UiT

THE ARCTIC UNIVERSITY OF NORWAY

Climate and Fisheries in the North

Klima og fiskerier i Nord

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Vice Dean / Prodekan
Faculty of Biosciences, Fisheries and Economics
UiT The Arctic University of Norway





Klima Marin 16. November 2016

ClimeFish:

Co-creating a decision support framework to ensure sustainable fish production in Europe under climate change



ClimeFish

This project has received funding from the European Union´s Horizon 2020 research and innovation action under grant agreement no.677039


SEA BASS
SALMON
HADDOCK
CARP
COD

ClimeFish Horizon 2020 project

- 48 month duration, 04/2016 – 03/2020
- 5 MEUR EU contribution, 1.6 MEUR to Norway
- UiT leads, 21 participants from 16 countries

- In Tromsø:
  BFE Faculty and
  K.G. Jebsen Centre for the Law of the Sea
- Nofima
- IMR

http://climefish.eu/

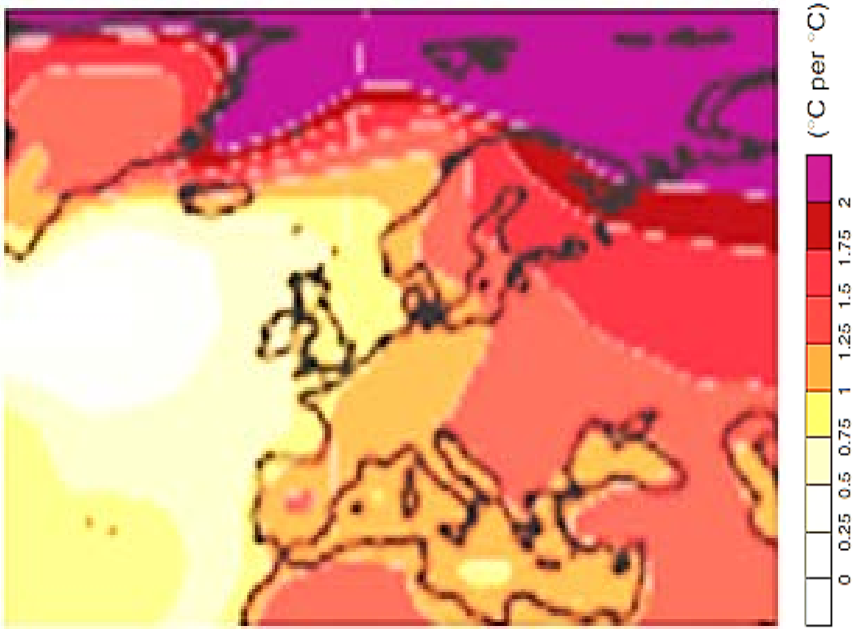
Categorization of ClimeFish case studies

Case #	Ref	Sim	Impl	Geographical area	Species	Participants
C1F	X	X		NE Atlantic	Herring, mackerel, capelin, blue whiting, anchovy, sardine	Matis, IMR, ICES, UniAbdn, MUN
C2F	X			Baltic Sea	Herring, sprat	SU BSC
C3F	X			Baltic Sea	Cod	SU BSC
C4F	X			Barents Sea	Cod, haddock	IMR, UiT
C5F	X	X	X	West of Scotland	Hake, cod	UniAbdn
C6F	X			Adriatic Sea	Hake	UniVe
C7F	X			North Norwegian lakes	Brown trout, Arctic char, whitefish, vendace	UiT
C8F	X	X		Italian lake Garda	Whitefish, Arctic char	UniVe, UiT
C9F	X			Czech Republic lakes	Catfish, pike-perch, carp, whitefish	BCAS, UiT, UniVe
C10A	X	X	X	Hungary	Carp, catfish	HAKI
C11A	X	X		NE Atlantic	Salmon, cod	Nofima, UoS
C12A	X	X	X	Greece	Sea bass, meagre	HCMR
C13A	X	X		Spain, Iberian upwelling	Blue mussel, carpet shell	CSIC
C14A	X			Scotland	Blue mussel, flat and cupped oyster	UoS
C15A	X			Italy	Blue mussel, carpet shell	UniVe
C16AF	X	X		European waters overall	All species listed above	UiT, Nofima, all

