

Marine Science

Bill Turrell



marinescotland
science

Aims of the Talk

Part 1

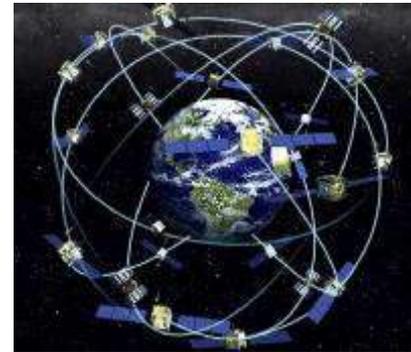
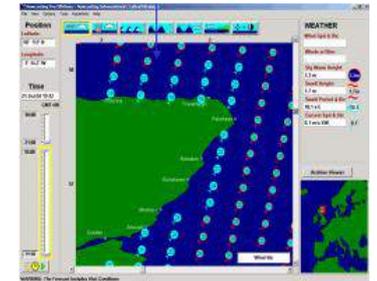
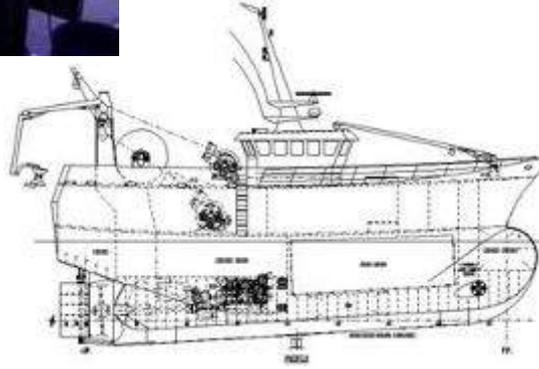
- **Briefly introduce marine science and marine scientists**
- **Explain how science, management and fishing fit together**

Part 2

- **Introduce the biological cycle in the sea**

Part 3

- **Introduce oceanography and what it can tell us about our seas**



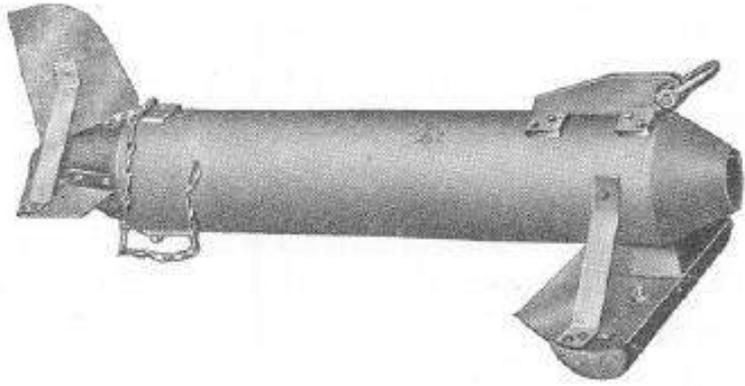


FIG. 4.—The Plankton Indicator.

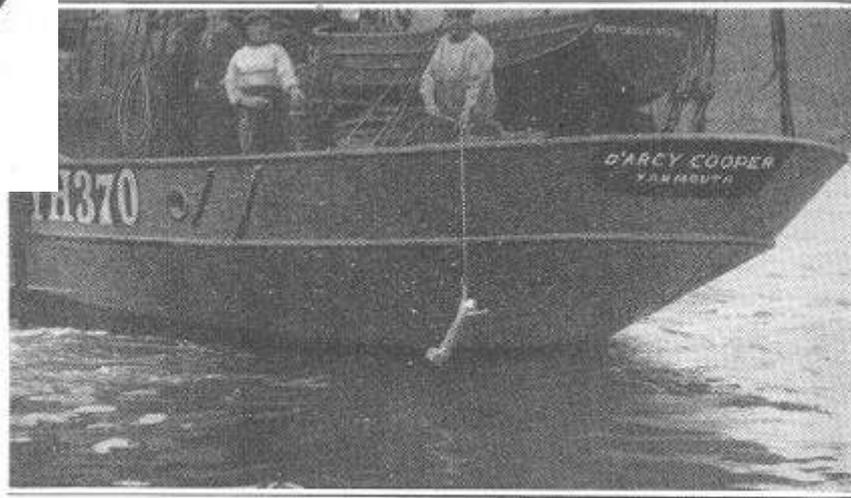


FIG. 6.—The Plankton Indicator in use on a drifter.

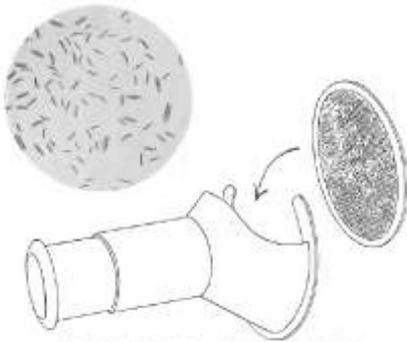
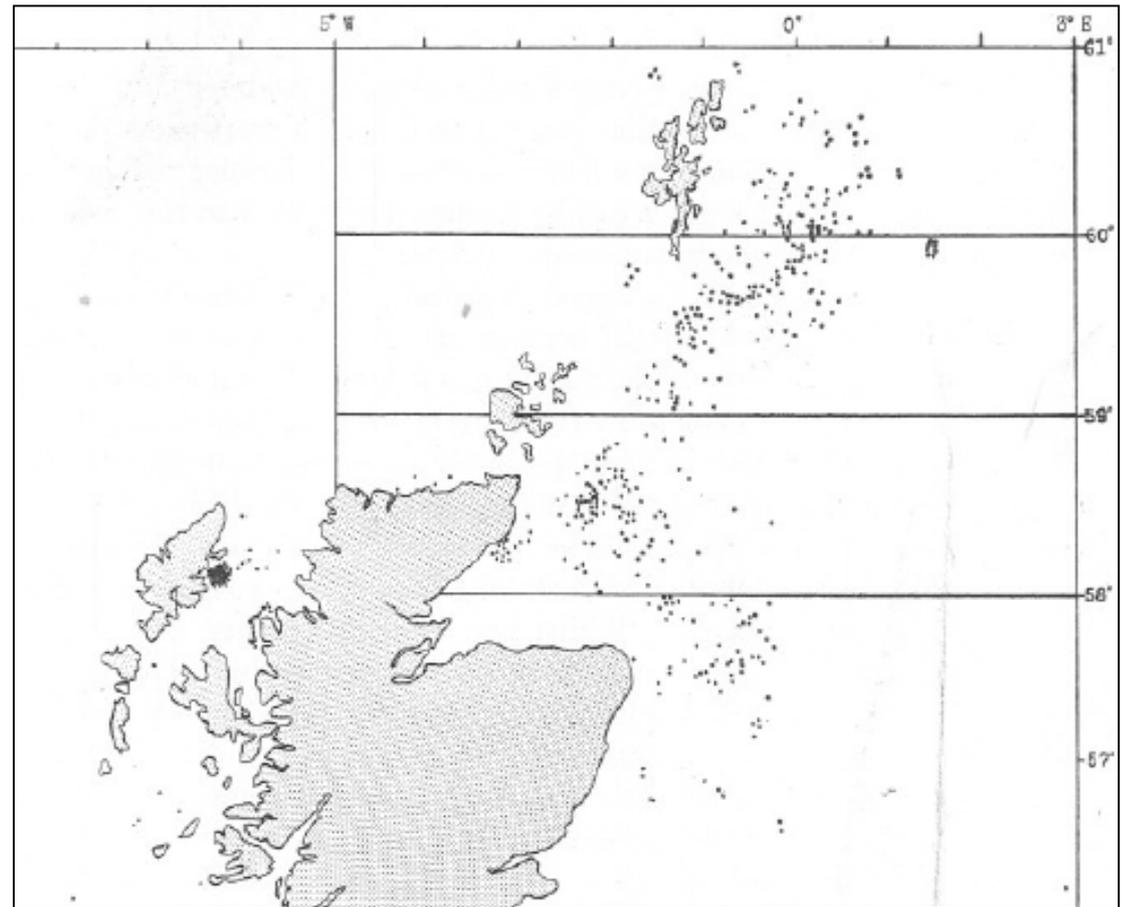
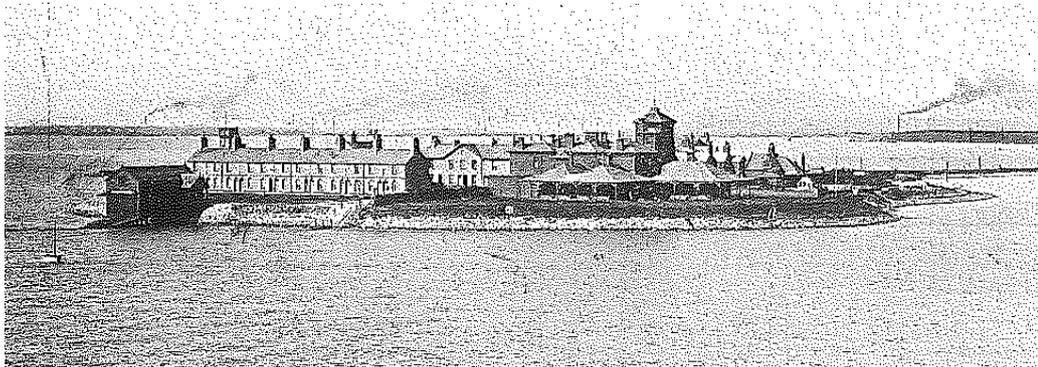


FIG. 5.—The box holder used for examining the net for Galanus inflections.





be used as an aid to fishing. The fisherman, having learnt to distinguish the differences in the appearance of the discs, would, by frequently sampling the water, be guided away from unprofitable water and into that in which he would be more likely to catch fish.



