



Iceland

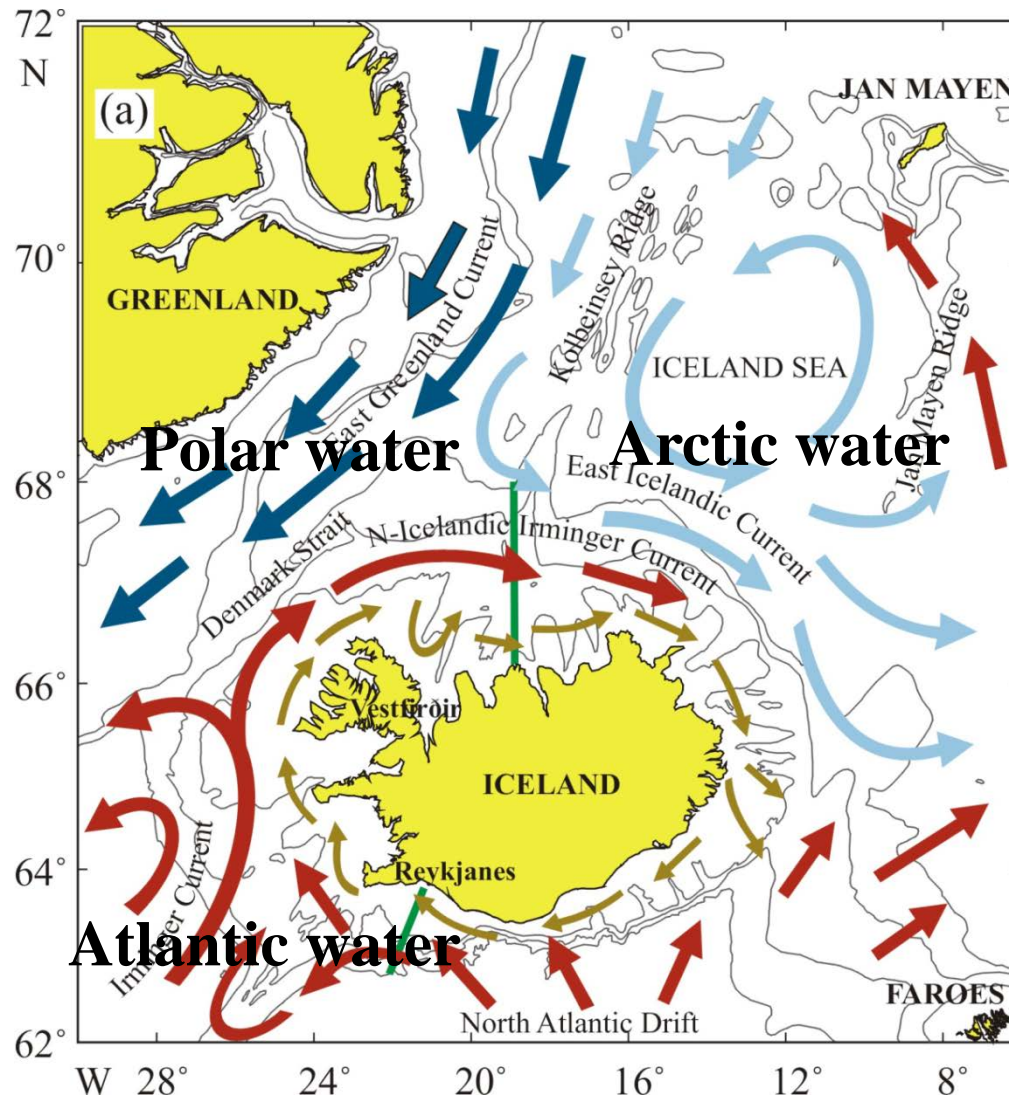
Arctic Research Activities

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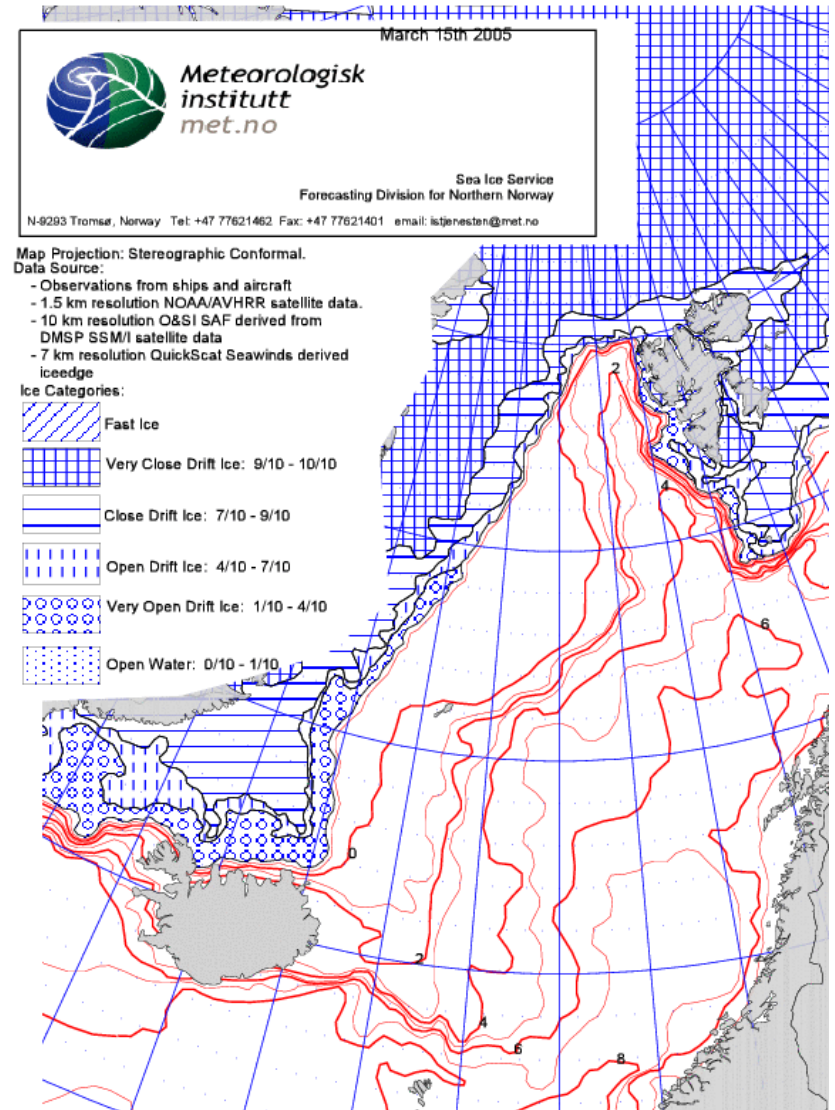
Main currents and water masses





Sea ice map, 15 March 2005

**Iceland is located close
to the outflow from the
Arctic Ocean**





MRI main annual and long term monitoring of fish and environment

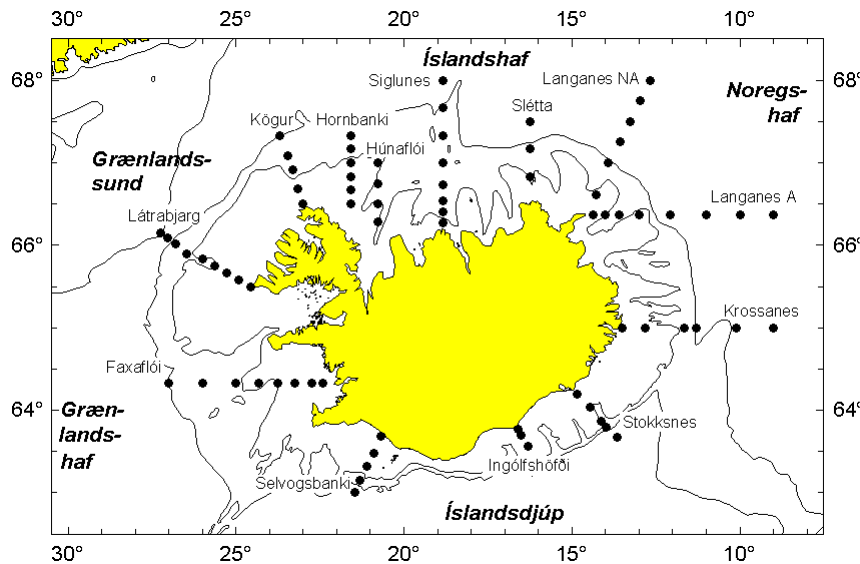
Time	Project	Area
January	Capelin	N, E, S
Feb	Environment	V, N, E, S
March	Groundfish	V, N, E, S
May	Herring	E
May	Lobster/flatfish	V,S
May	Environment	V, N, E, S
July/August	Mackerel	V, N, E, S
August	Hydrography	V, N, E, S
October	Capelin	N
November	Environment	V, N, E, S
November	Groundfish	V, N, E, S
December	Herring	V, N, E, S