ClimeFish

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Climate change - Scenarios and forecasts

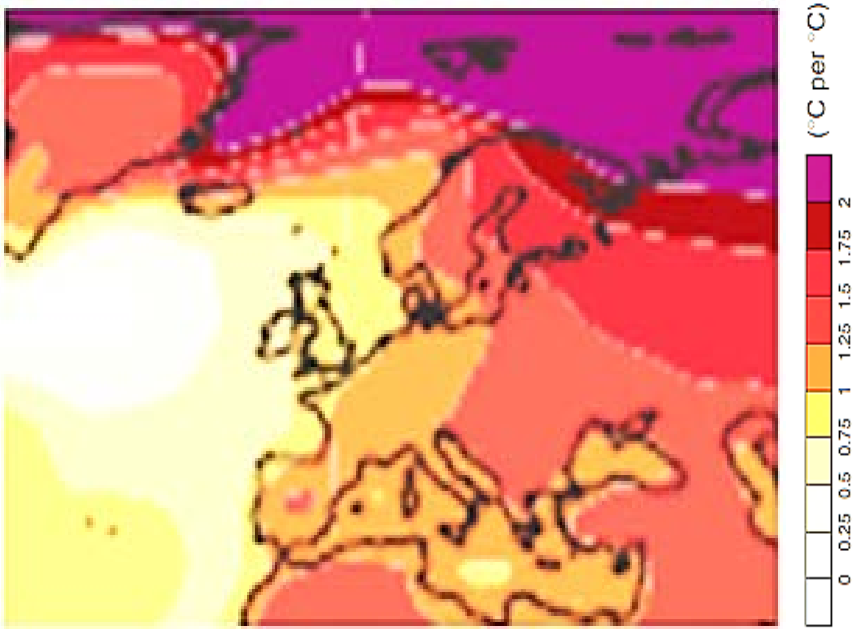


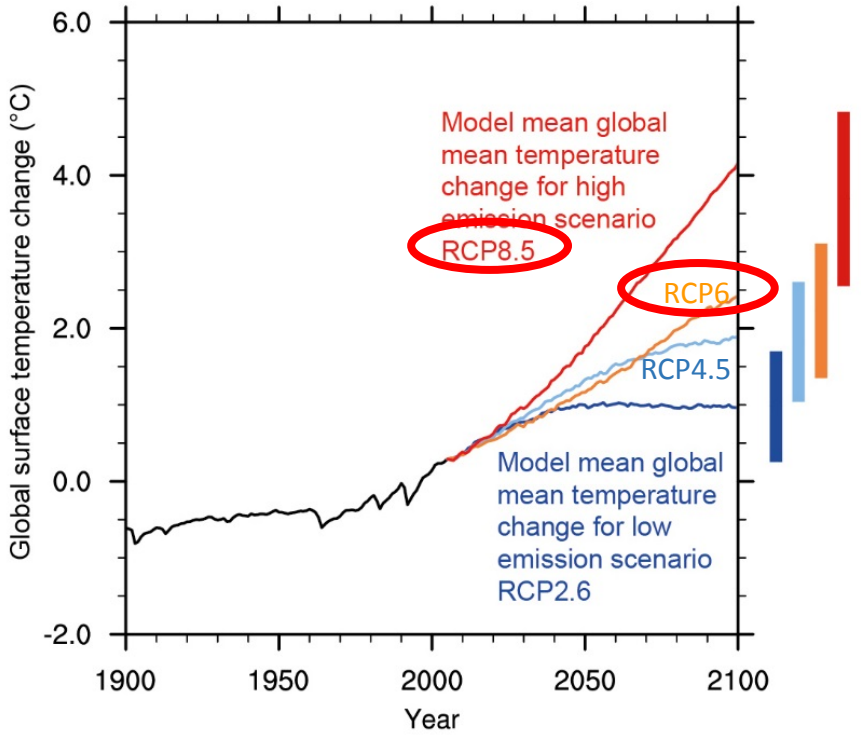
Regional sensitivity map for temperature change in relation to global warming (°C per °C)