SYLLABUS

OF THE

Lessons on Marine Biology and Navigation

FOR FISHERMEN

GIVEN AT THE

Marine Laboratory, Piel, Barrow-in-Furness

BY THE

Lancashire and Western Sea-Fisheries
Joint-Committee

—
THIRD EDITION
REVISED, FEBRUARY, 1914
—

LIVERPOOL:
C. TINLING & CO., LTD., PRINTERS, 53 VICTORIA STREET

1914

Mathematicians



Engineers



Biologists



Physicists



Chemists





NGO



Can lobby, can have an agenda
Can be selective, subjective
Can challenge Government

Academic



Can have an agenda
Should be objective, up to a point
Can challenge Government

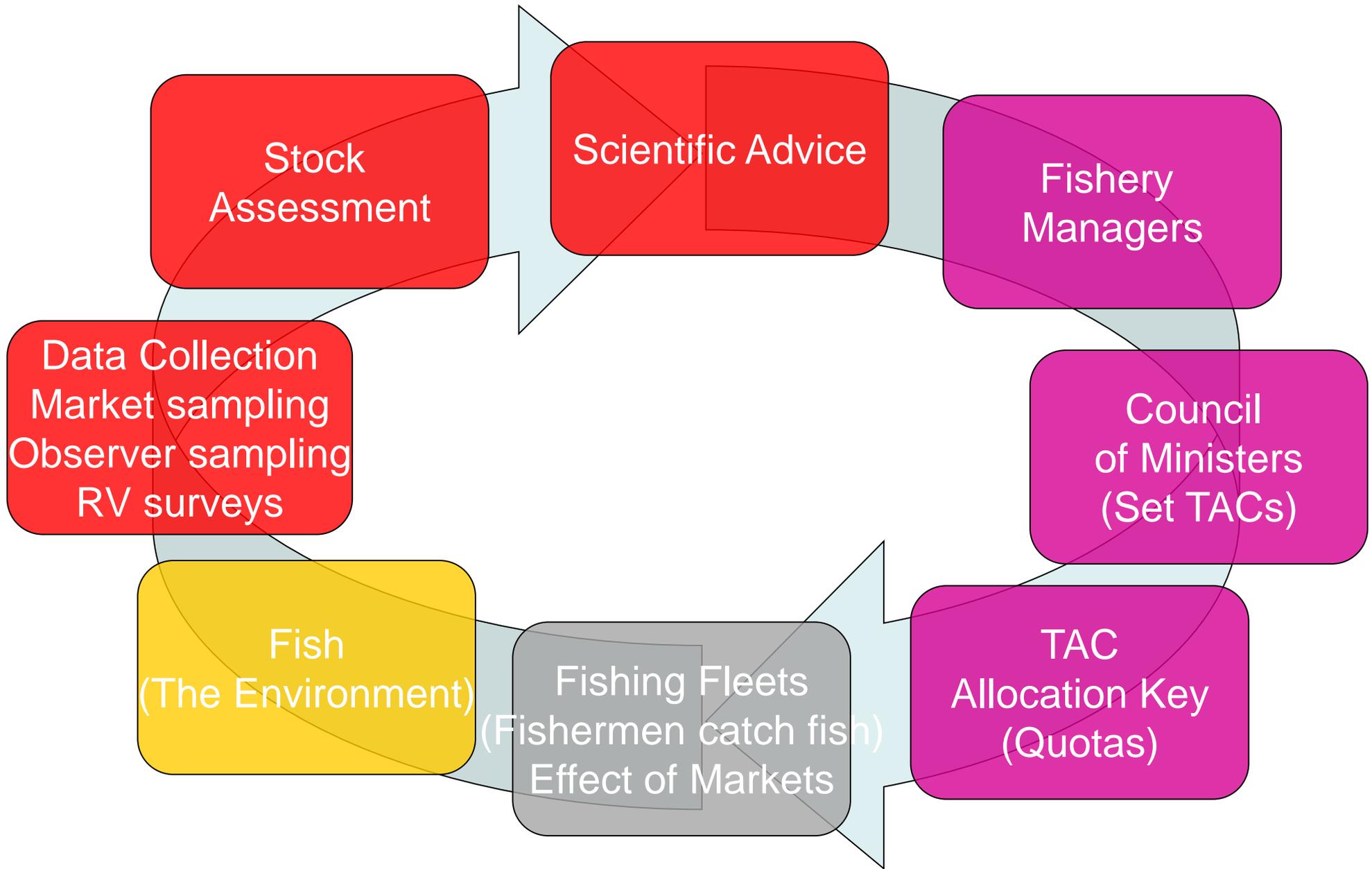
Species of Scientists

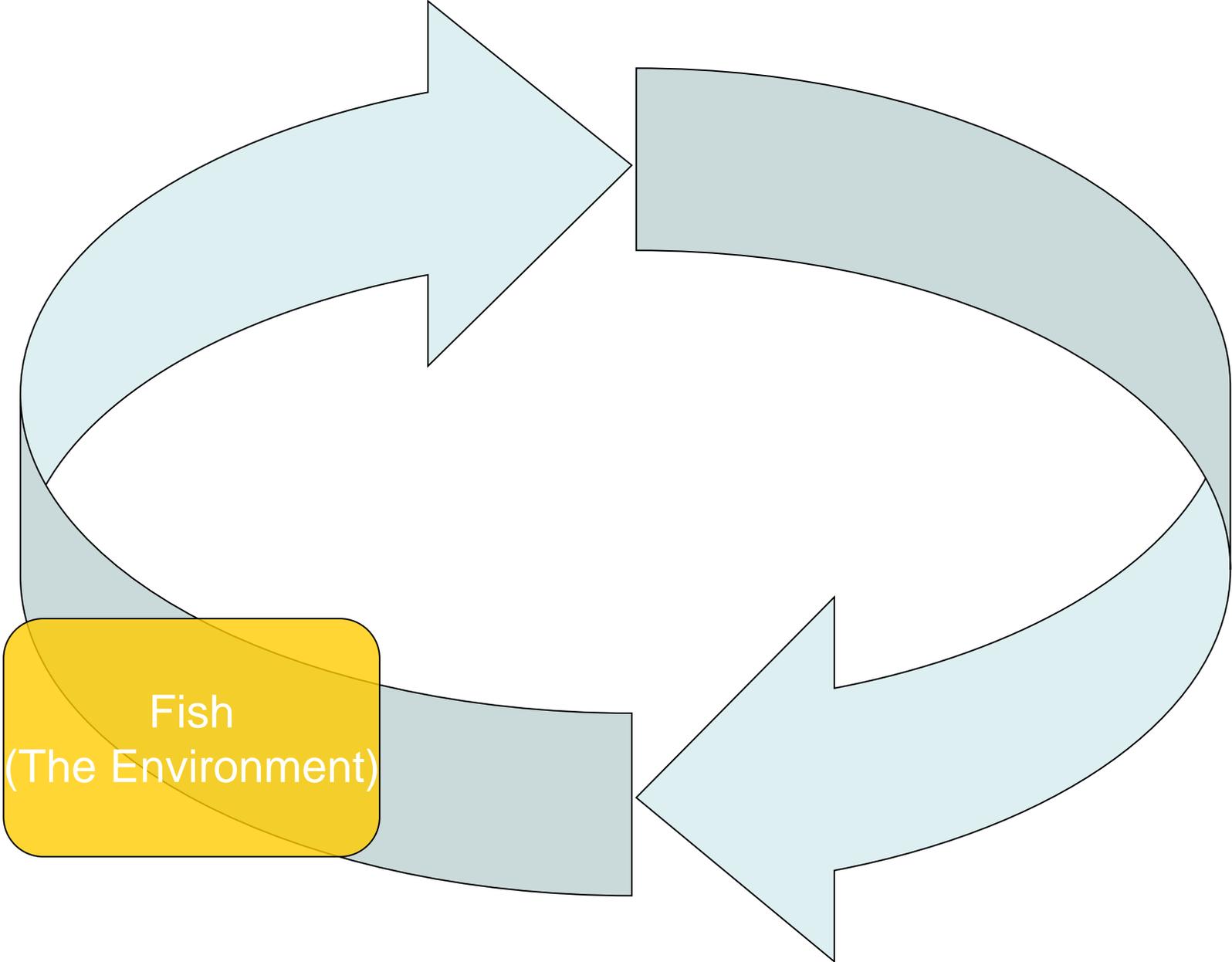
Government



Can not have an agenda
Must be objective, always
Can not challenge Government,
but must be honest and open
Can not avoid unpopular truths

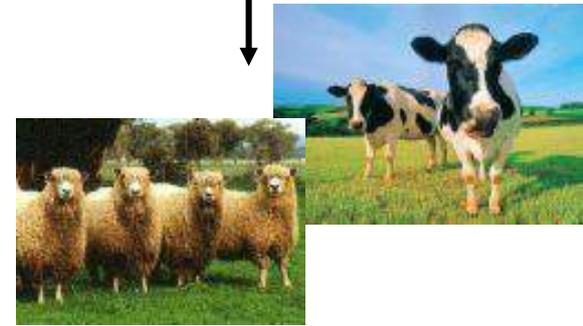
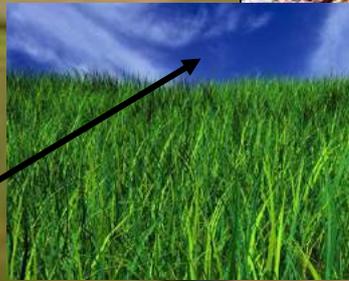
Science, Management and Fishing