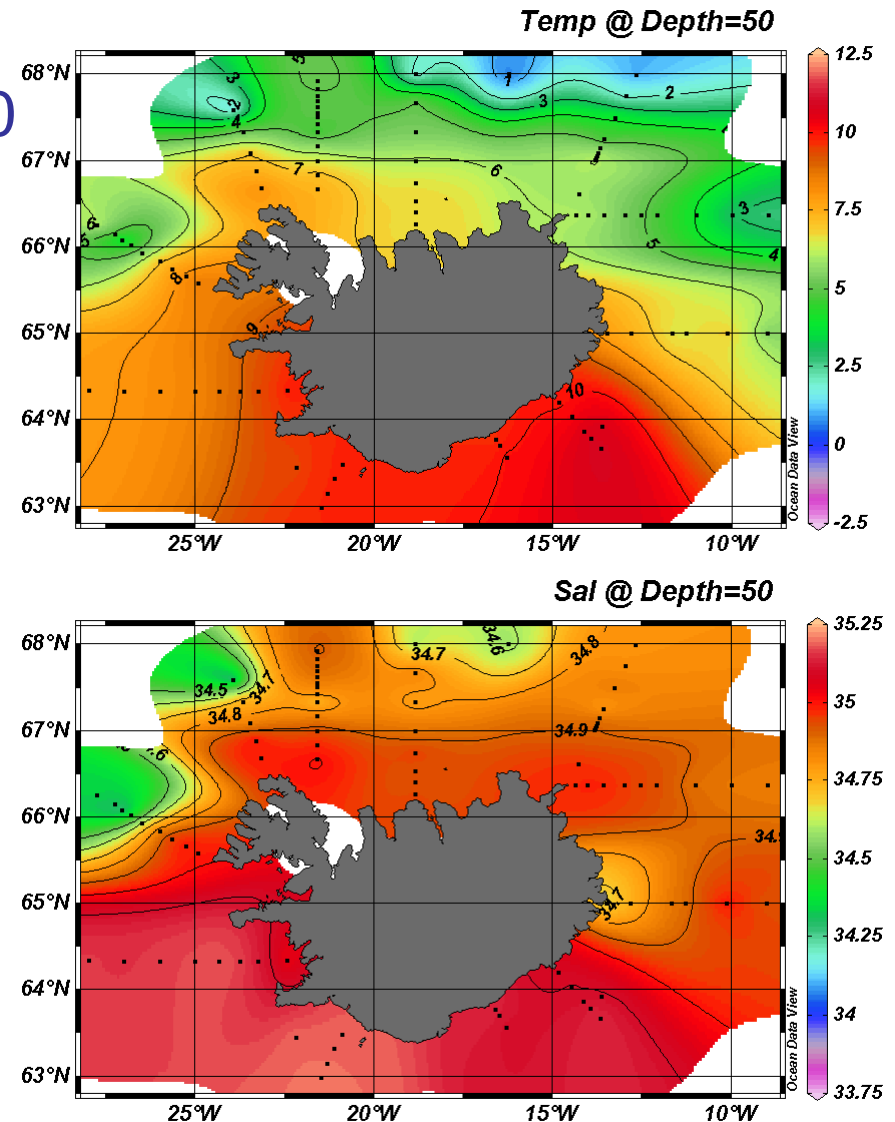
Environment monitoring since 1950s

Feb/May/Aug/Nov: hydrogr, nutrients , plankton

Temp, Aug 2010

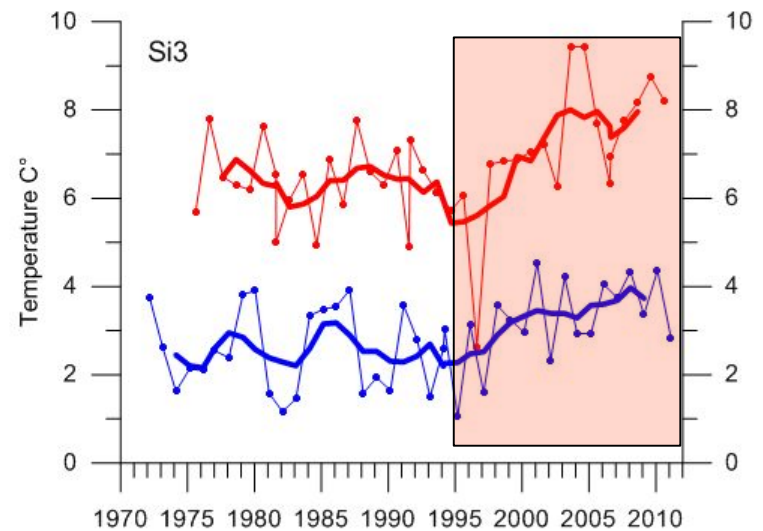
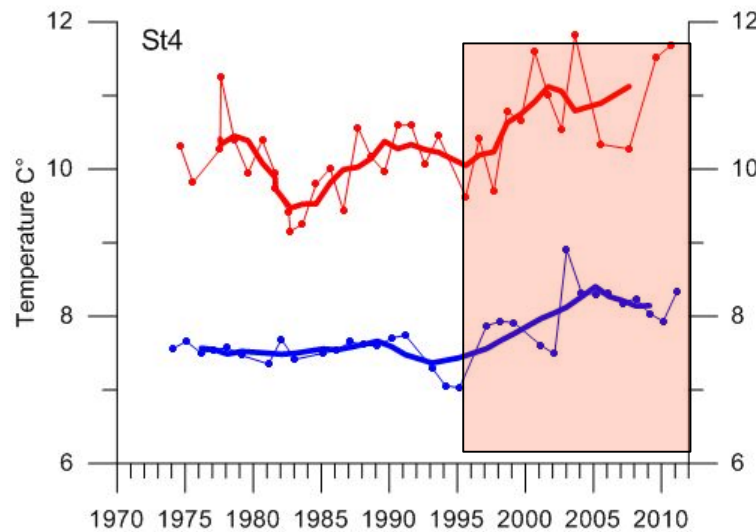
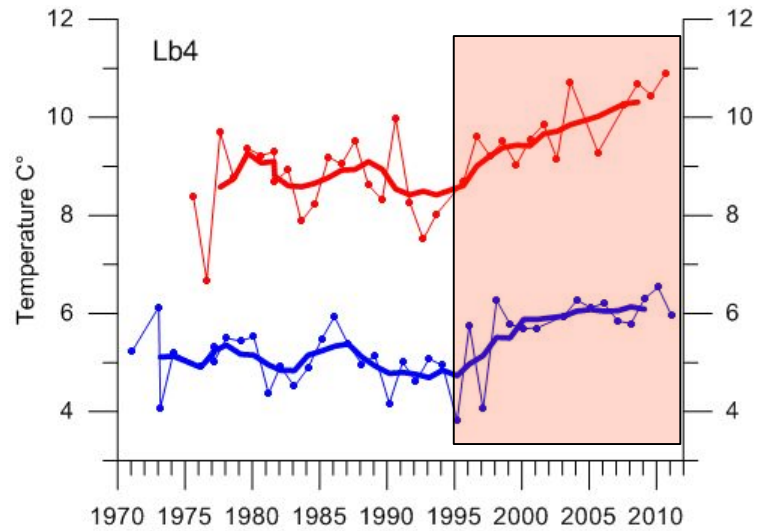
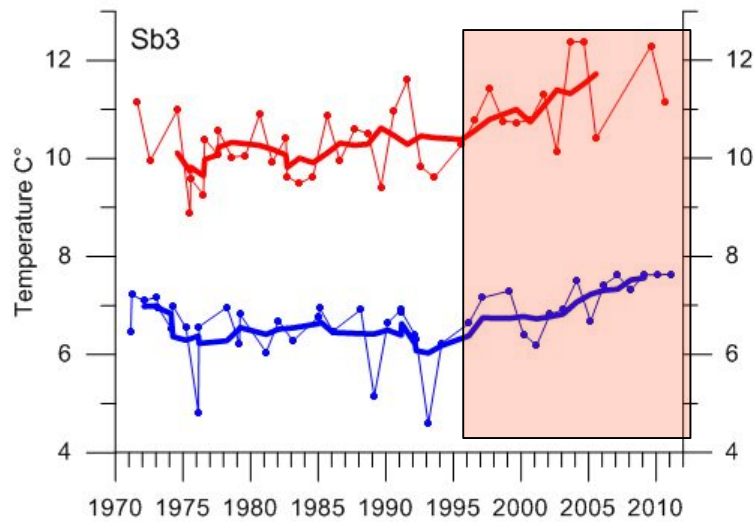


