
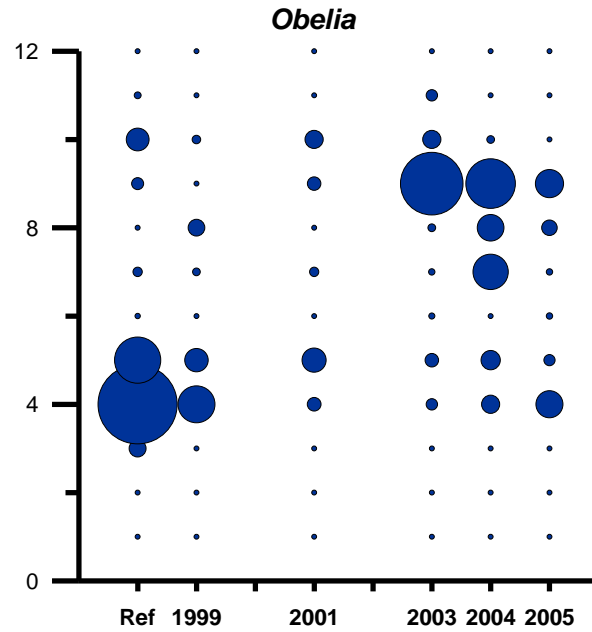
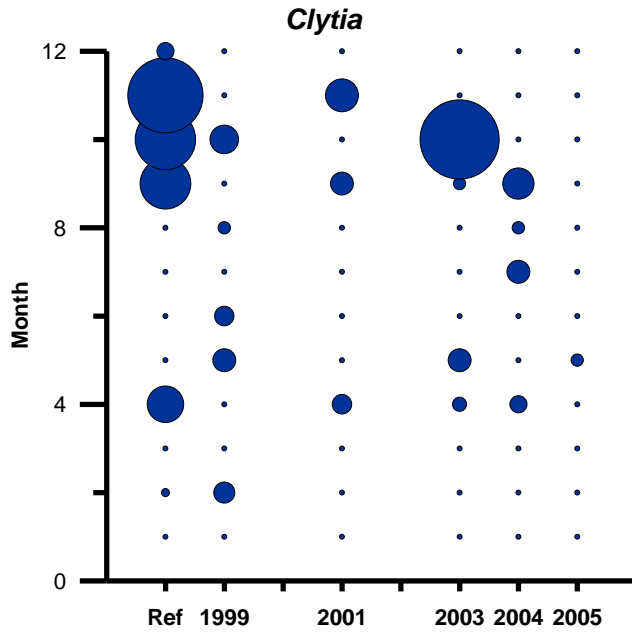
Gelatinous zooplankton

Ichthyoplankton





What are the changes?



Summary

- **The zooplankton at Stonehaven and Loch Ewe would be classed as GES using this method**
 - The phytoplankton life forms are still to be assessed
 - Trend analysis and pressures used needs more work
- **Changes in PI reflect real changes in seasonal cycles in the life forms and species**
- **Future work is needed to determine whether the most appropriate life forms were selected.**



Acknowledgments

- **All samplers and analysts that have worked on the MSS monitoring programmes over the years**
- **Members of the HBDSEG Pelagic Habitats subgroup**
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