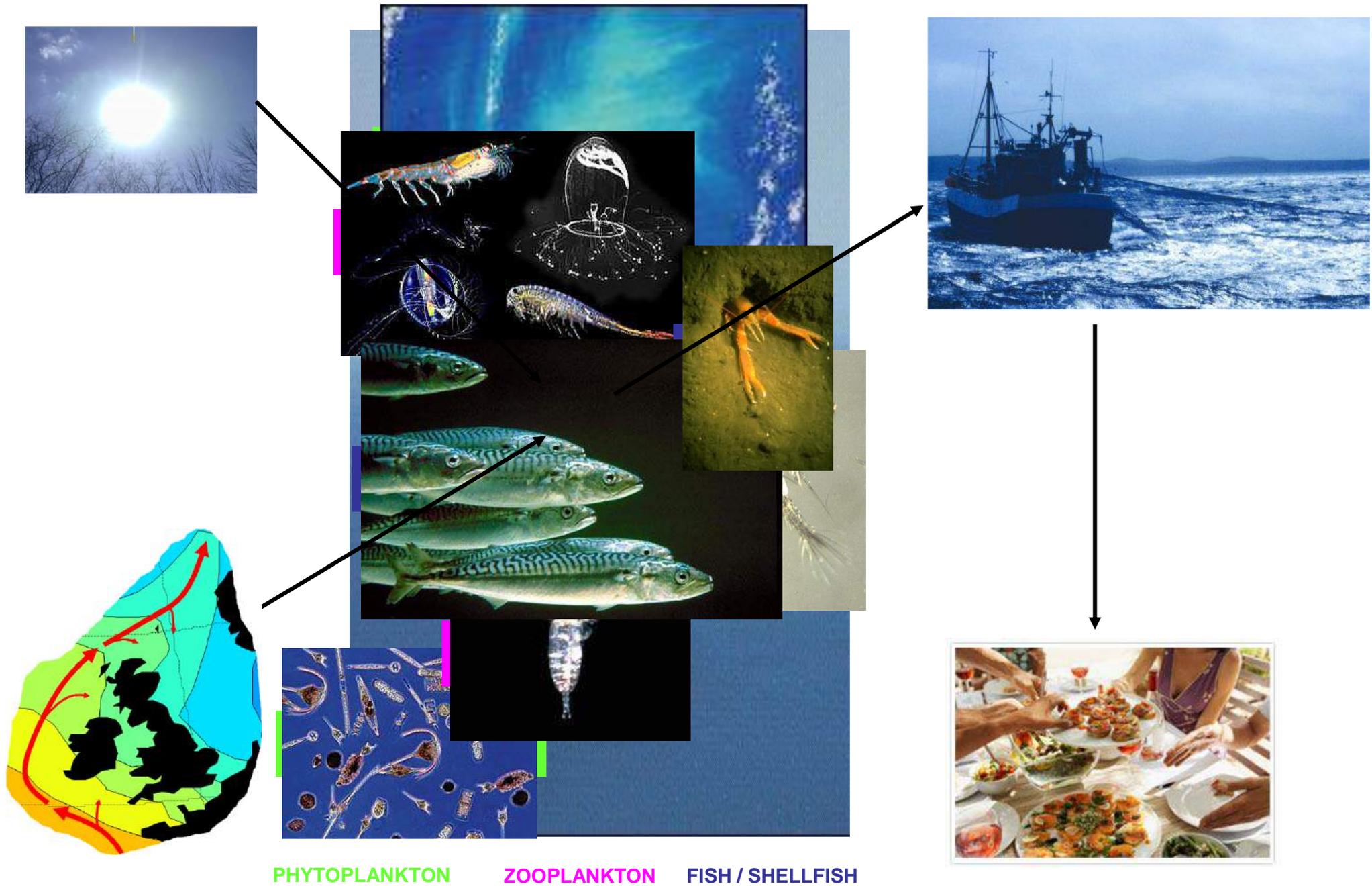
The Biological Cycle

... on land

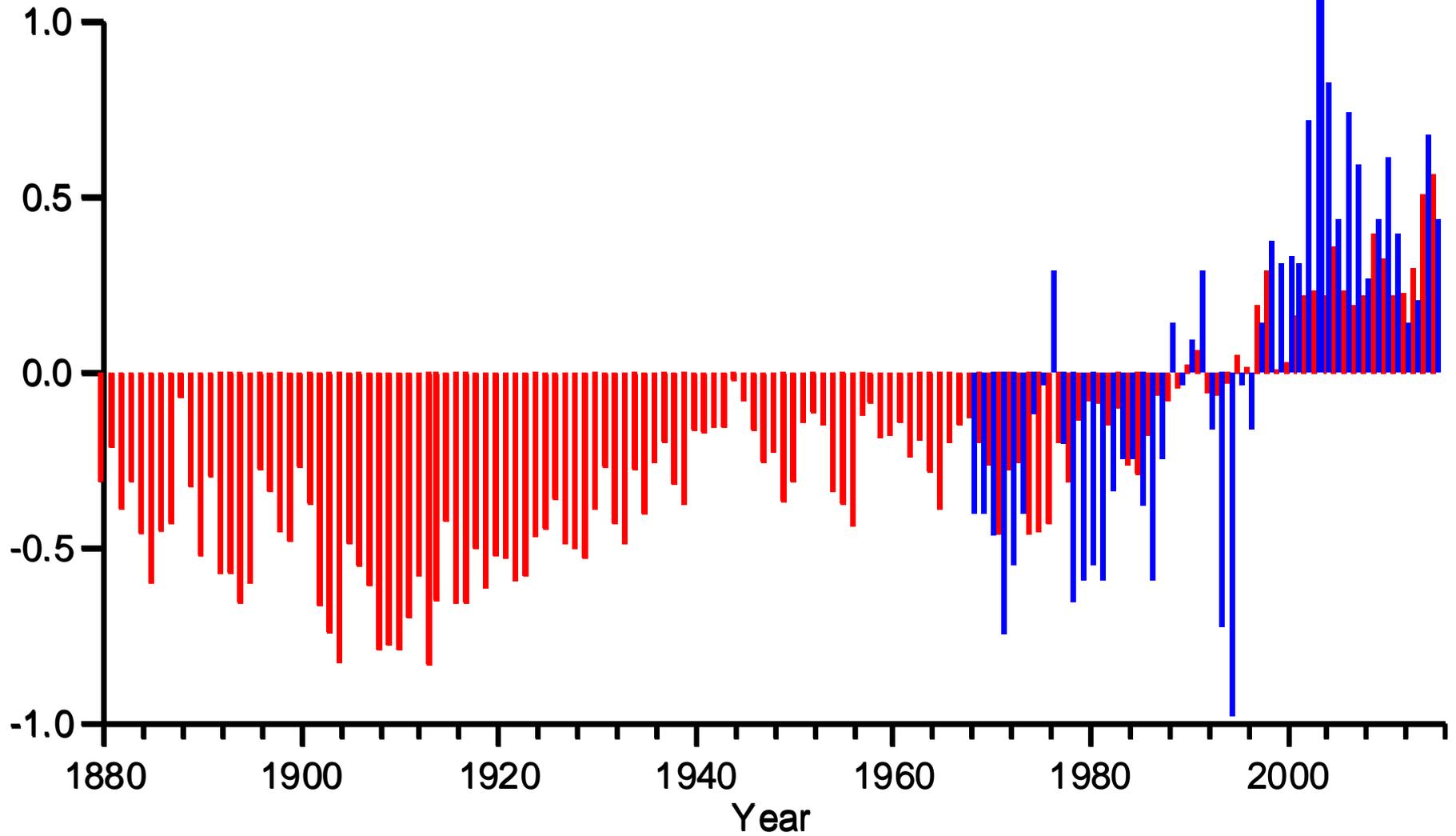


The Biological Cycle

... at sea

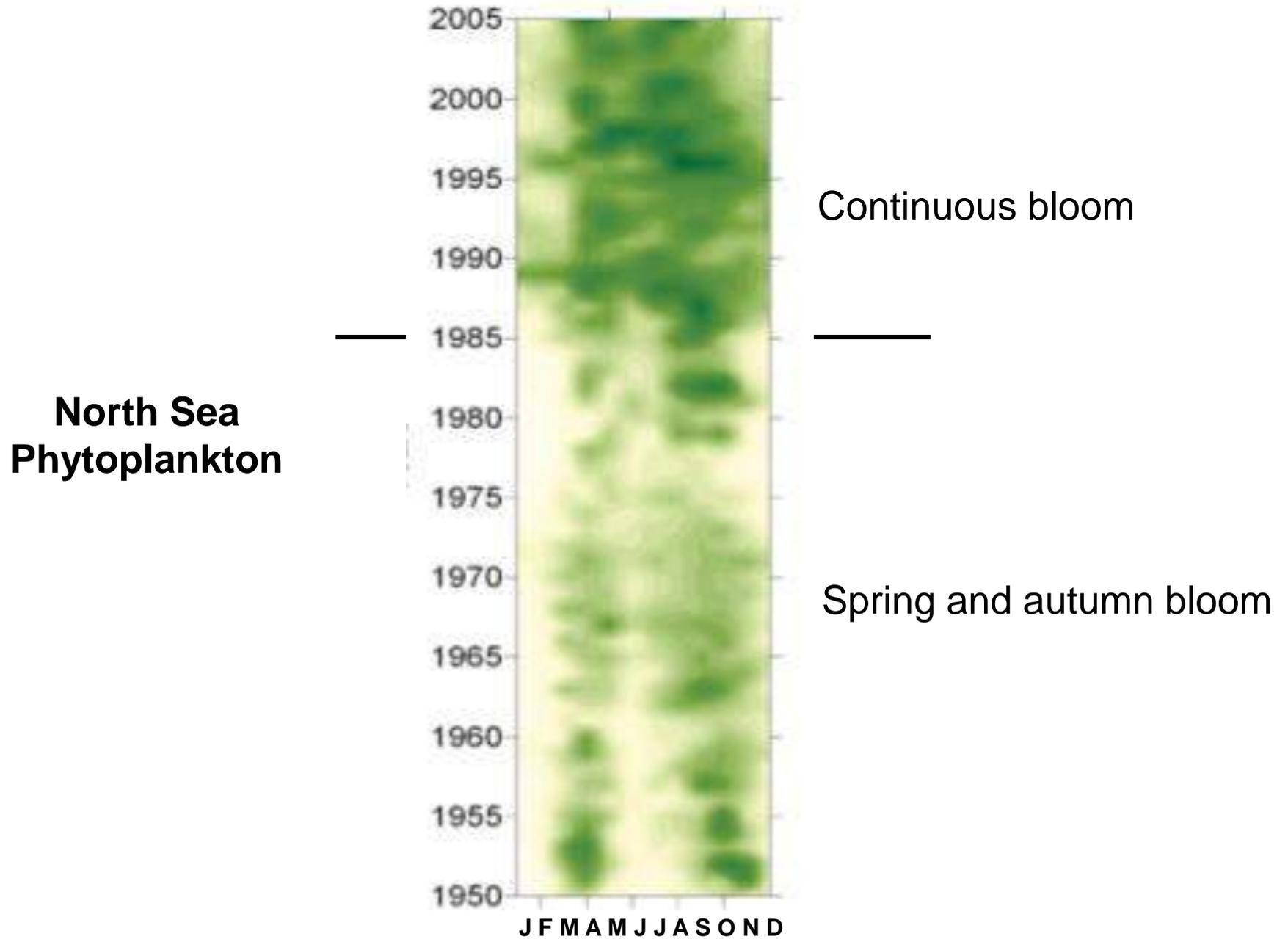


... conditions do change



Average Northern Hemisphere Sea Temperatures in June
Northern North Sea Temperatures