Sal, Aug 2010



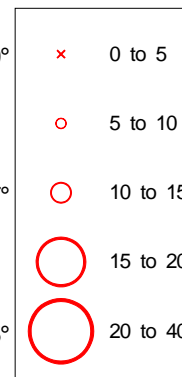
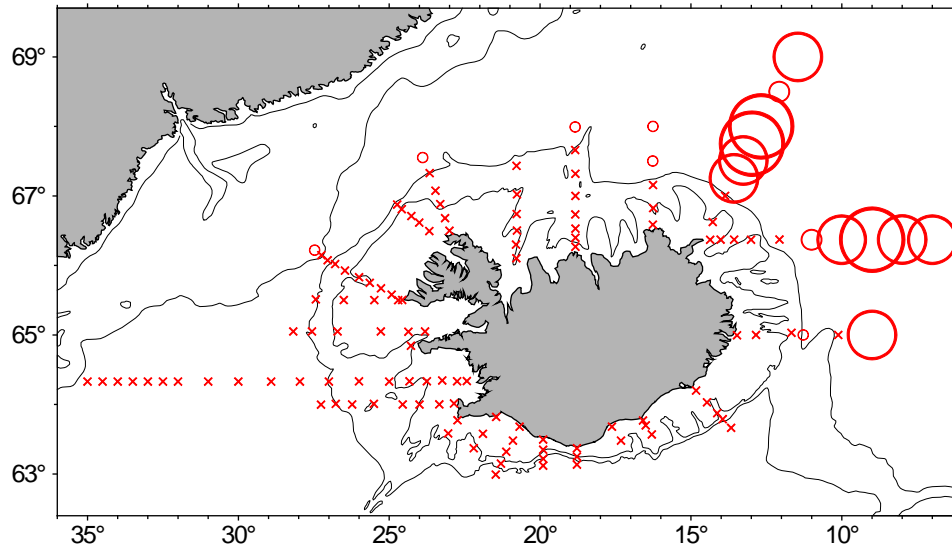
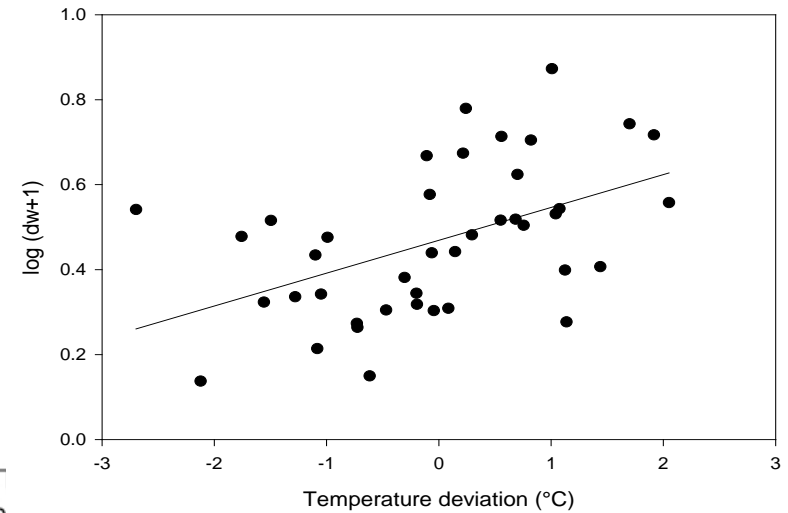
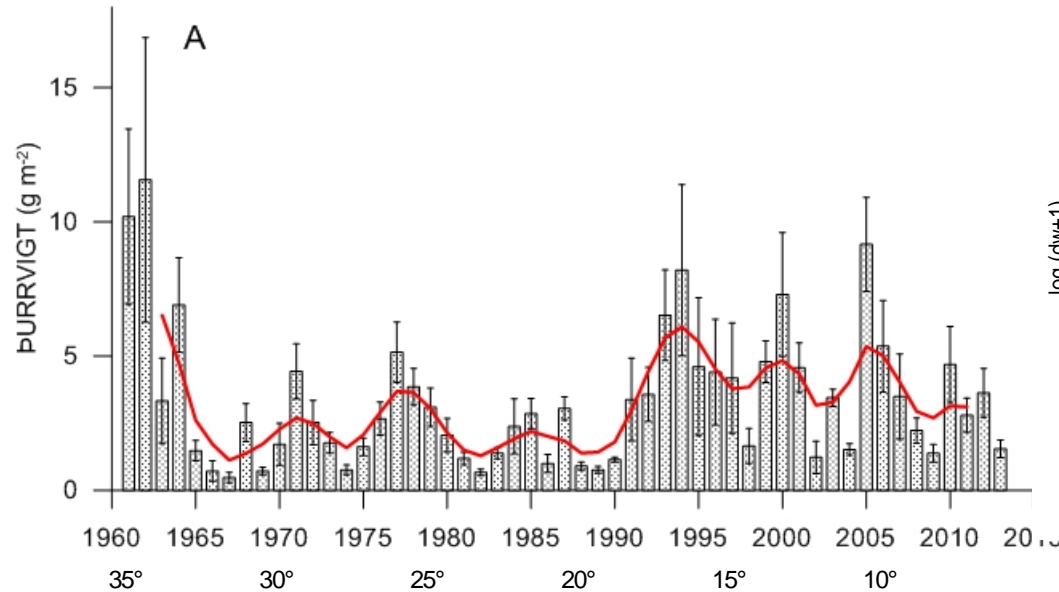


