

NL Fisheries in 2012: ecology

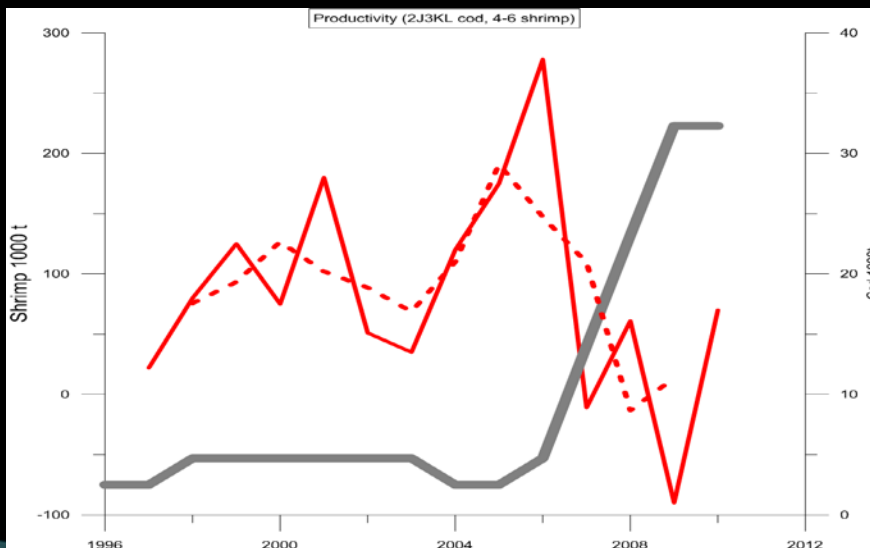
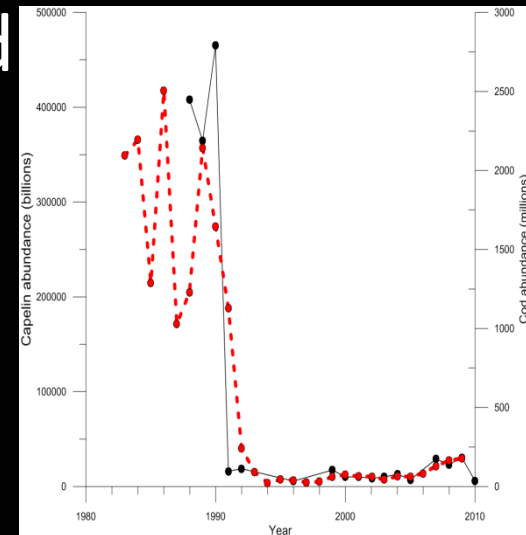
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Present state of ecosystems:

- Ecosystem is unstable after declines in dominant species, capelin and cod
- Crustacean productivity declining
- Seals make ecosystem top heavy



Impacts??

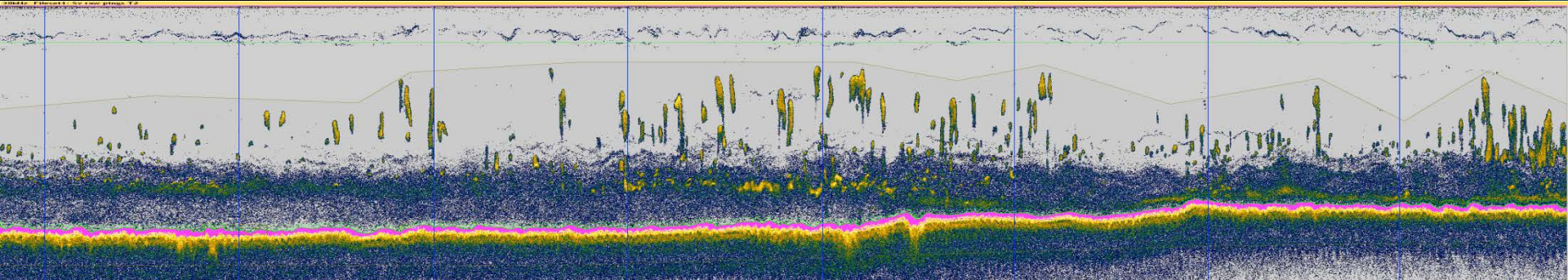
- Overfishing – foreign, Canadian
- Climate change
- Ghosts of past (mis)management
- Fossil fuel extraction (for another day)