ClimeFish

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Climate change - Scenarios and forecasts





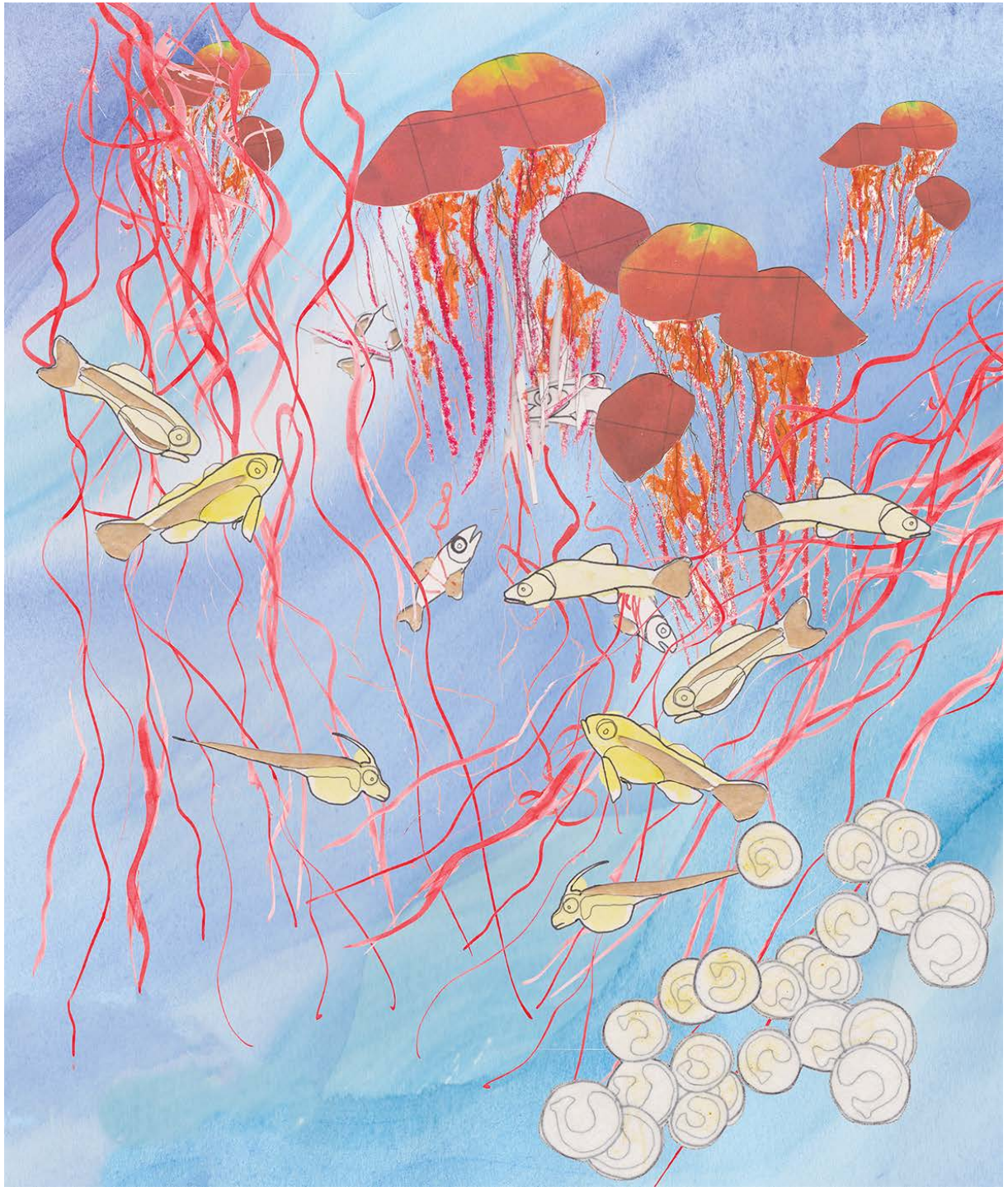
Focus on two radiative scenarios (W/m^2 by 2100) – RCP Representative Concentration Pathways