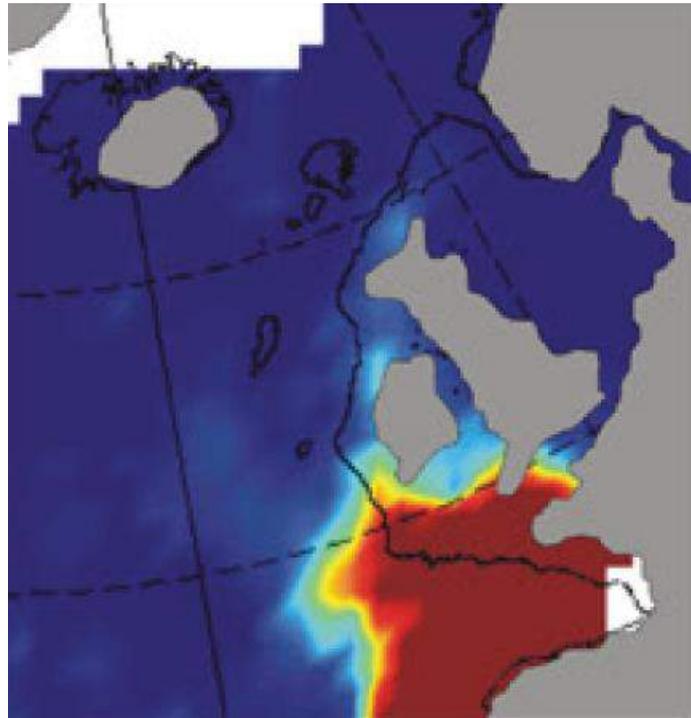
... conditions do change



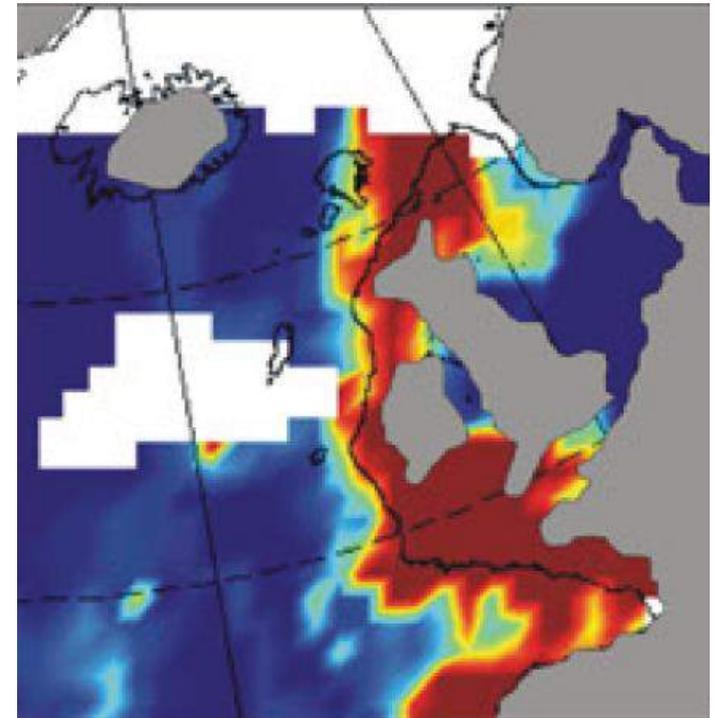
... conditions do change

**Warm-water
Zooplankton**

1958 - 1981



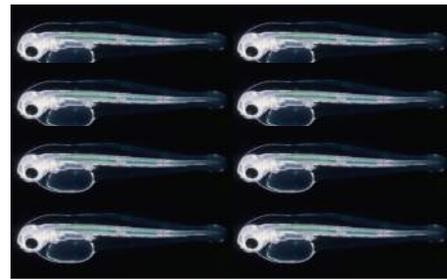
2003 - 2005



RECRUITMENT

Wind
Tide
Storms
Drift

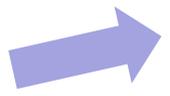
Nutrients
Sun
Species
Timing



Larvae

Currents
Climate
Species
Timing

*Food
(Medium)*



Juveniles

Currents
Storms

Habitat

Sun / Clouds
Climate
Wind

Temperature

GROWTH



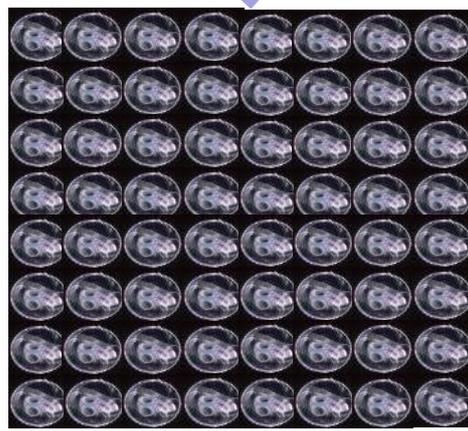
*Food
(Big)*

Climate
Species



Adults

*Food
(Small)*



Eggs

Temperature

Sun / Clouds
Climate

Drift Wind
Tide
Storms

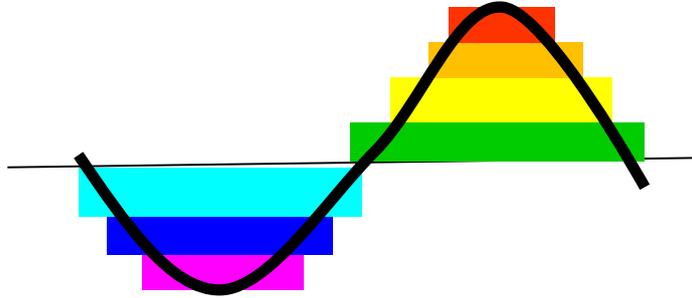
Natural Variability

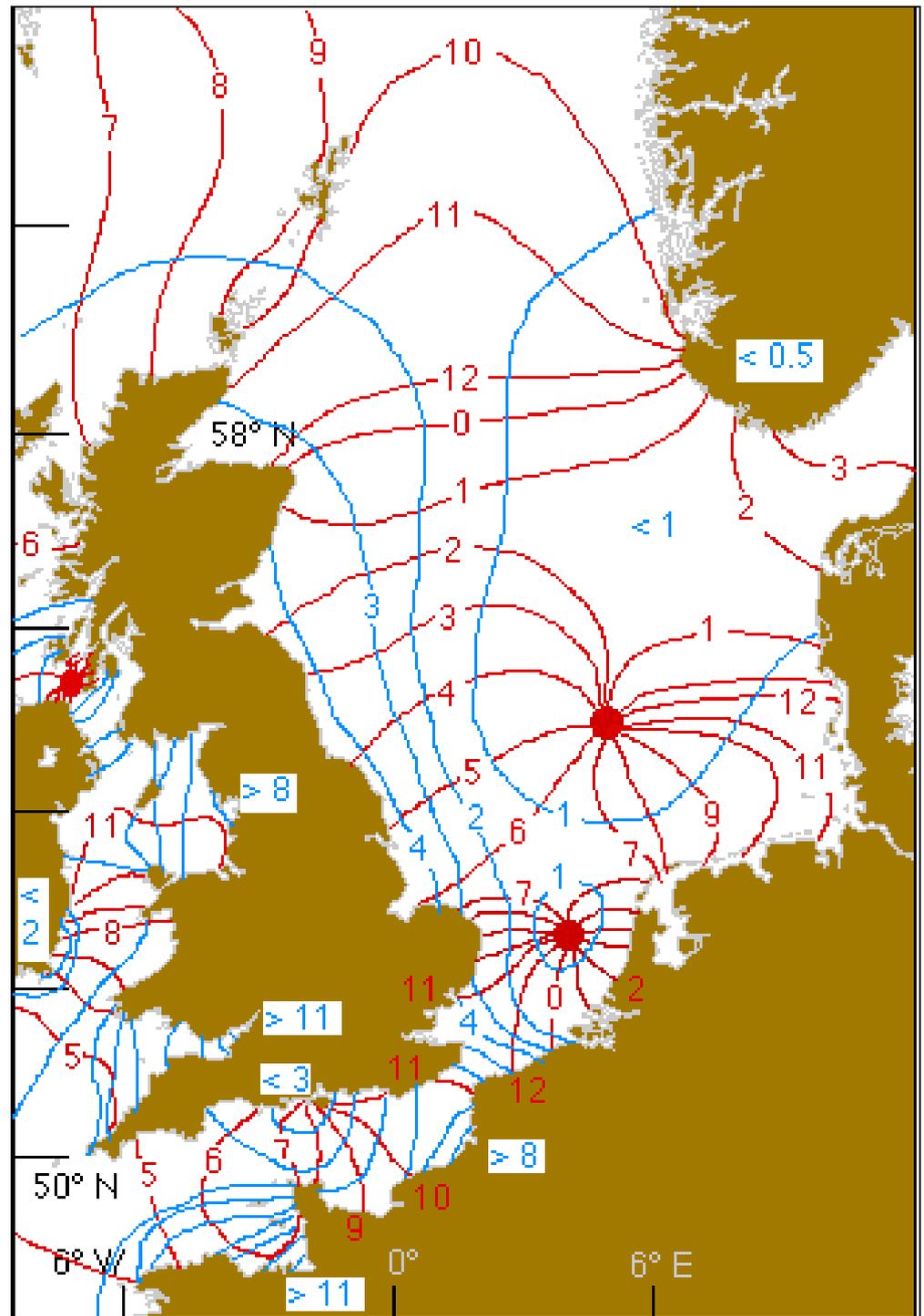
Oceanography – Currents - Tides

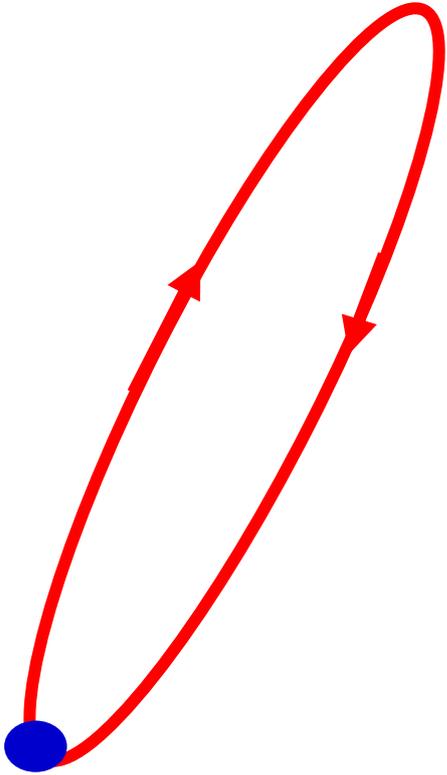


MCMINN MARINE Ltd

Virtuous FR253
For Mr Sandy West and partners of Fraserburgh
Built Parkol Marine 2010