Temperature





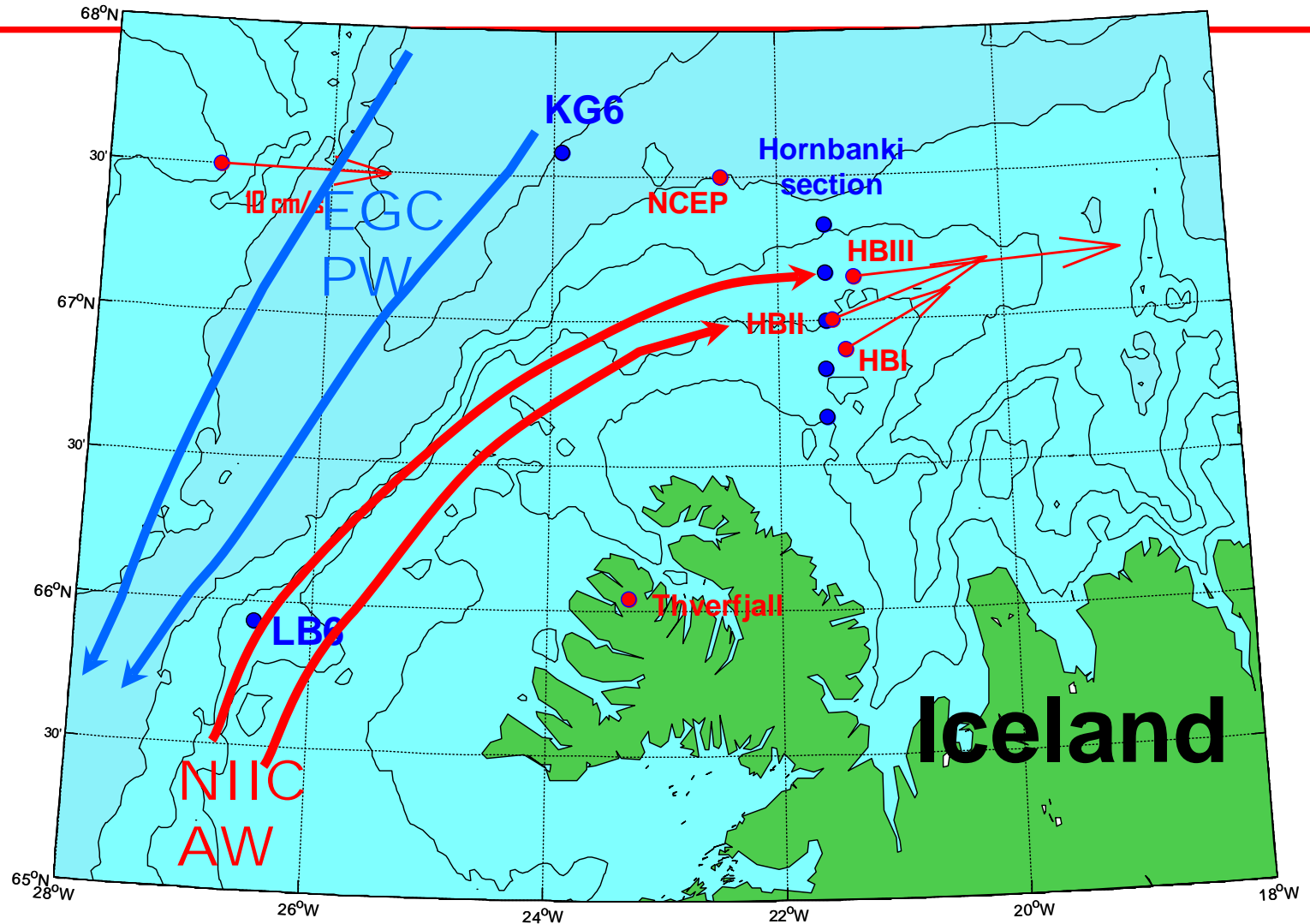
Zooplankton Biomass and composition



% *C. hyperboreus*

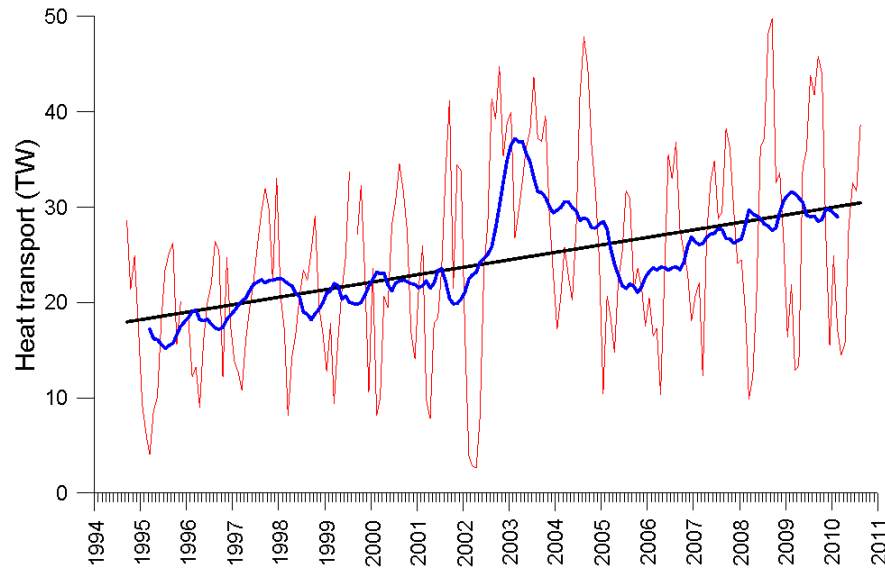


ADCP moorings to measure Atlantic inflow

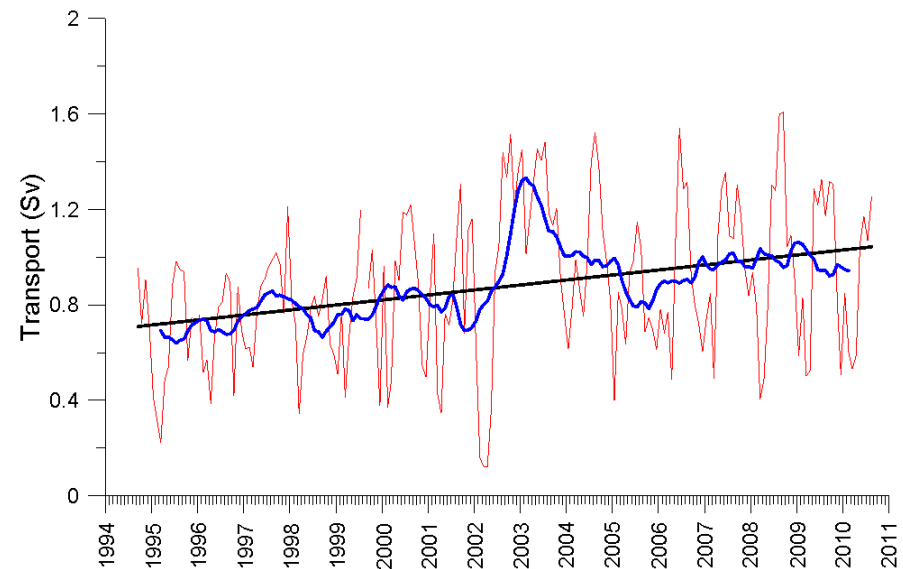




Heat and volume transport North west of Iceland



Monthly mean
13 months running mean

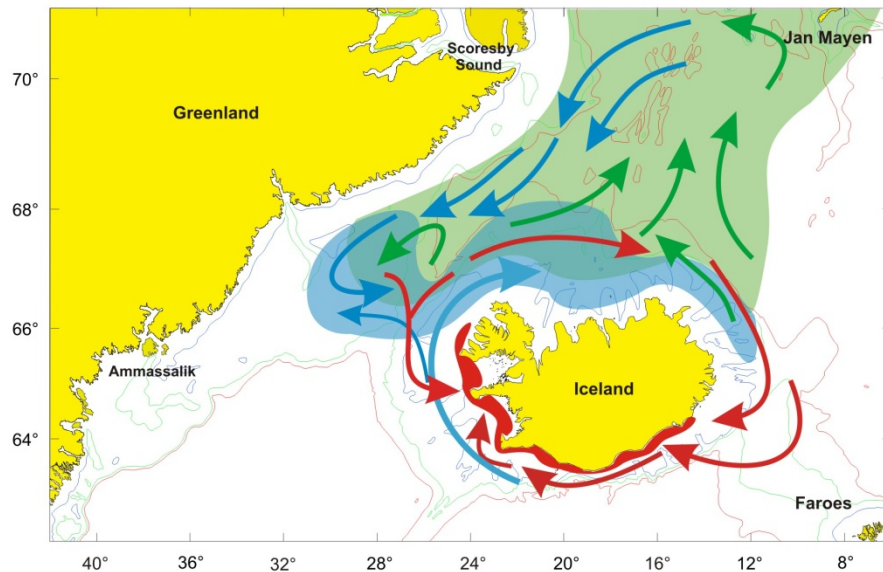


From S. Jonsson, MRI/UAk



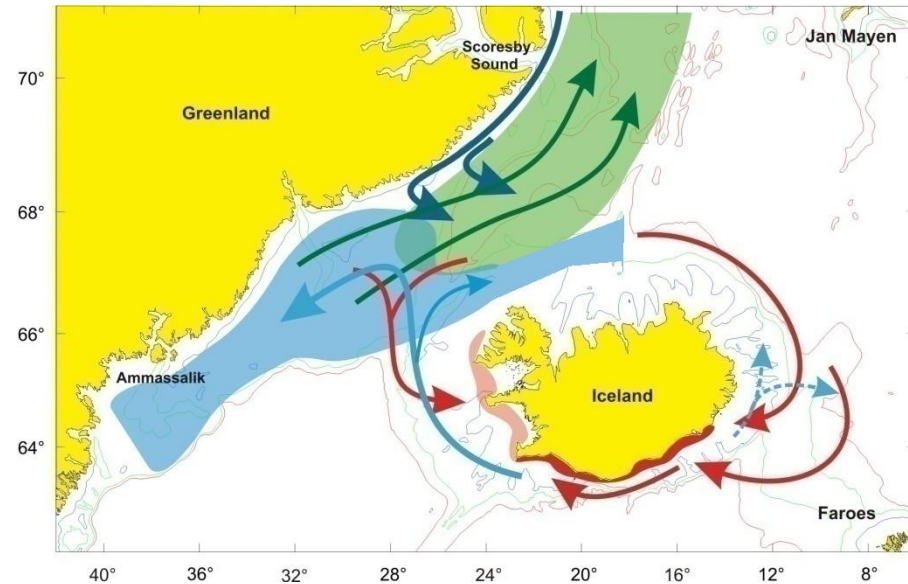
Capelin distribution and migration

Until early 2000s



- Fishable resource
- Food for other fish species, seabirds, whales
- Keystone in ecosystem