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Threats:

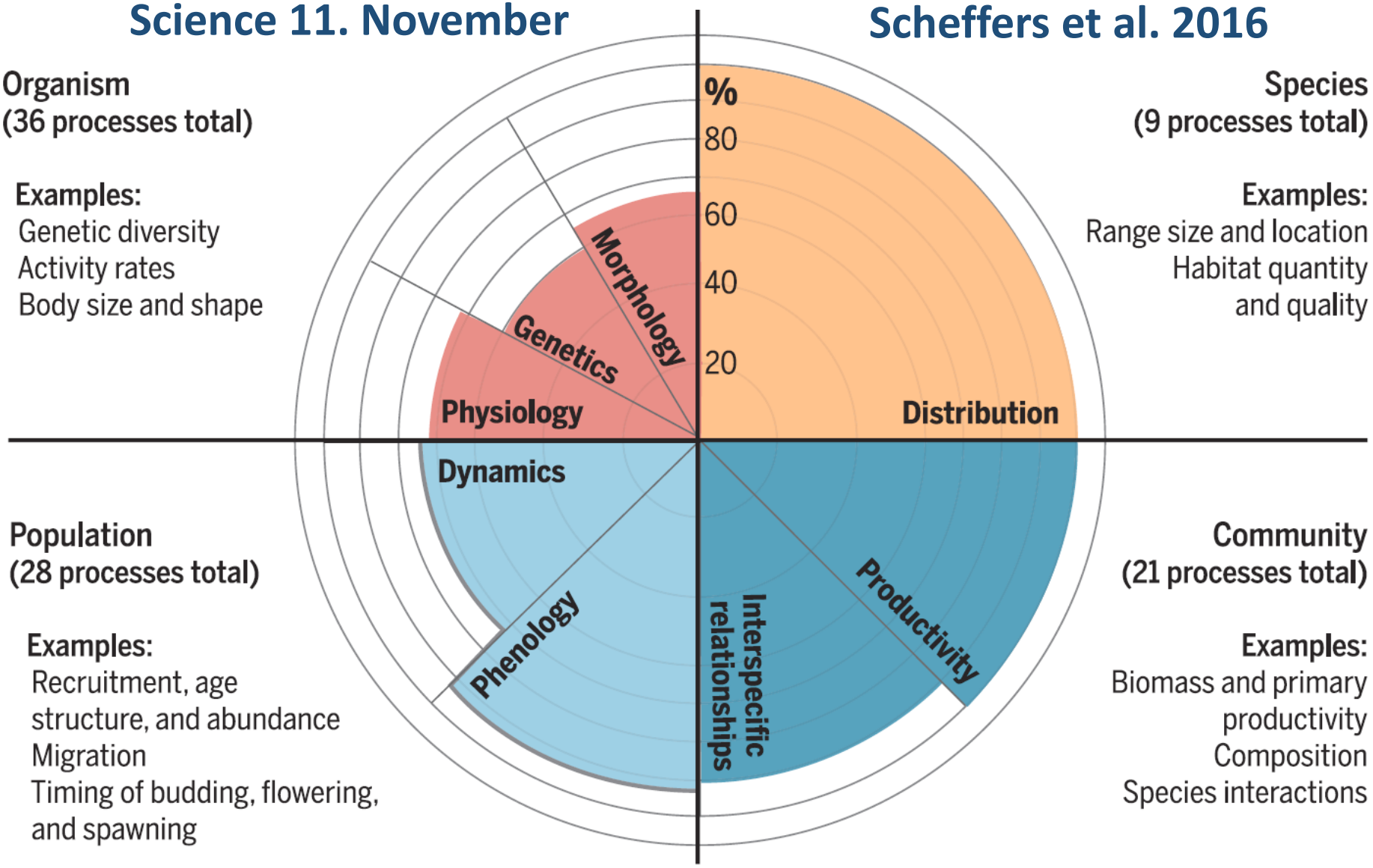
- Temperature
- Salinity
- Erosion
- Acidification
- Toxins
- Jellyfish
- Disease