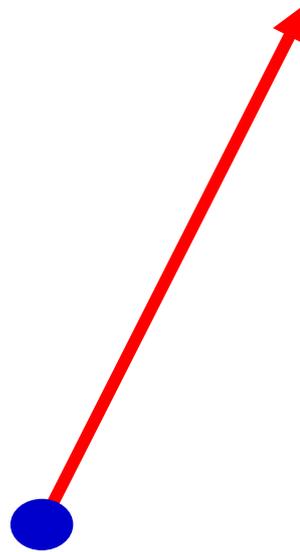




Tide

0 to 5 knots

Driven by
ocean tide

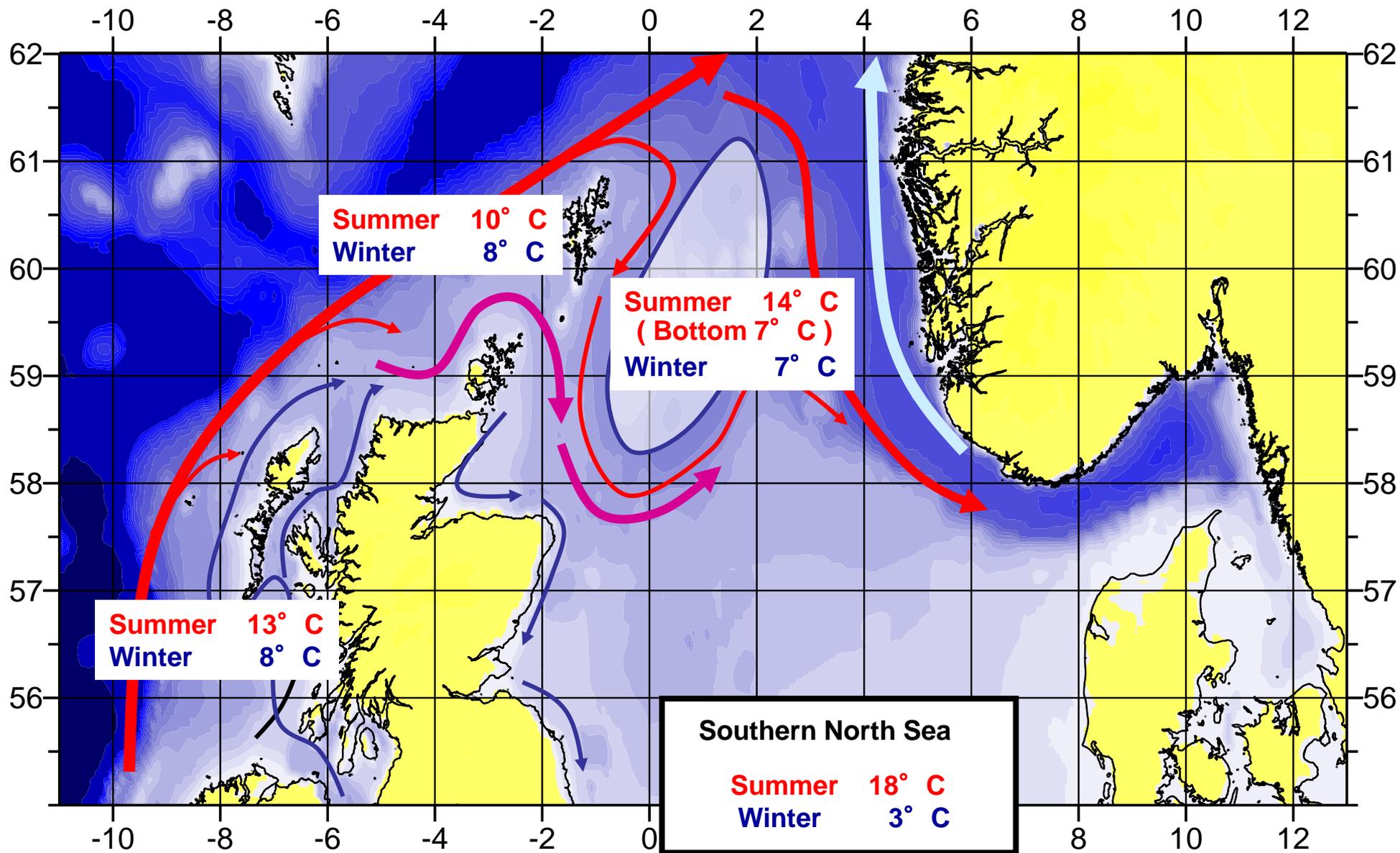


Residual

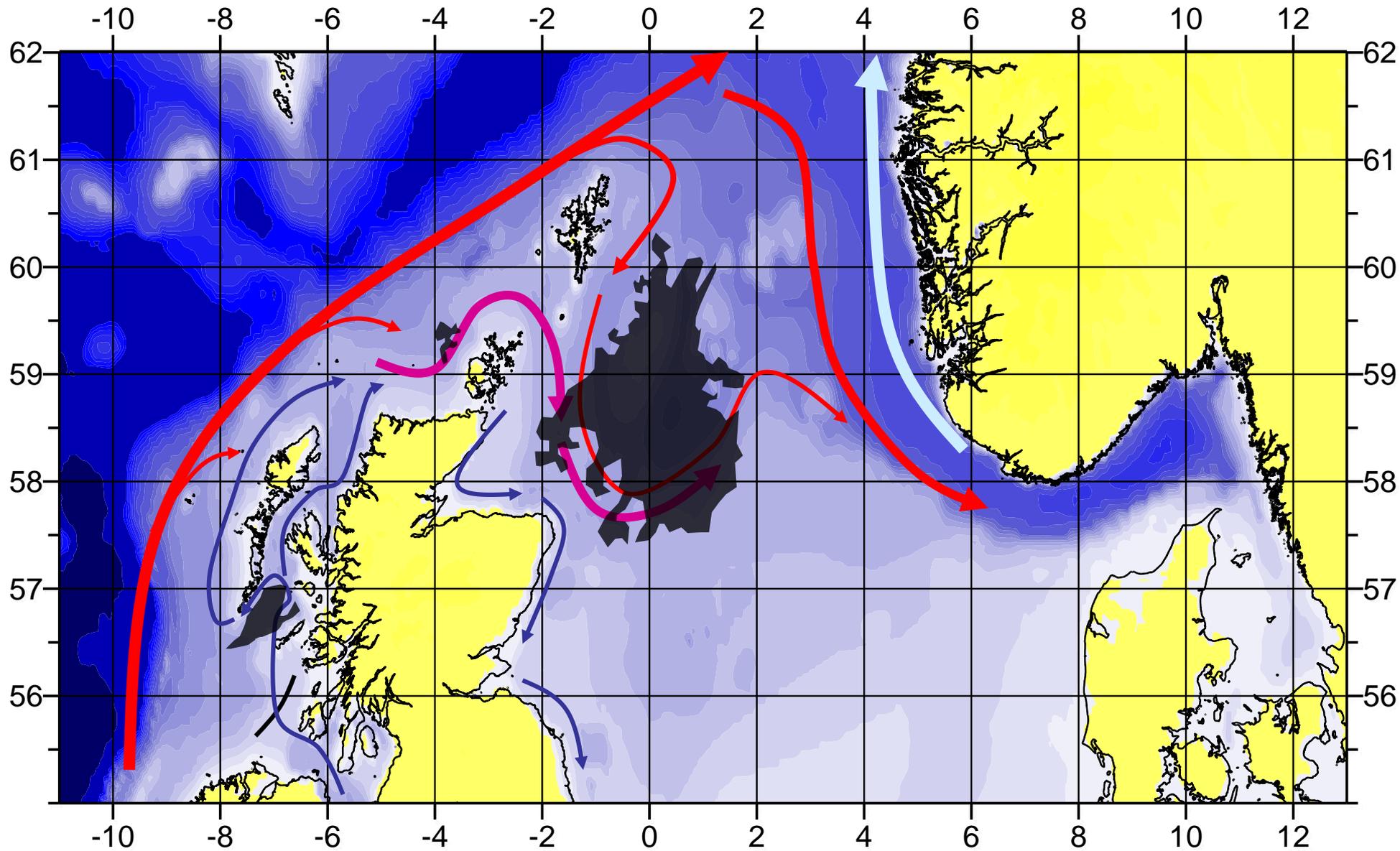
0 to 0.5 knots

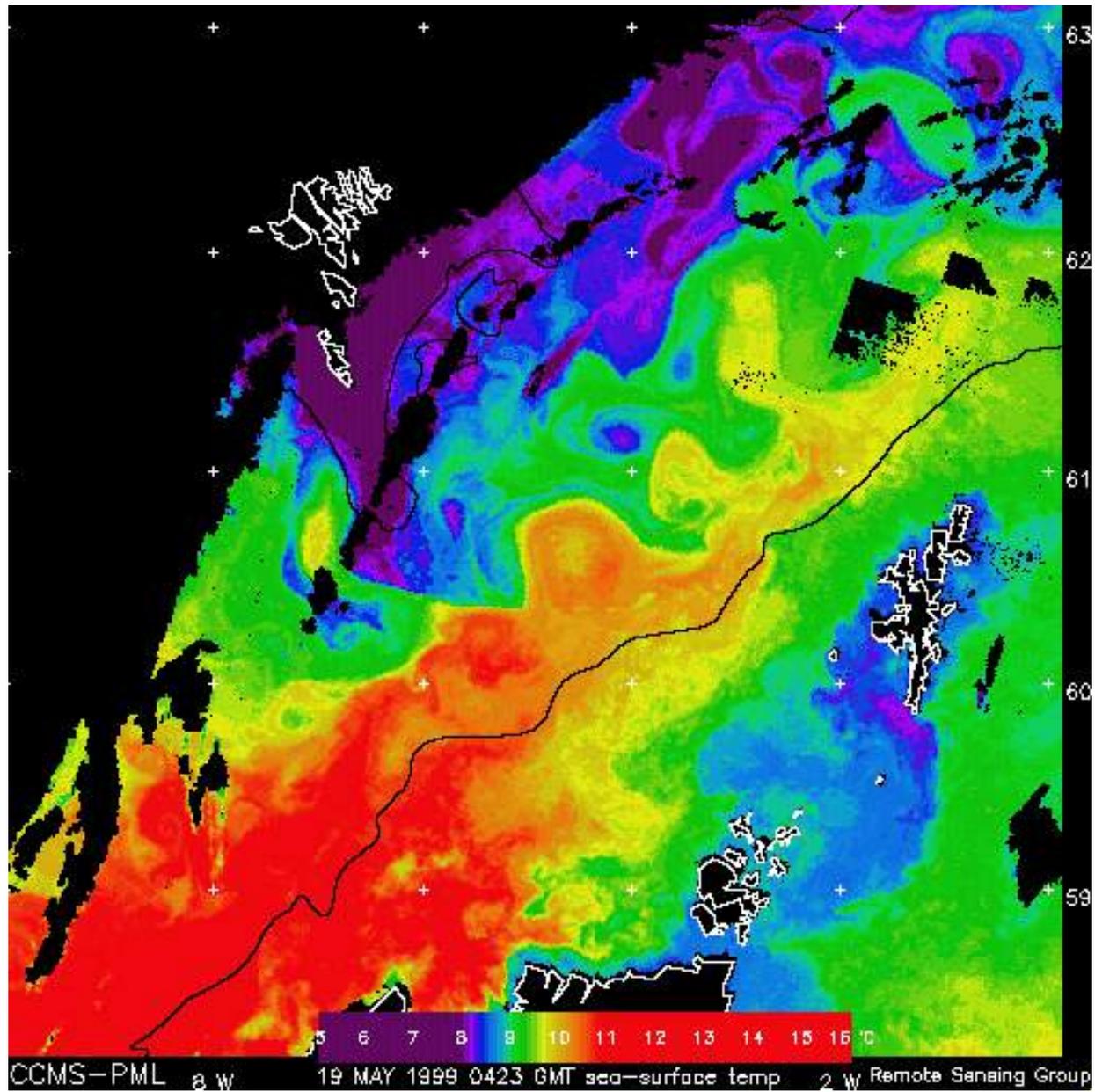
Driven by
Local Wind
Remote Storms
Density Changes