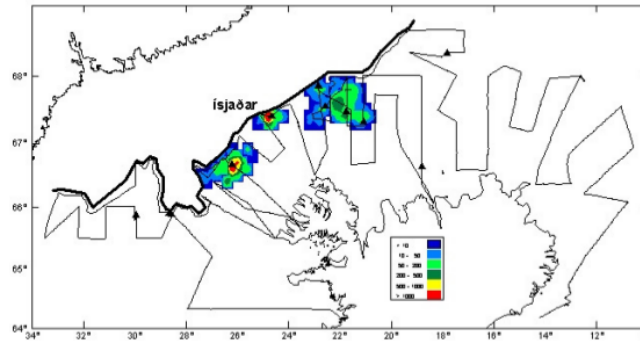
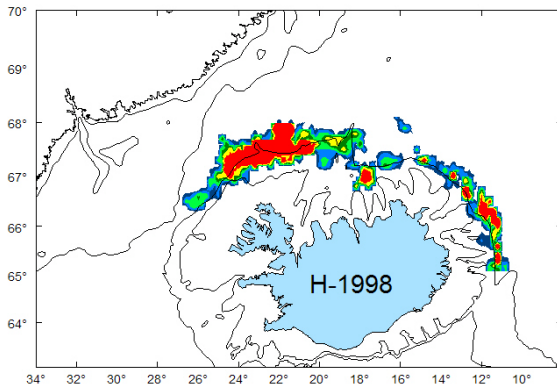
From early 2000s



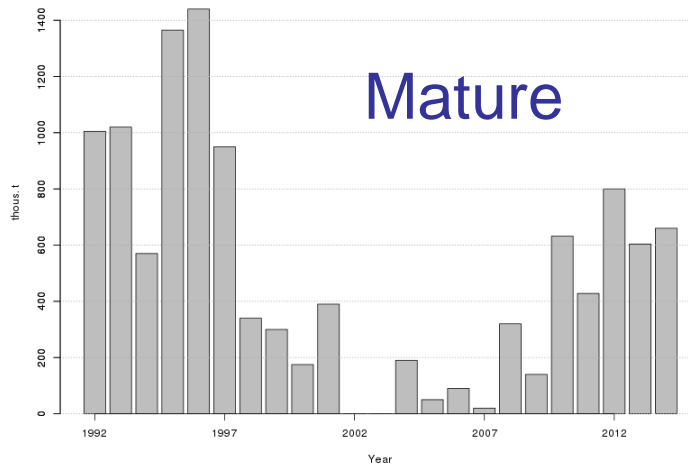
- Nursery area (blue) -> westwards
- Feeding area (green) -> westwards
- Spawning area (red) still the same
- “Return migrations” now later



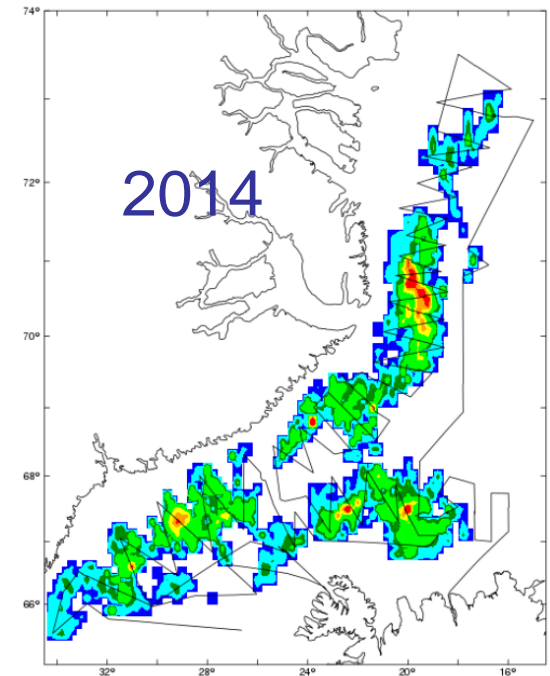
Capelin autumn surveys



2007



Mature



2014

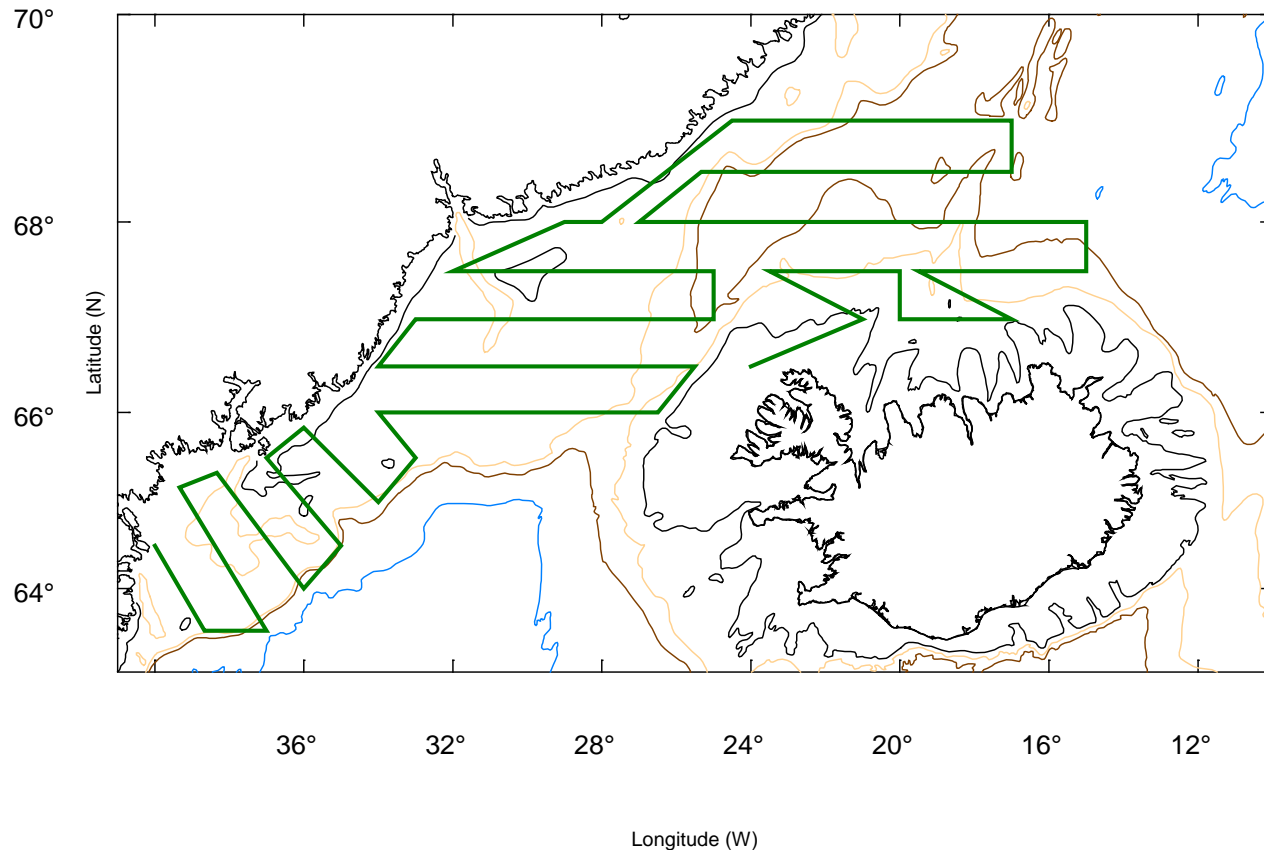


Ecosystem of the Iceland Sea

Life history of capelin and ecosystem pattern

Field phase in 2006-2008

Component of ESSAS (Ecosystem Studies of Sub-Arctic Seas)