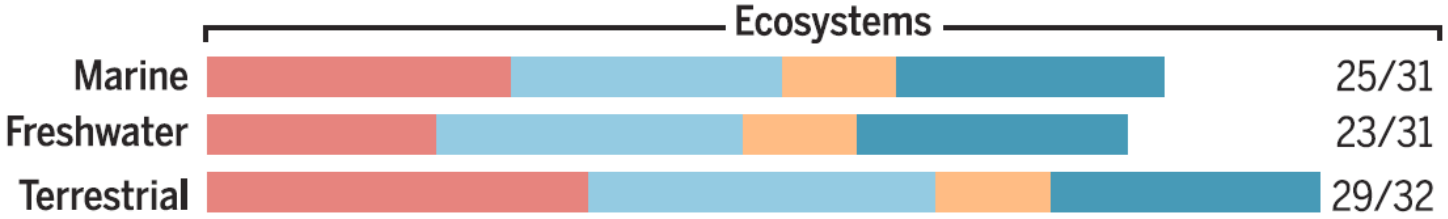


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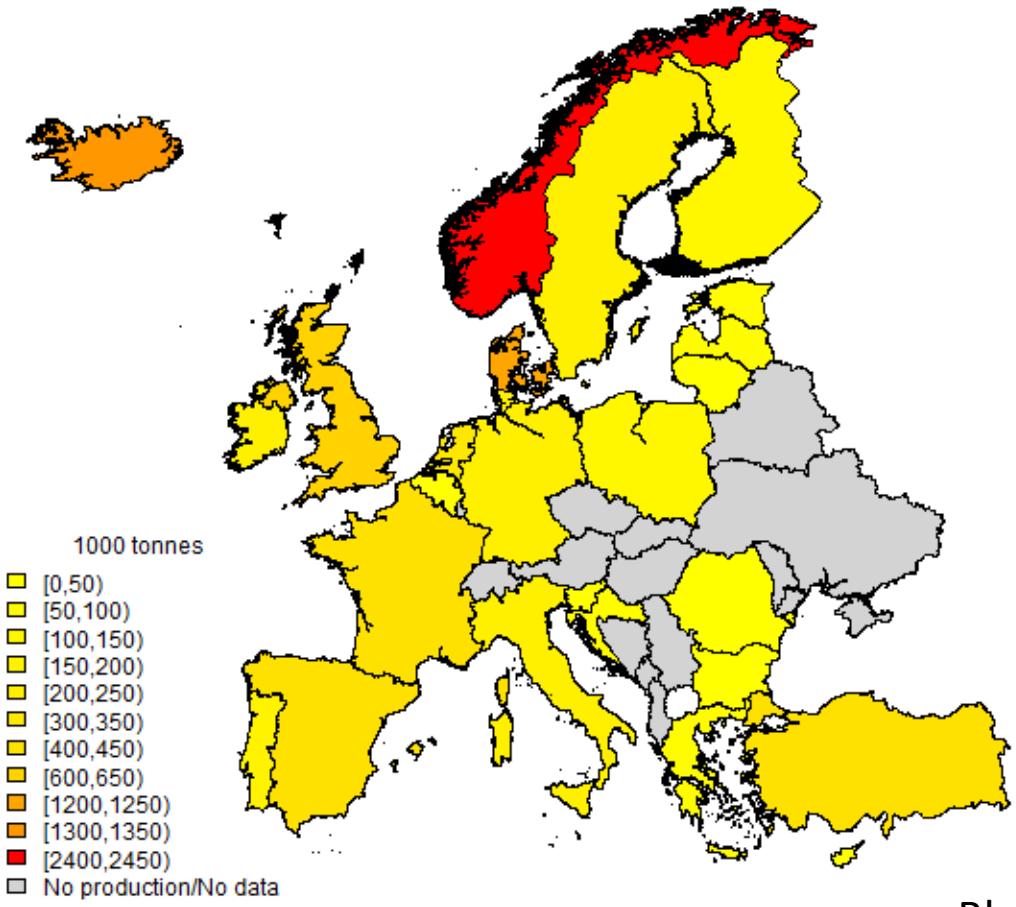
Science 11. November