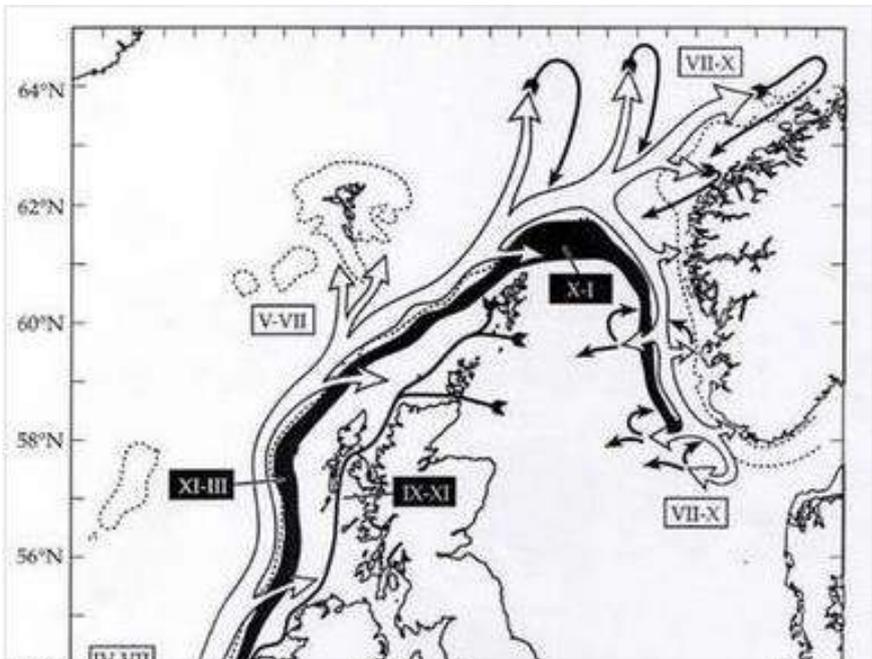
Oceanography – Currents - Residual



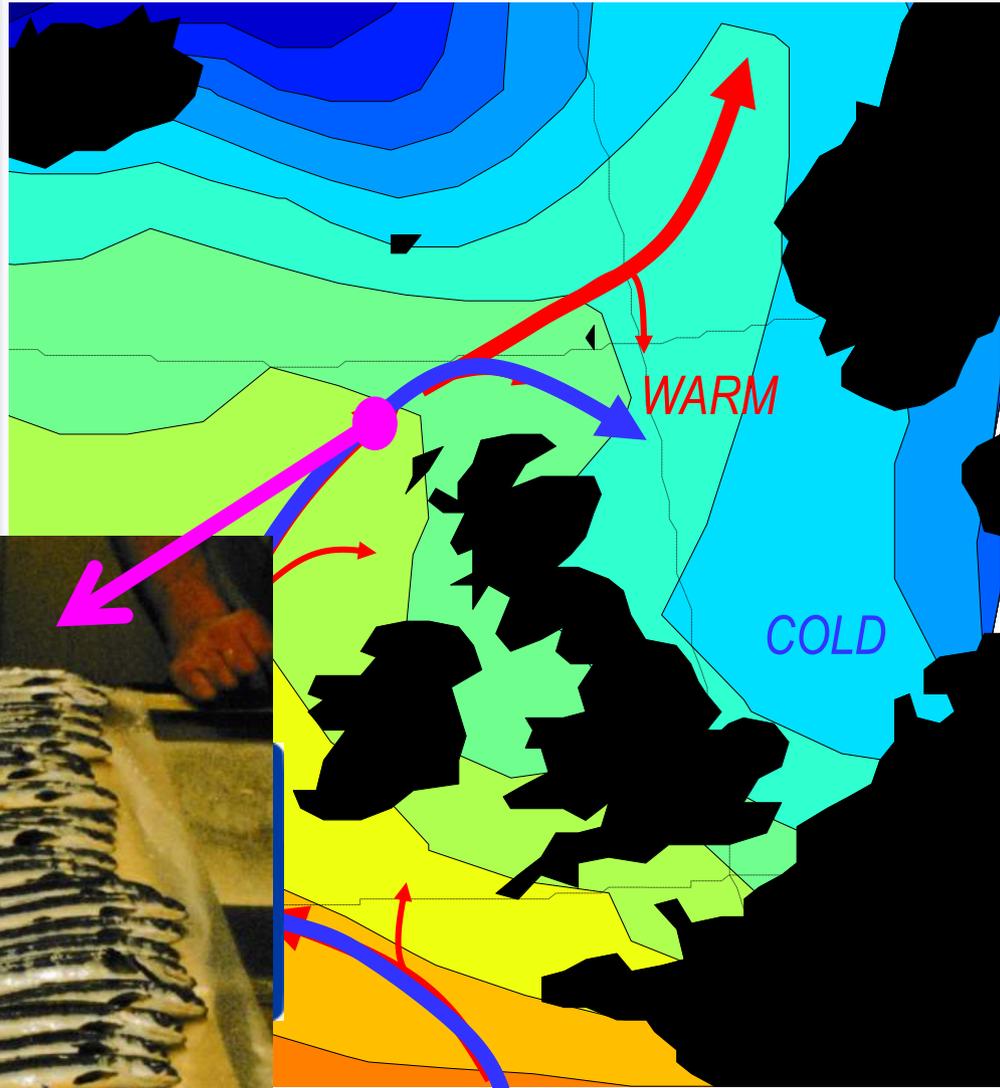
100m=55 fathom





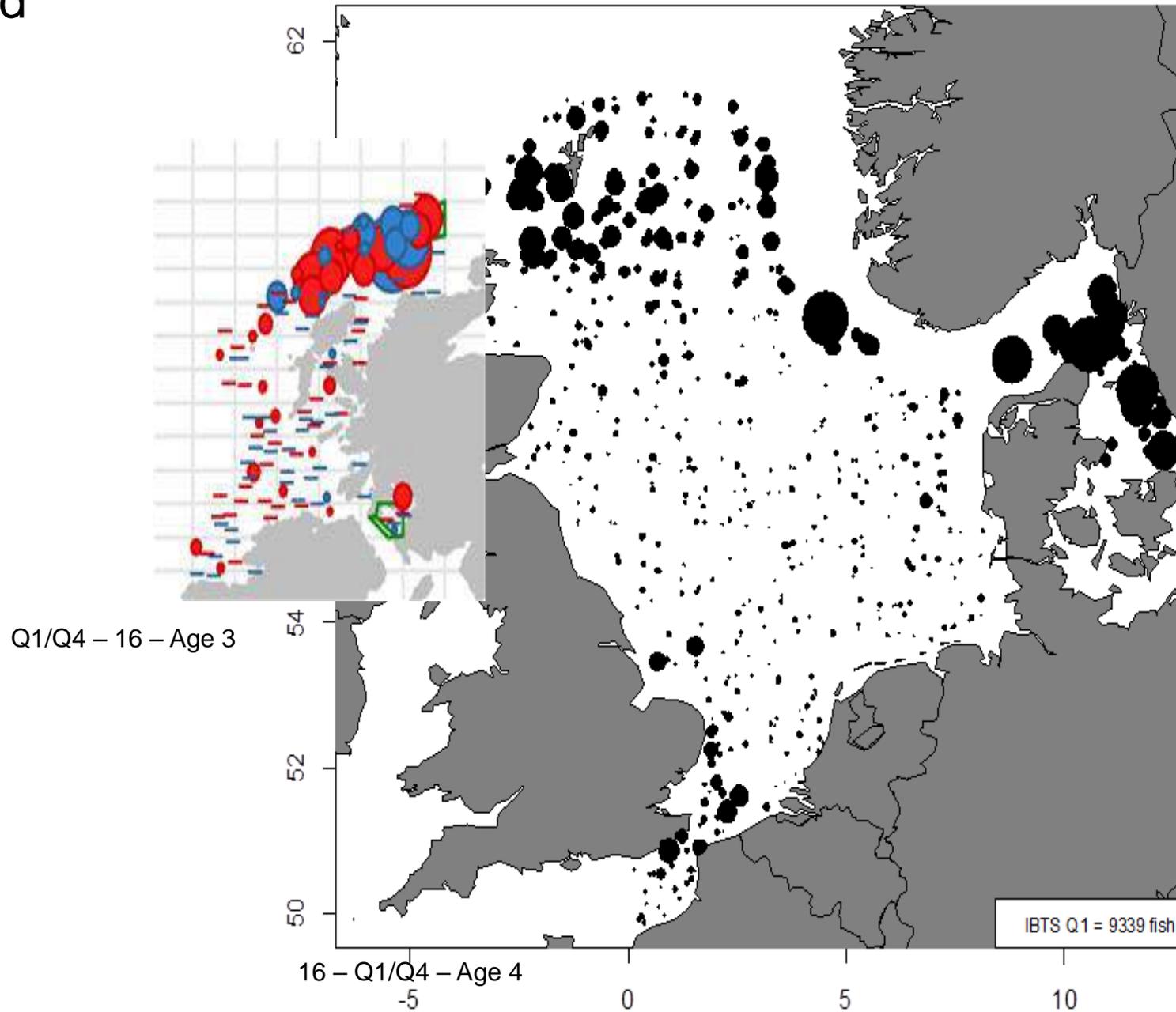


Average Winter Temperatures

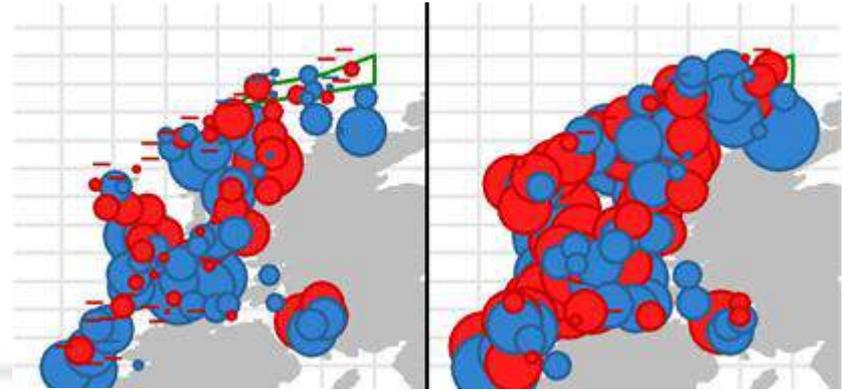


Cod

cod 2012-2016: length > 30 cm