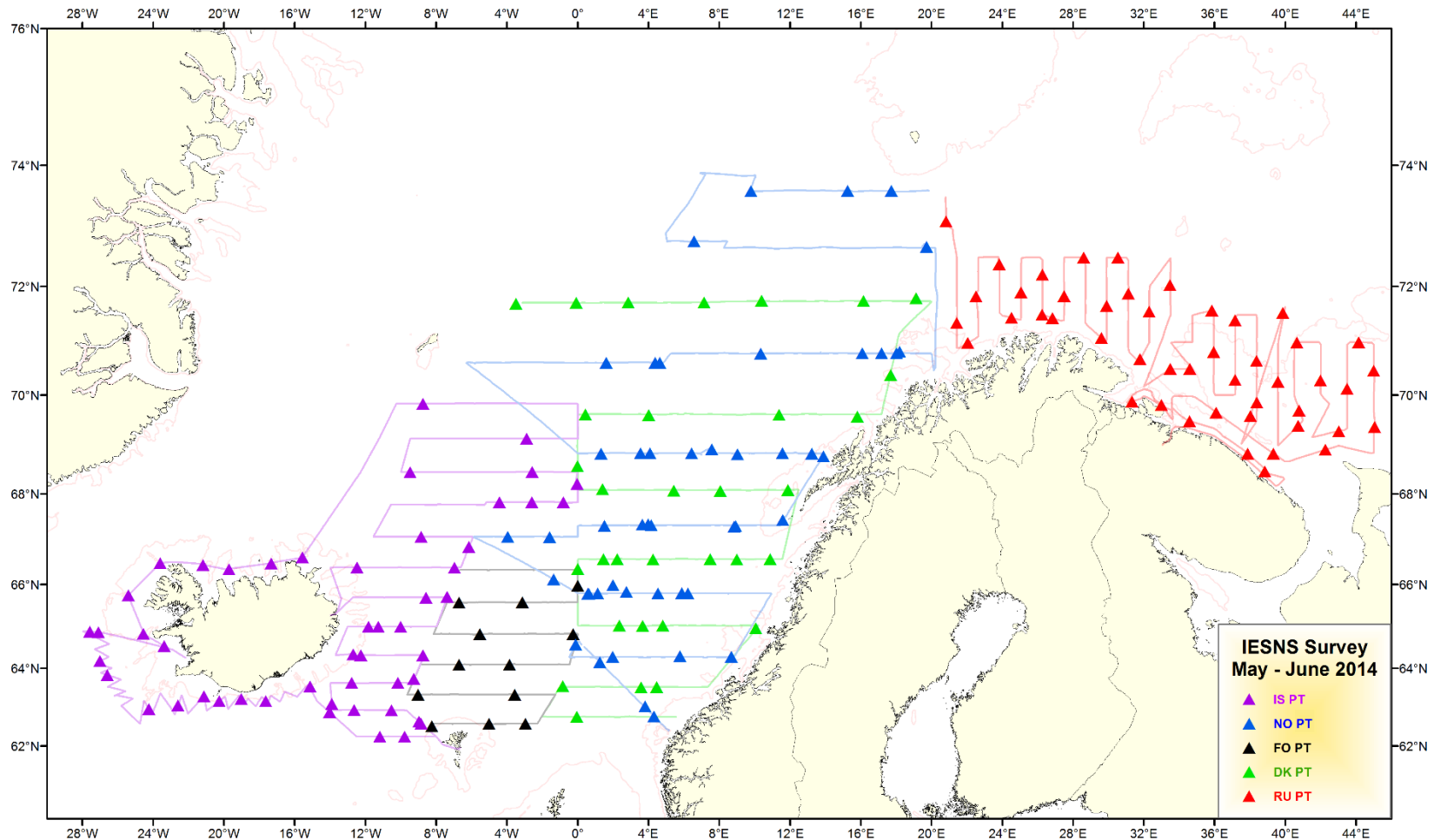




ICES IESNS

Int'l Ecosystem Survey in the Nordic Seas (May)