Scheffers et al. 2016



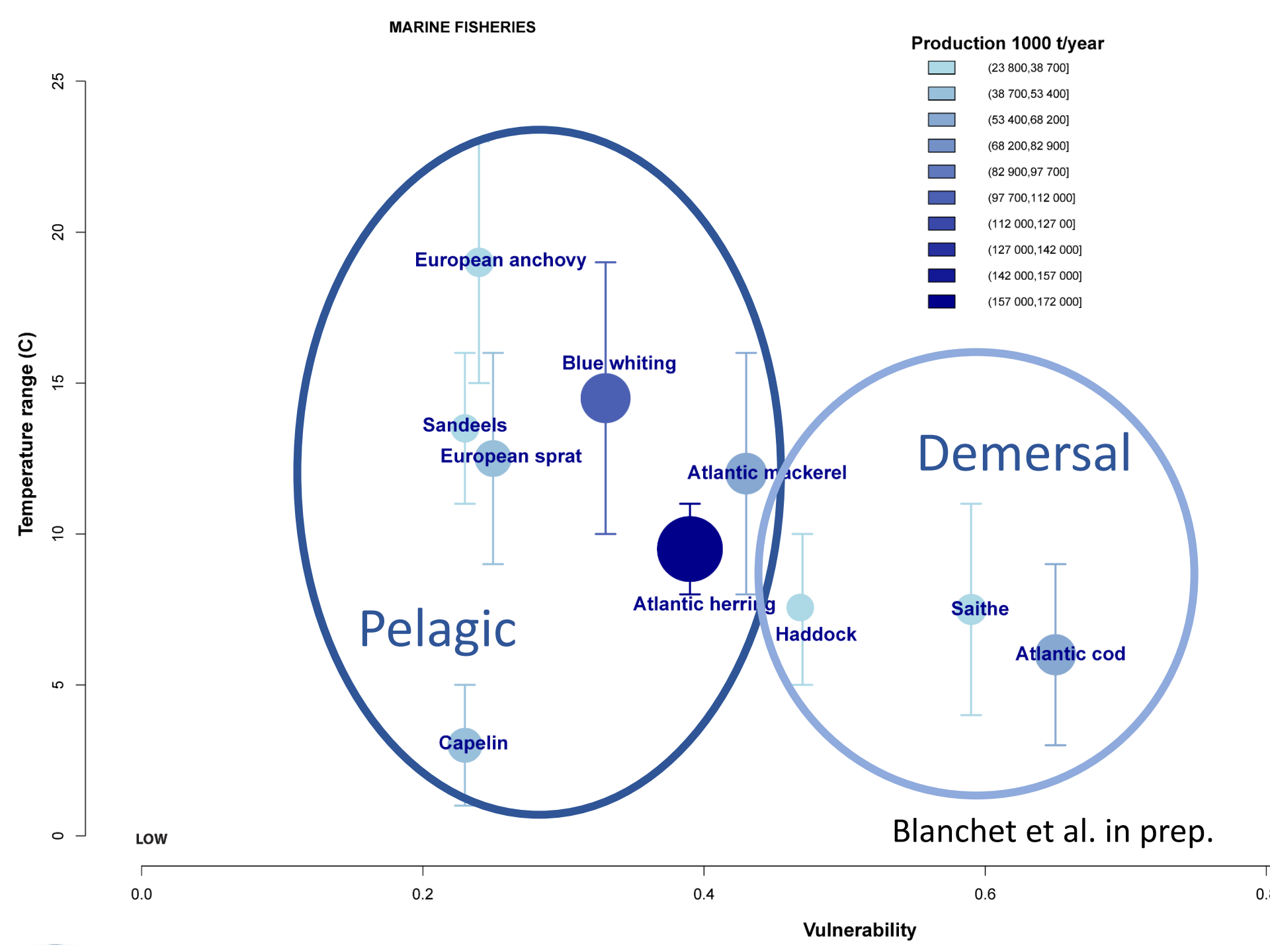