Haddock



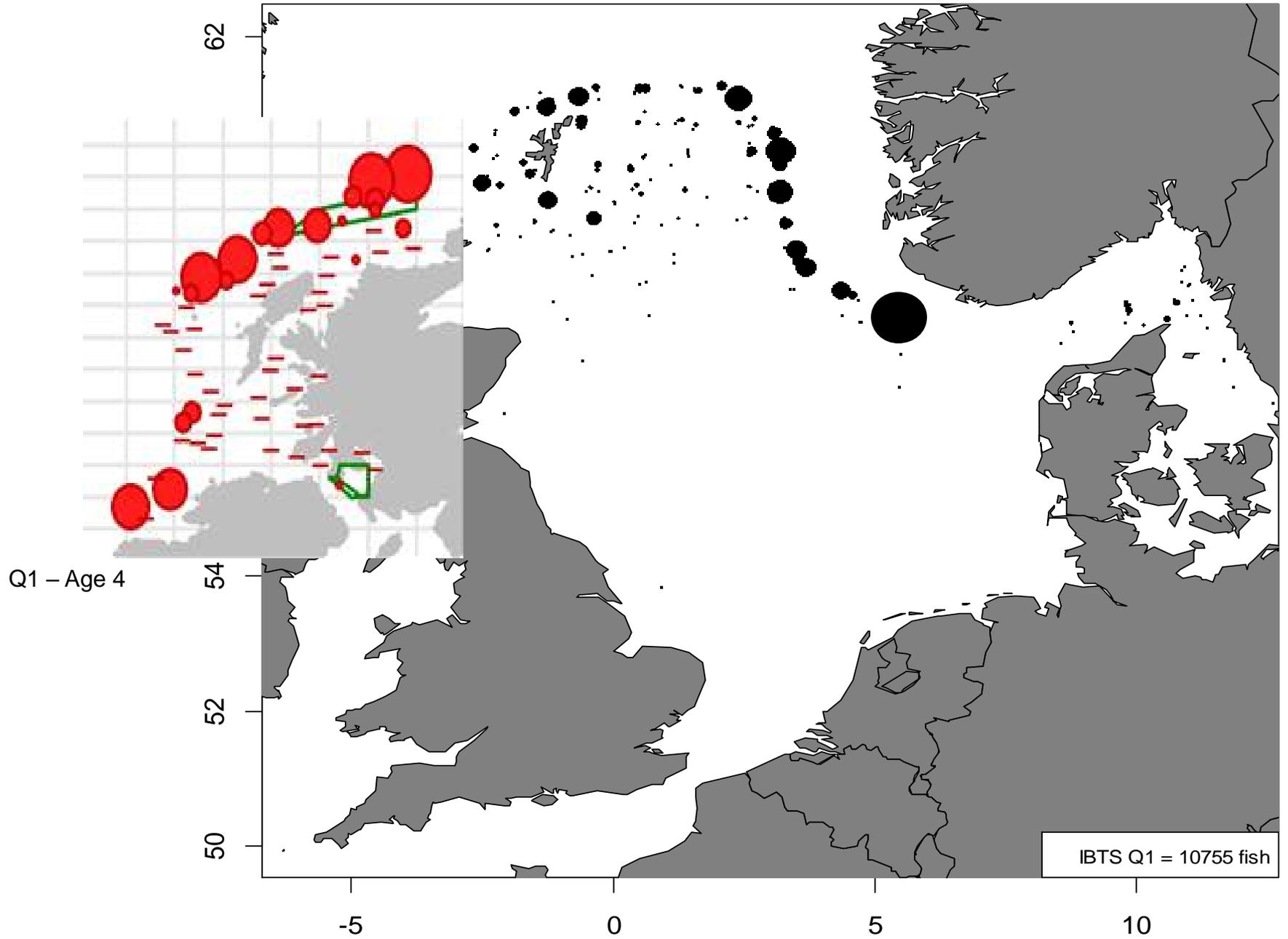
2016 – age 1 and 2



16 – Q1/Q4 – Age 4

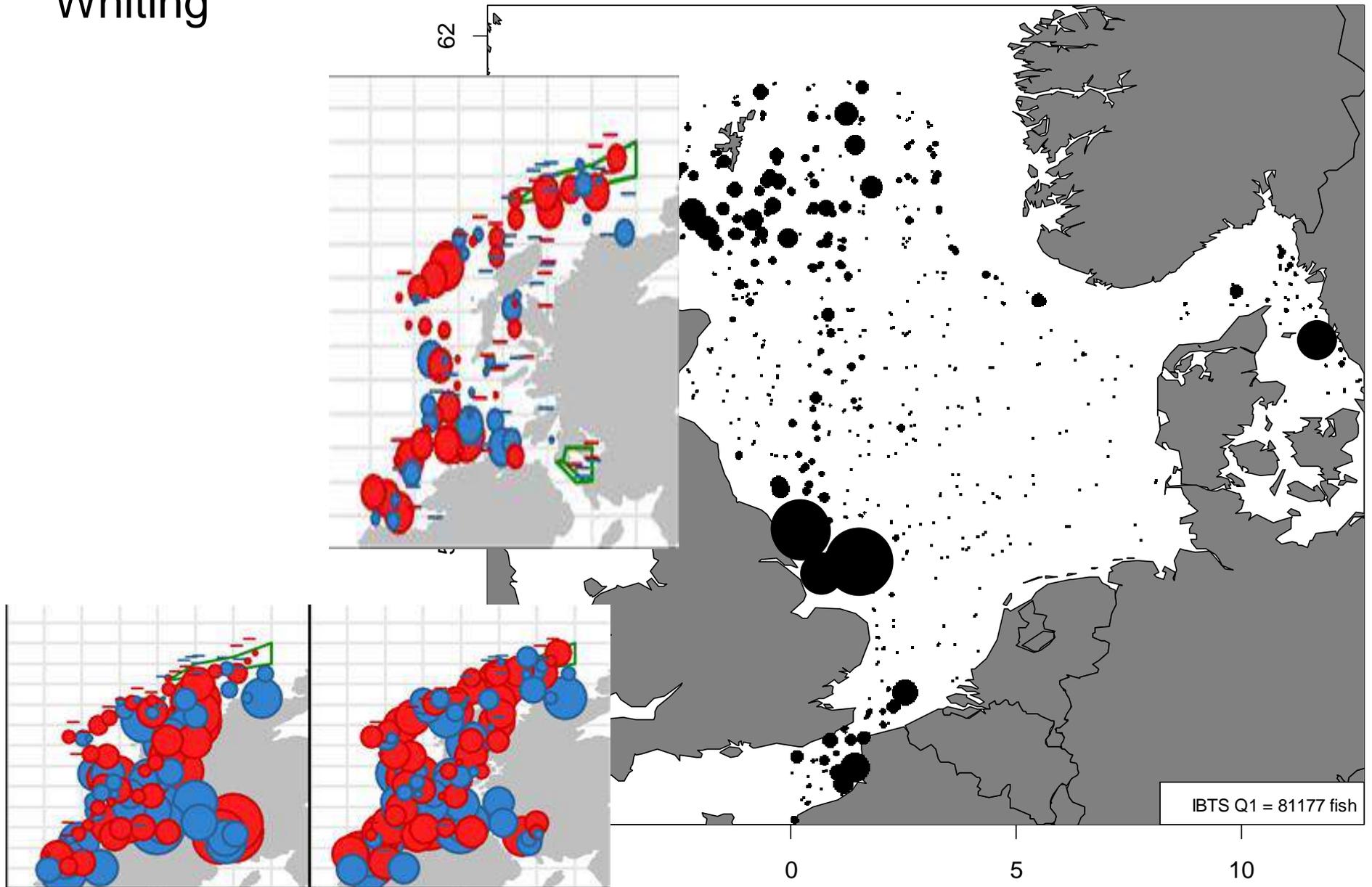
Saithe

saithe 2012-2016: length > 30 cm



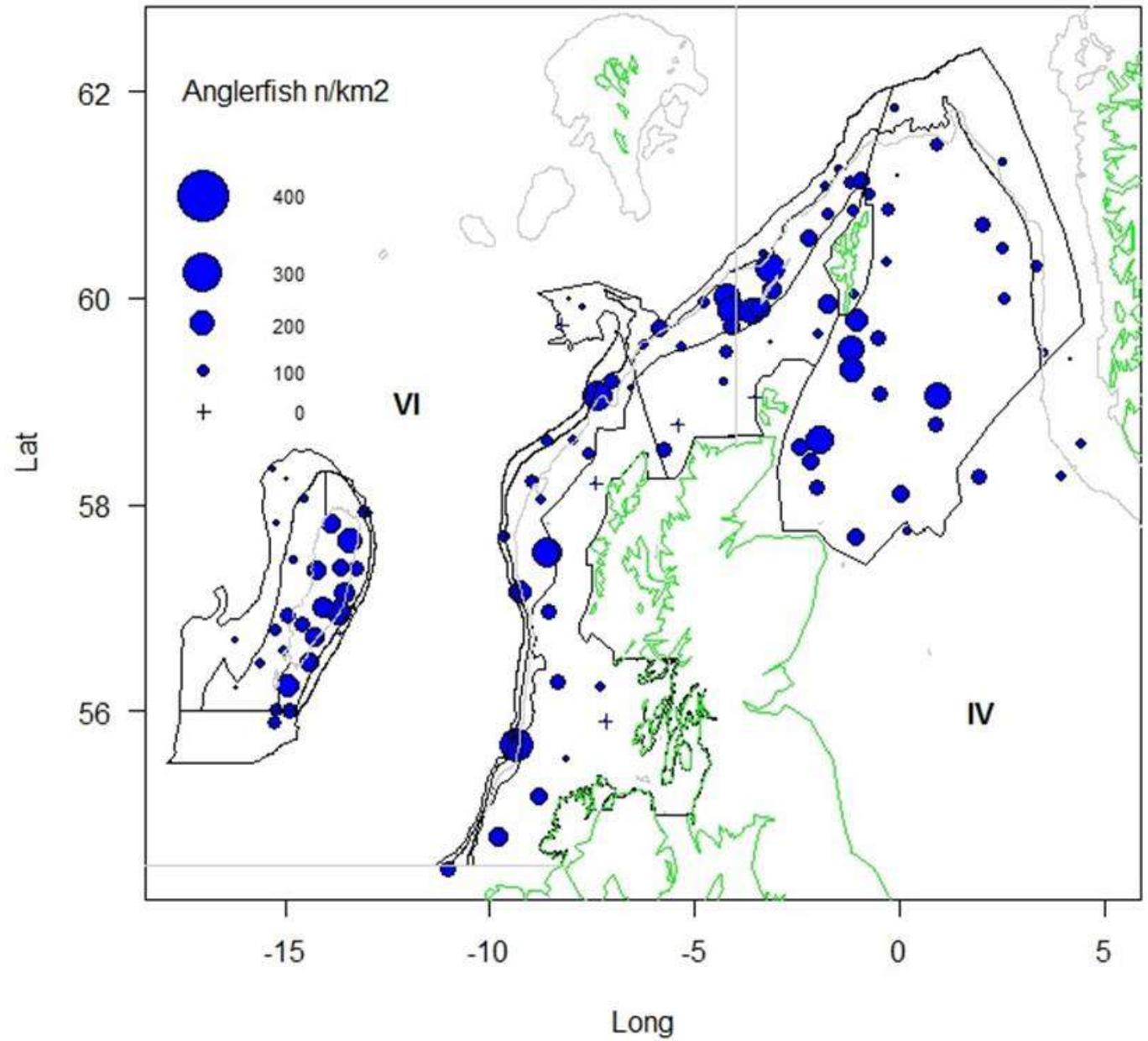
Whiting

whiting 2012-2016: length > 30 cm