Herring, blue whiting

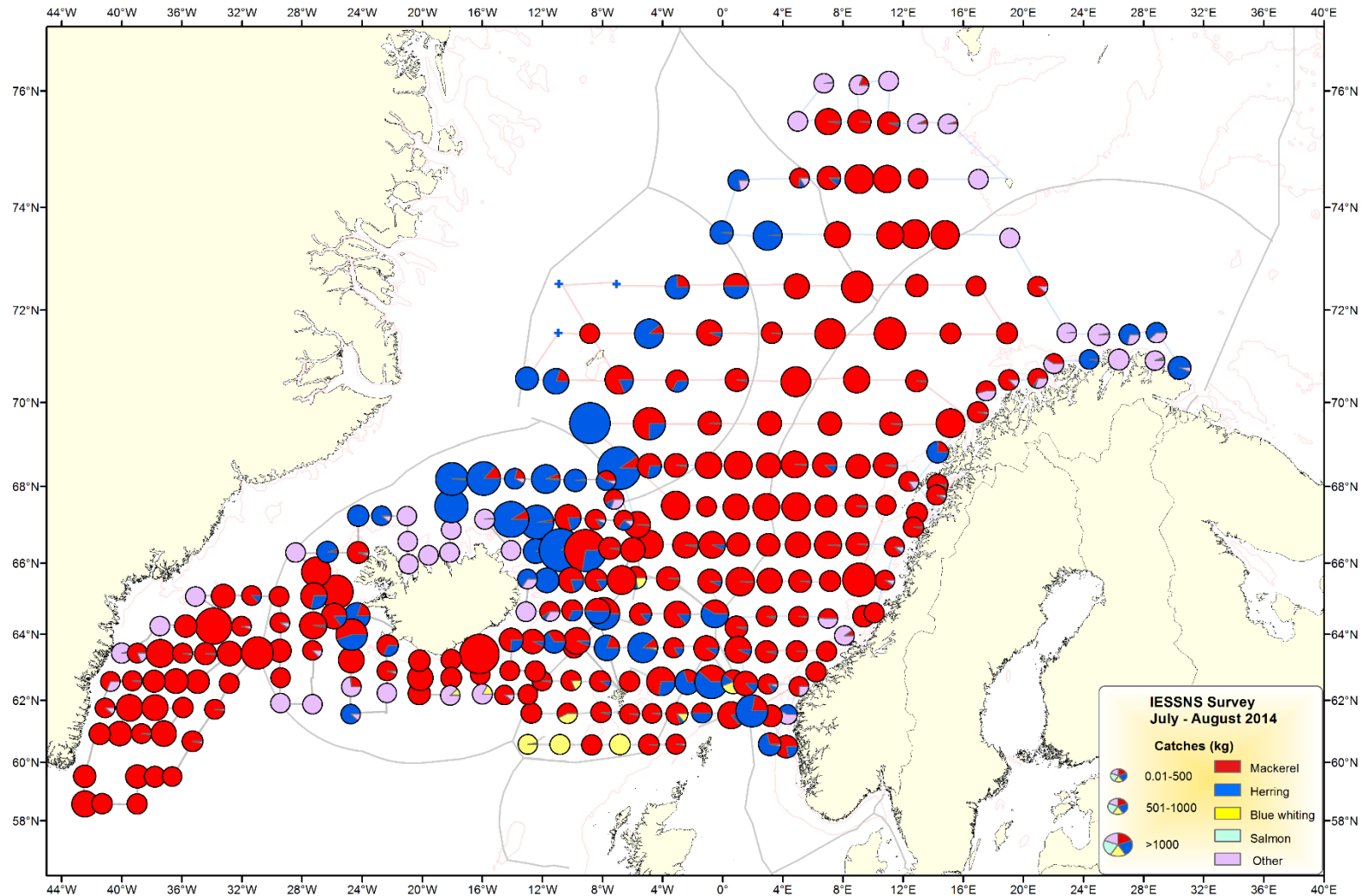




ICES IESSNS

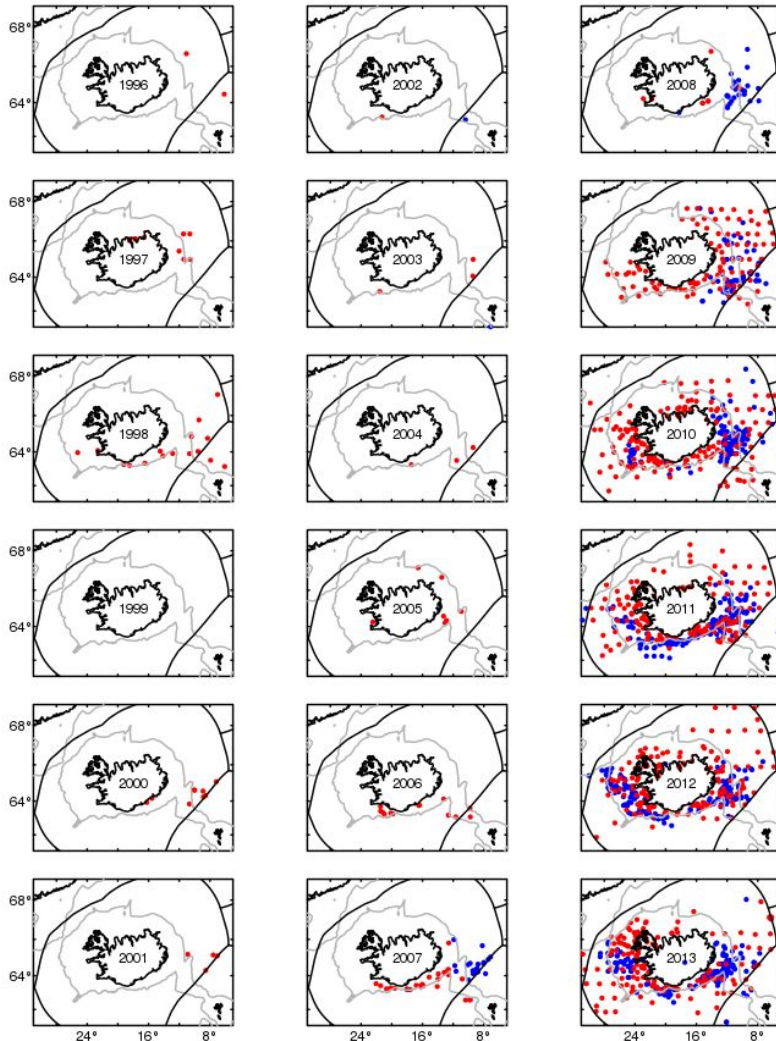
Coordinated Nordic Seas Ecosystem Survey (July/August)

Mackerel, herring

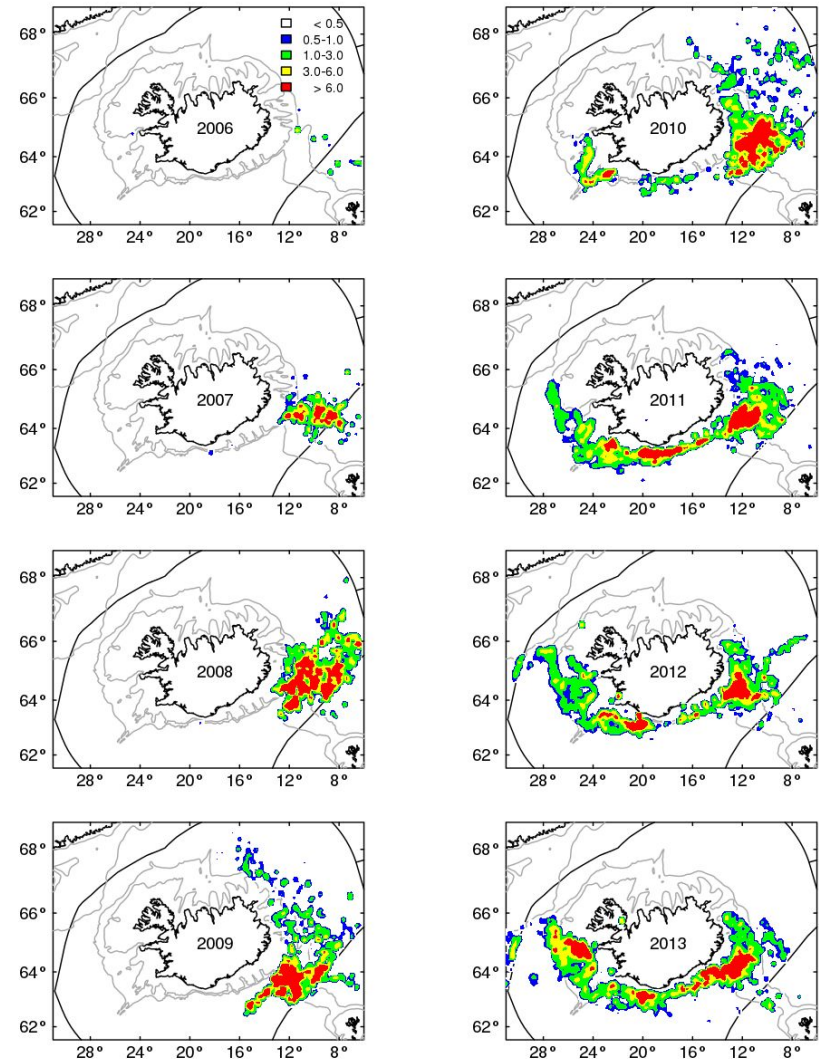




Mackerel at Iceland



Records 1996-2013

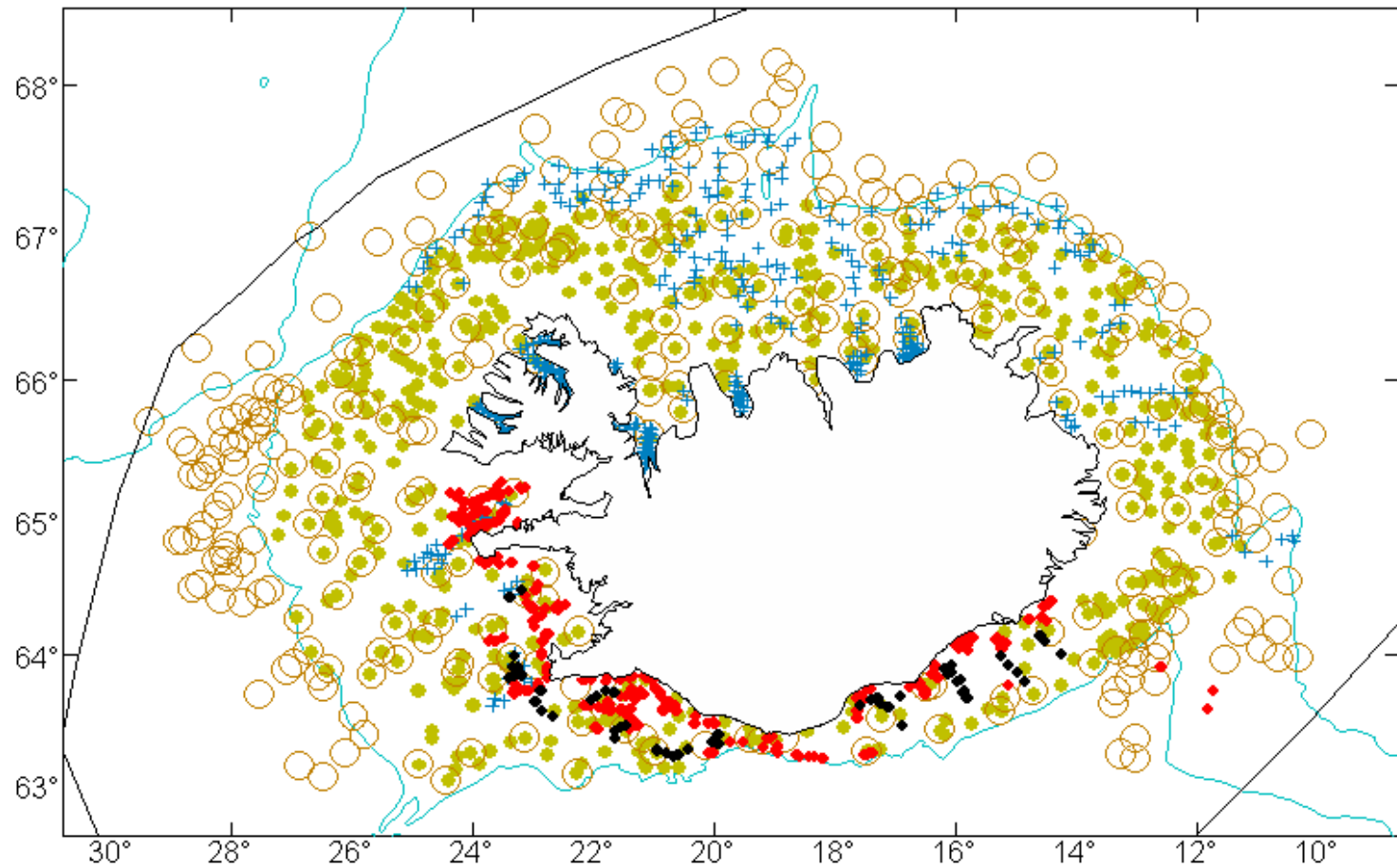


Fishery 2006-2013



Demersal fish monitoring

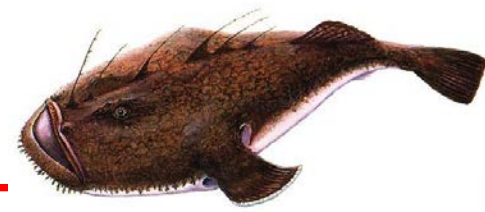
1500 stations in 6 surveys



Ground fish (spring, autumn), spawning cod, shrimp
(inshore/offshore, lobster/flatfish)