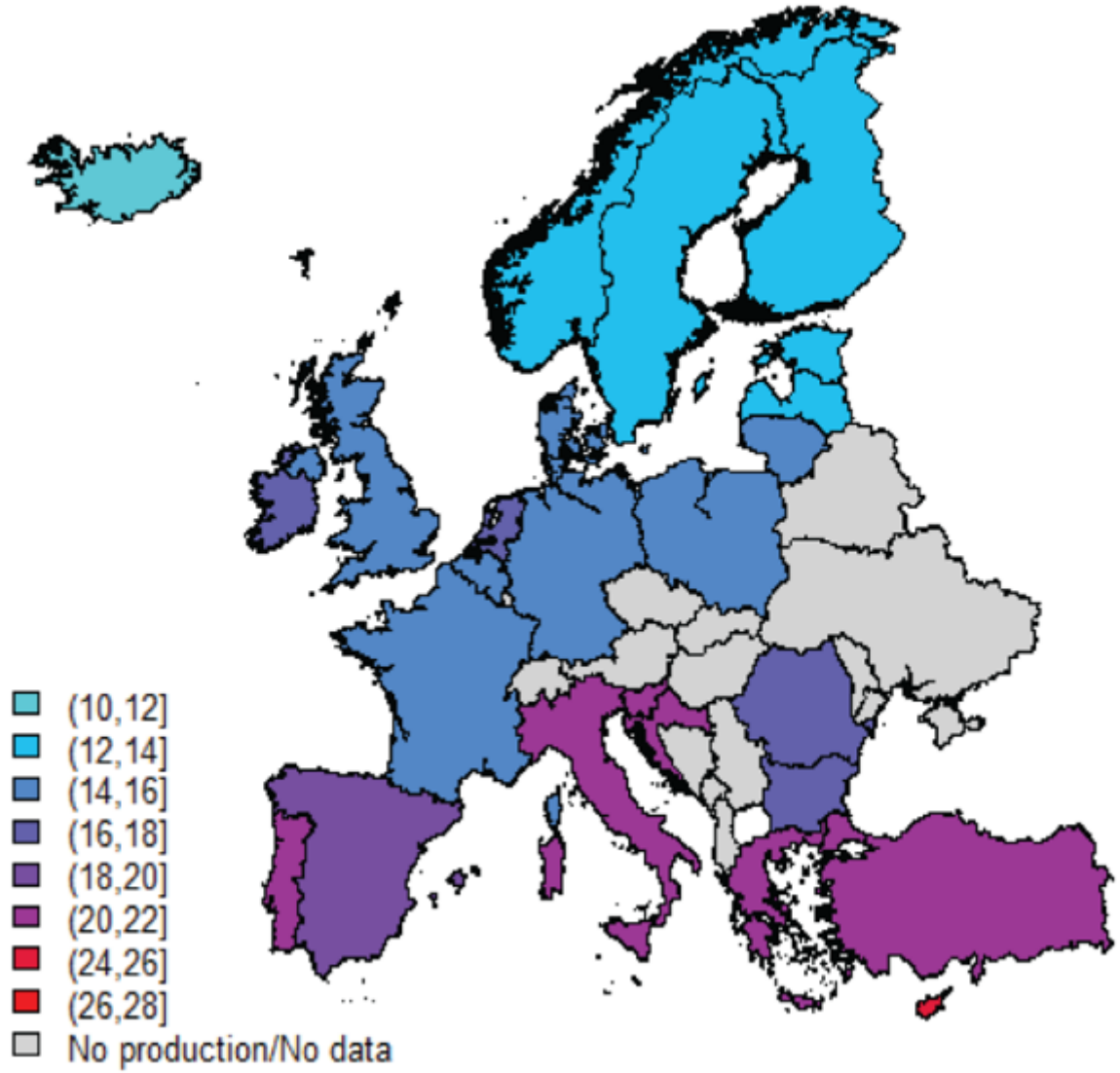
Average production in Europe 2004-2014 for marine fisheries