Overfishing (3 examples)

- Flemish Cap cod (3M) – fishing at F_{\max} despite objections and history
- Hawke Channel snow crab – despite closed area and possible increased productivity net loss because of increased effort
- Area 0 turbot – juvenile fishery despite objections

Climate change

- Warming waters in NW Atlantic – effects felt from Cape Cod to Cape Chidley
- Is affecting change in distributions, growth, recruitment of various fish and crustaceans (winners and losers)



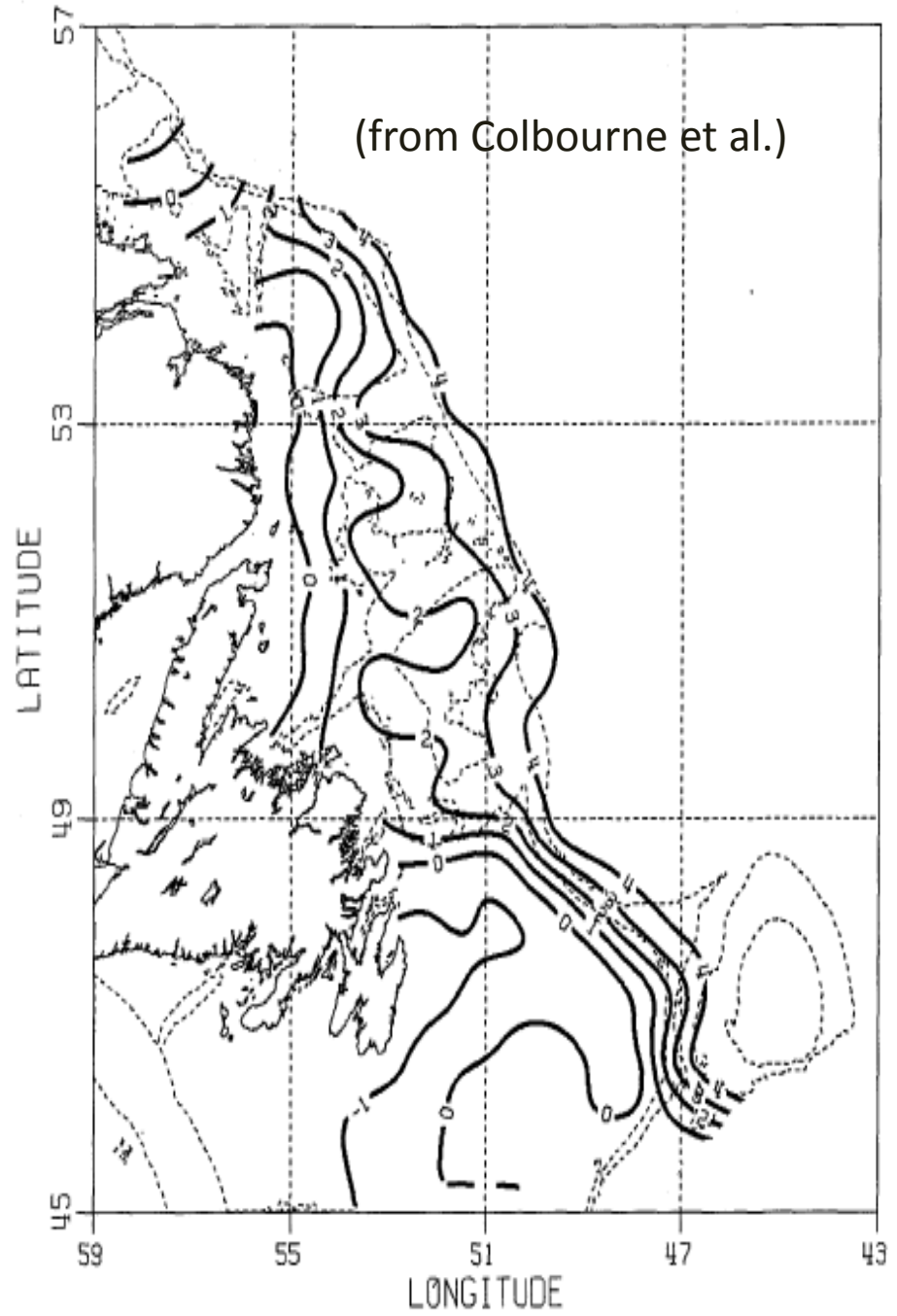
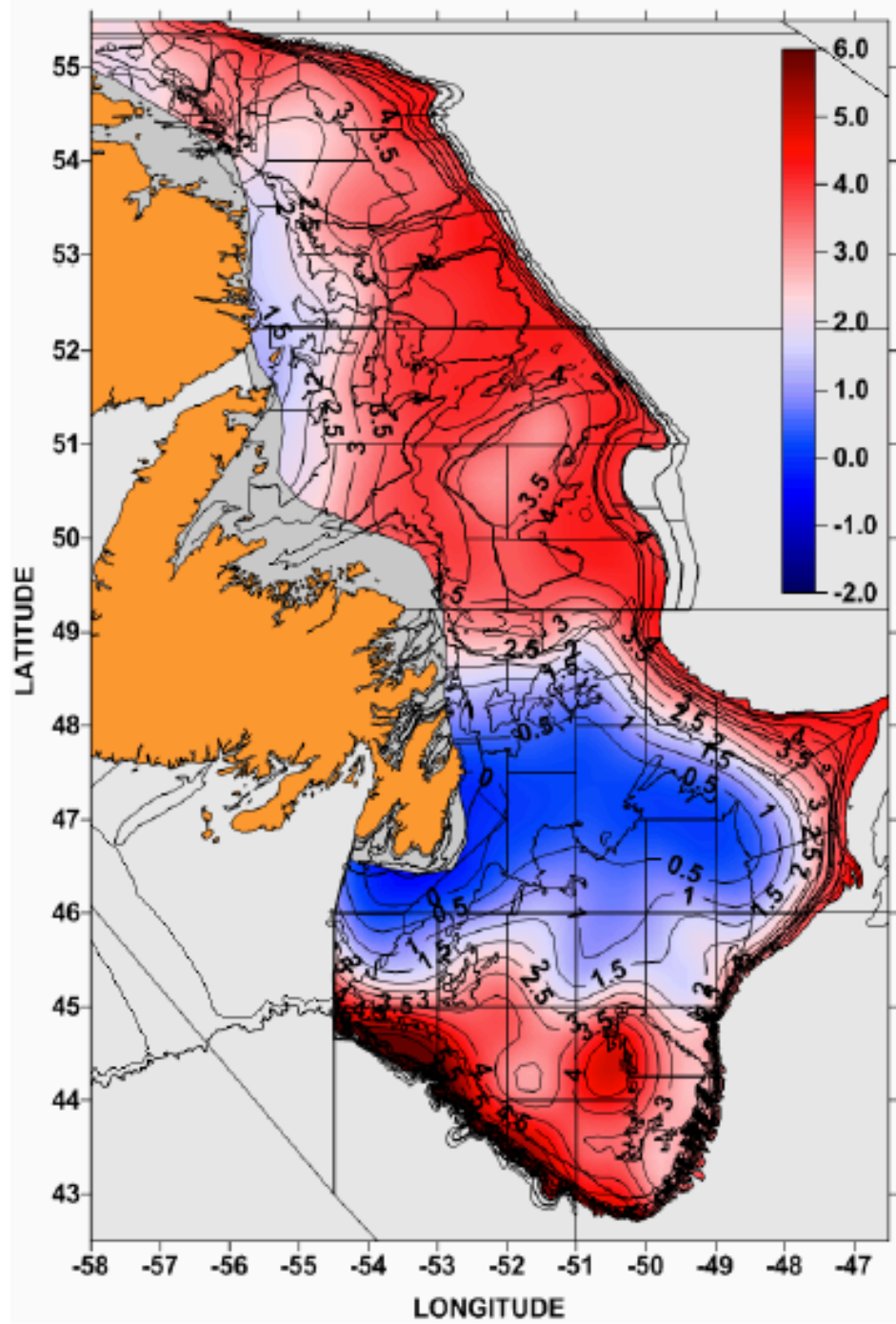
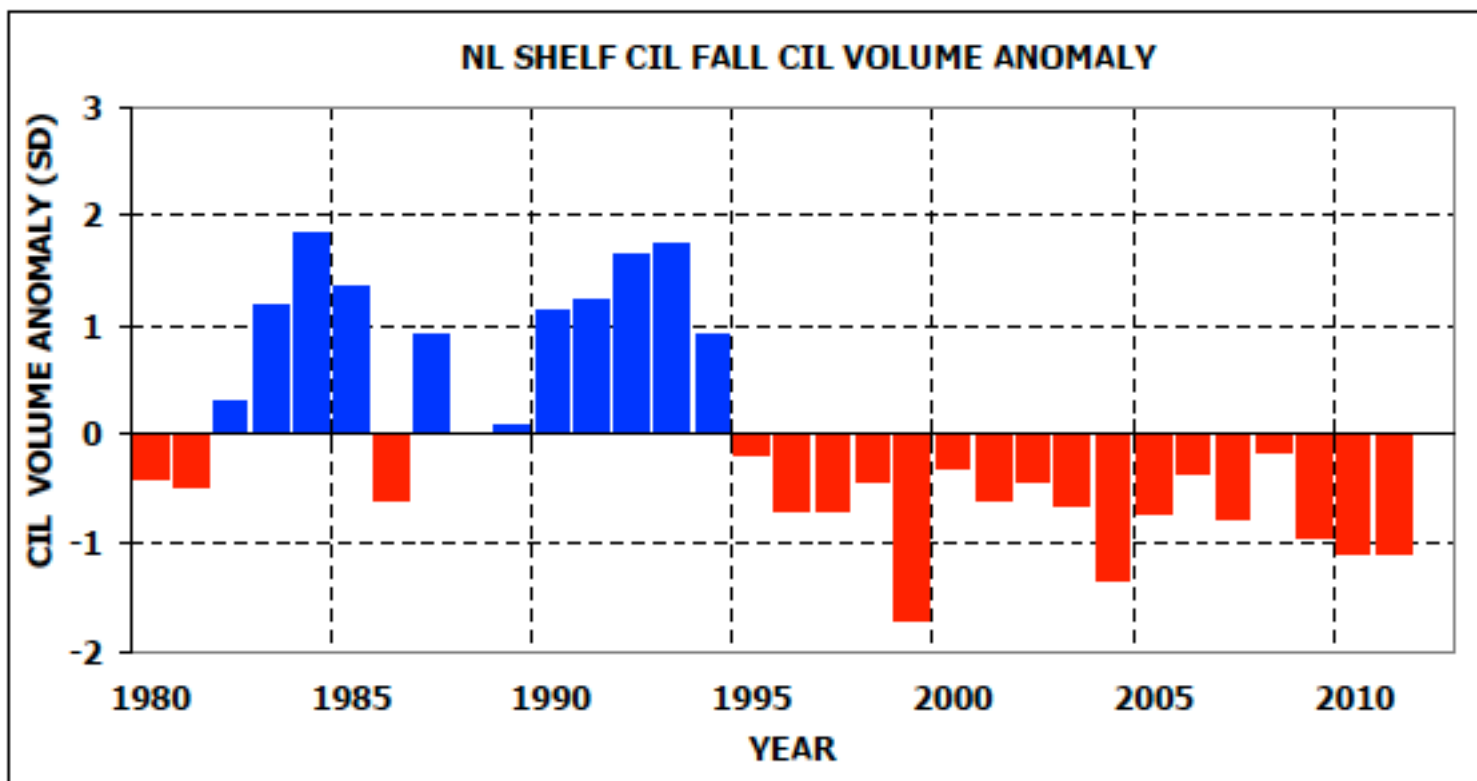
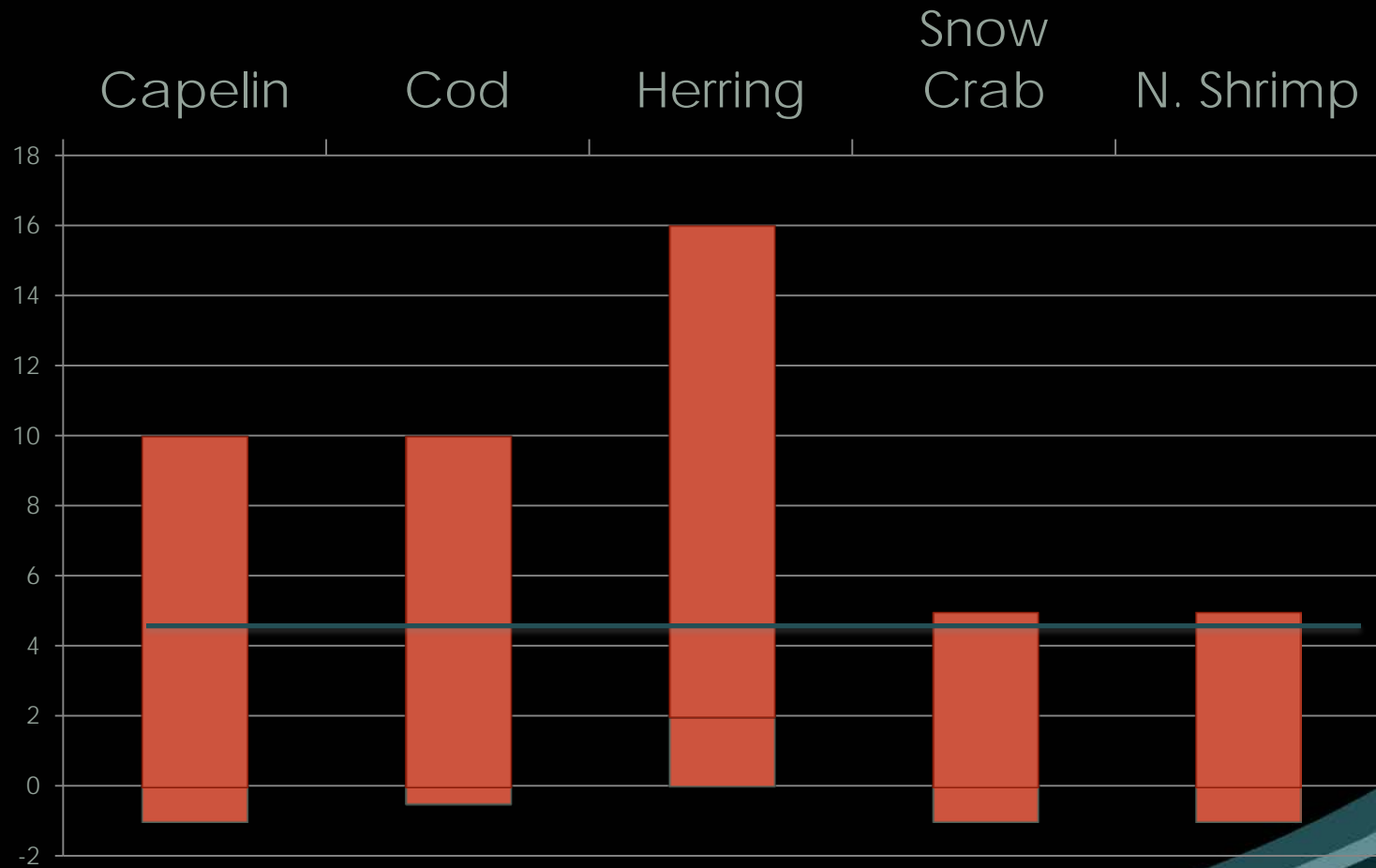