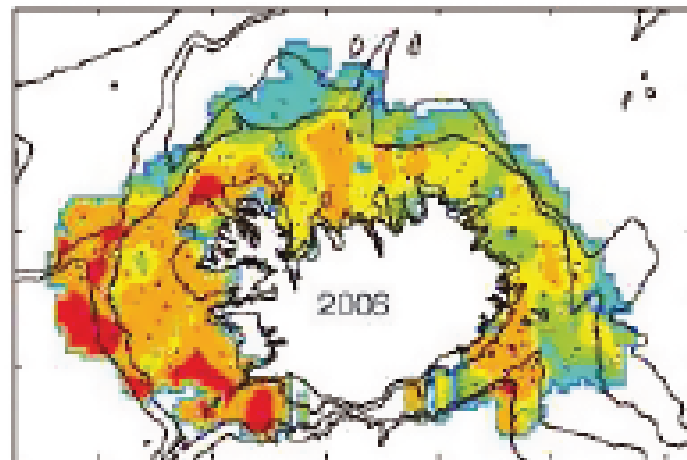
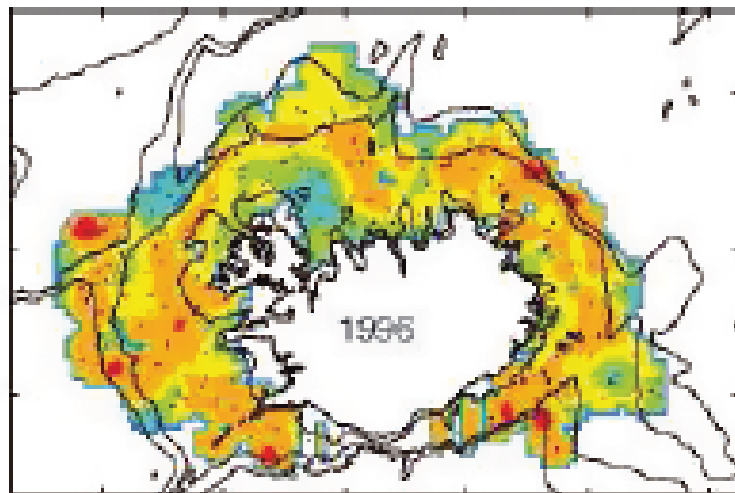


Monkfish, GFS (spring)





GFS autumn

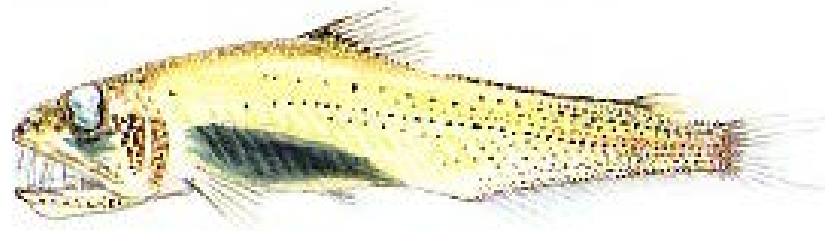
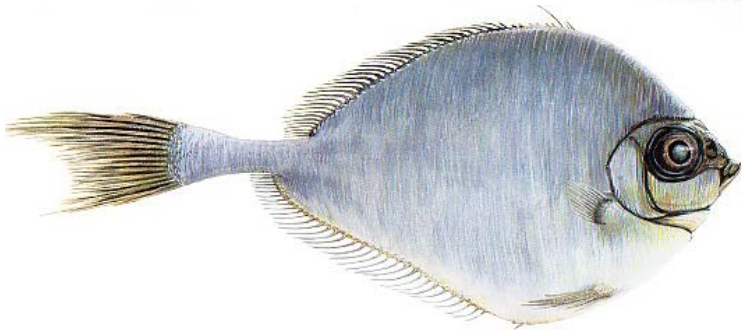
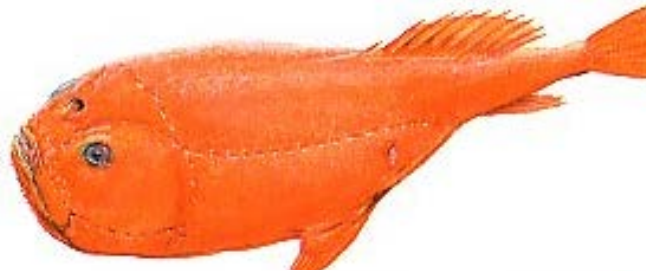


Geographical distribution of
species richness in autumn
ground fish surveys 1996 and 2006
Stefansdottir et al 2010





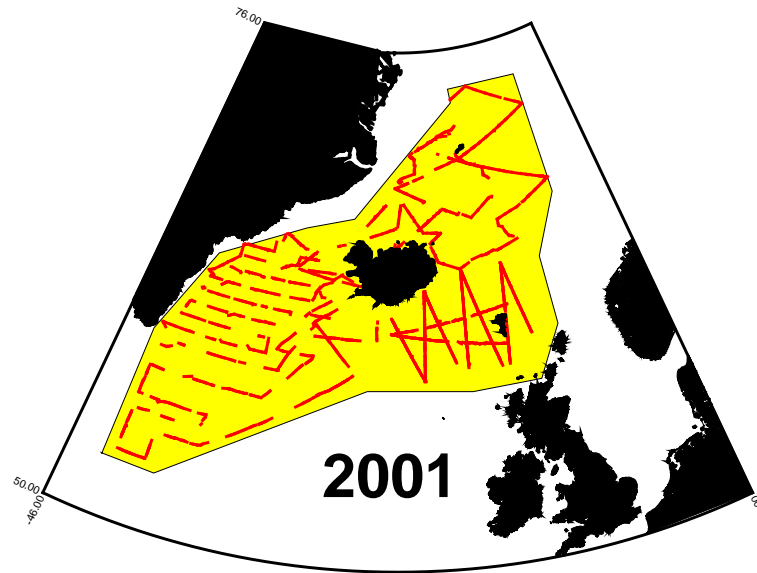
More than the 30 new fish species since 1995





Whale sighting surveys: NASS, TNASS

1987, 1989, 1995, 2001, 2007, 2015/2016



T-NASS 2007. Dedicated cetacean shipboard sightings surveys from 7 vessels (1 Faroese, 3 Icelandic, 2 Norwegian) while dedicated aerial survey conducted from 5 planes (3 Canadian, 1 Greenlandic, 1 Icelandic). Observers also on fishery research vessels from Iceland, Germany, Russia and UK



Log books

- All vessels fill out detailed report on each fishing operation
- Catch/species, position, time, fishing gear (how long/how).
- All data in MRI data base
- Annually about 170 thousand fishing related operations registered
- Electronic logbooks from 2009



Recent MRI international cooperation

- Hydrography: Arctic Subarctic Ocean Fluxes (ASOF), Thermo-Haline Overturning at risk (THOR), North Atlantic Climate (NACLIM)
- Biology/environment: Basin-scale Analysis, Synthesis and Integration (BASIN)
- Monitoring of fish stocks (capelin, herring) (ICES)
- Carbon absorption and release: Lamont-Doherty Earth Observatory USA, EU programs Carbo-Ocean, Carbo-Change)



Lack of knowledge

- Research on currents/fronts in relation to mixing processes and production (distribution, interaction, competition)
- Ability of organisms to adapt to climates changes
- Effect of climate changes on interactions between predator and prey
- Effect of new species with respect to competition
- Habitat needs of organisms
- Seabirds
- Ecosystem studies and comparison of ecosystems
- Models to link physics and biology