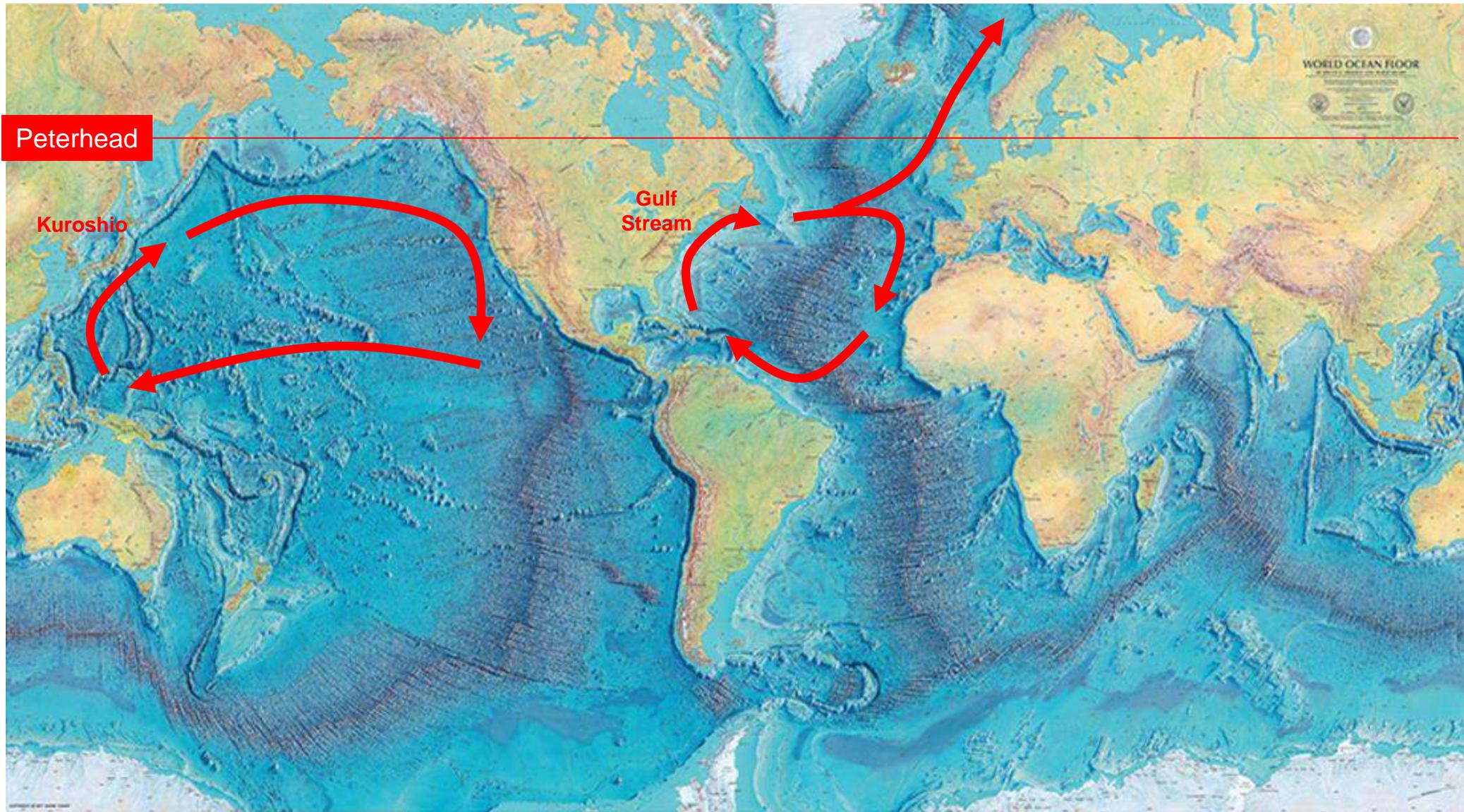


2016 - age 1 and 2

Monk



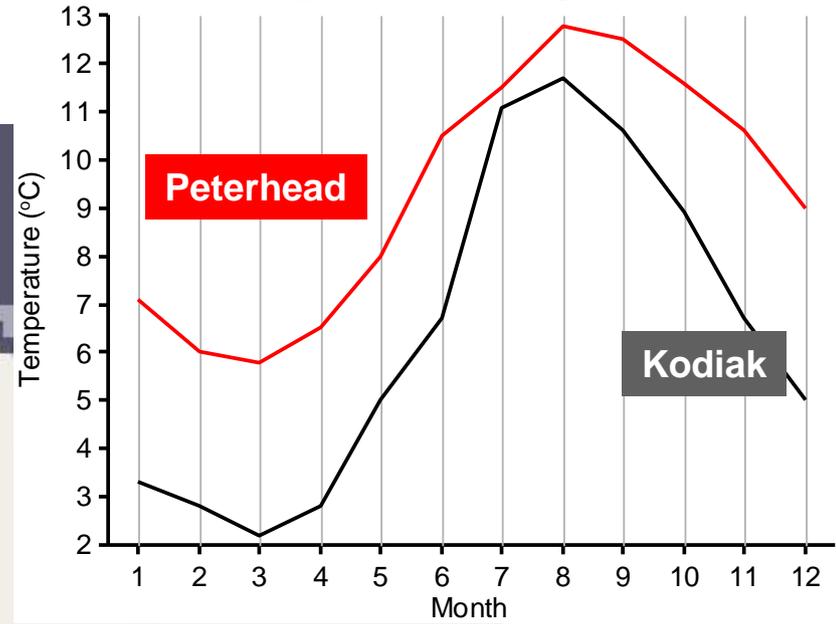
Oceanography – The Atlantic





Sea Ice - February 2015

Average Sea Temperatures



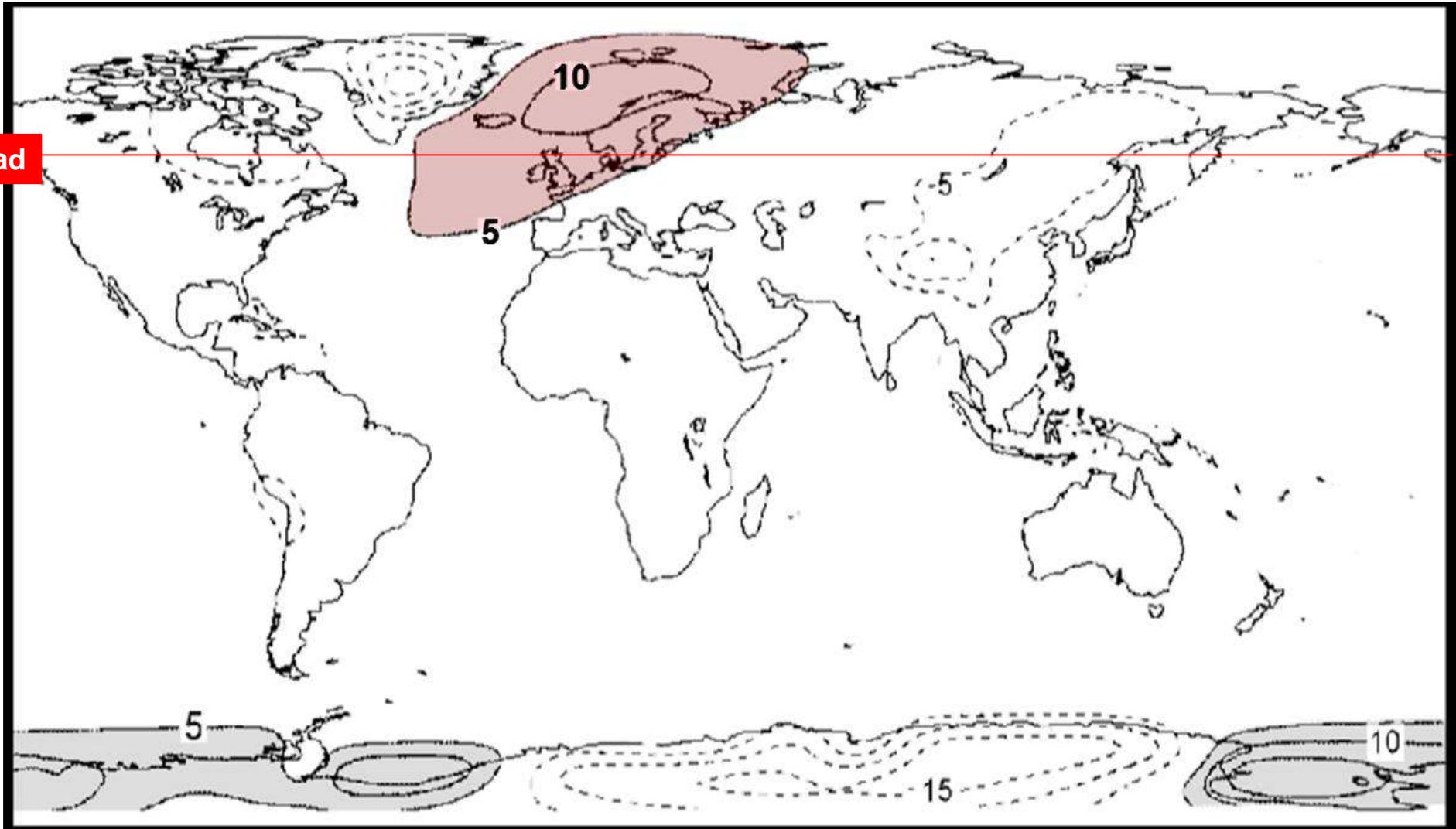
Lerwick

Peterhead

Kodiak



Peterhead



Peterhead