Fig. 7a. The 1980 to 1990 average fall bottom temperature.

Habitat change



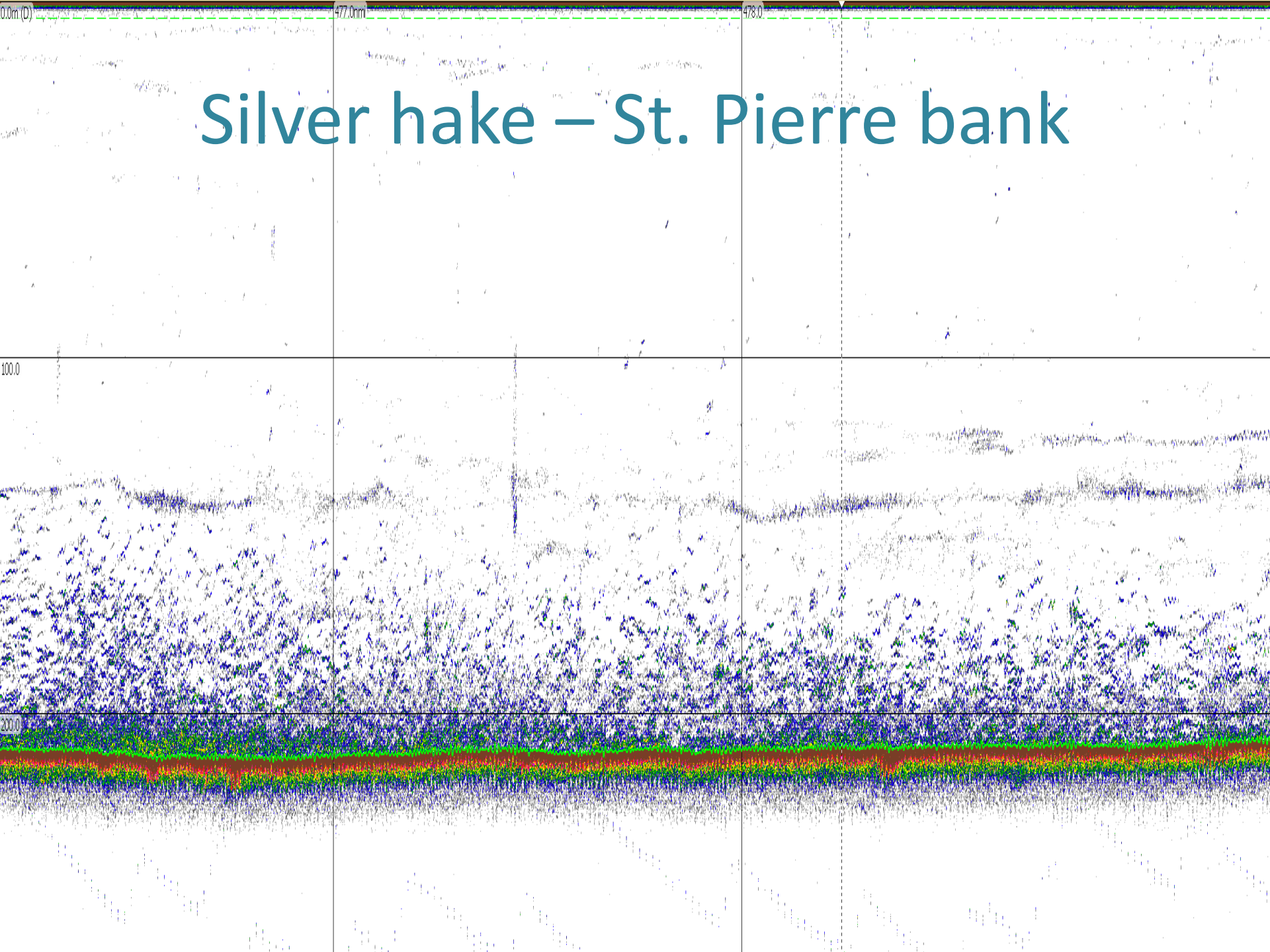
Temperatures they like



Science predictions with waters warming

- Incursions of some southern species (Silver hake, haddock, dogfish)
- Further N range of S migrants (tunas, sharks, mackerel)
- Range expansion N of resident species (e.g., capelin, cod)
- Declines in productivity of cold water species (shrimp, crab, Arctic cod, plankton species)
- Increases in productivity of cool water species (capelin, cod, plankton species ...)

Silver hake – St. Pierre bank



Ghosts of past mismanagement

- All of the above

What can we do??

- Get out in front of changes – rather than chasing them
- To better advise govts and industry