Blanchet et al in prep.

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pean Union´s Horizon 2020 research
innovation action under grant
ement no.677039


MARINE FISHERIES
Production 1000 t/year
(23 800,38 700]
(38 700,53 400]
(53 400,68 200]
(68 200,82 900]
(82 900,97 700]
(97 700,112 000]
(112 000,127 00]
(127 000,142 000]
(142 000,157 000]
(157 000,172 000]
Temperature range (C)
0
5
10
15
20
25
European anchovy
Blue whiting
Sandeels
European sprat
Atlantic mackerel
Atlantic herring
Capelin
Haddock
Saithe
Atlantic cod
Pelagic
Demersal
LOW
0.0
0.2
0.4
0.6
Vulnerability
Blanchet et al. in prep.



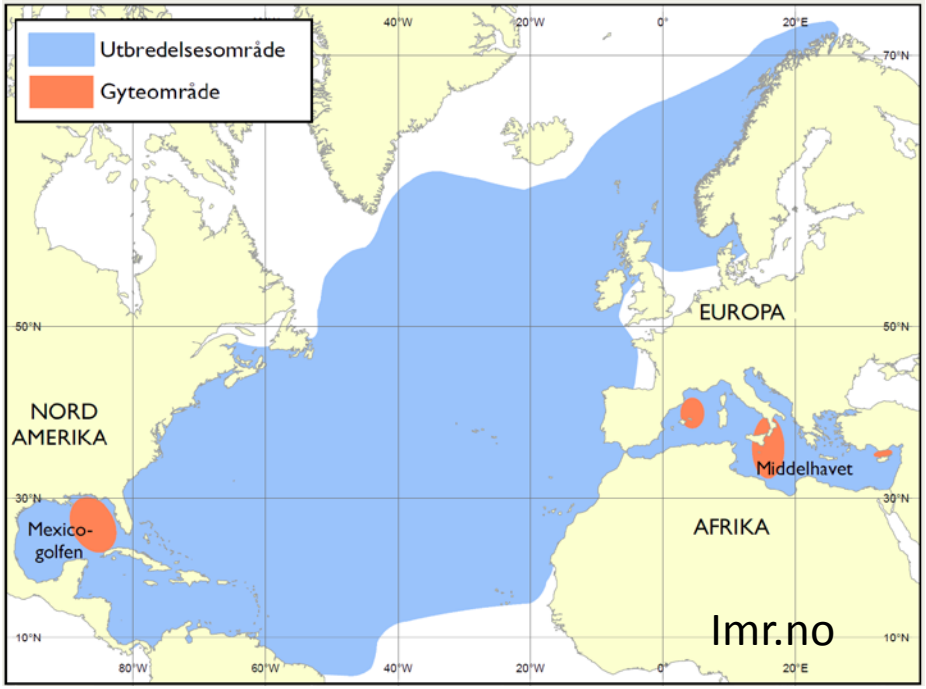
Maximum temperature tolerance of the top exploited marine fish species

- **Low temperature tolerance**
- **High temperature tolerance**

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Atlantic bluefin tuna







Makrellstørja, verdens største tunfisk, er tilbake i norske farvann



Her sløyes makrellstørjene på dekk i natt. Mannskapet jobbet hele natten med 190 størjene. FOTO: PRIVAT

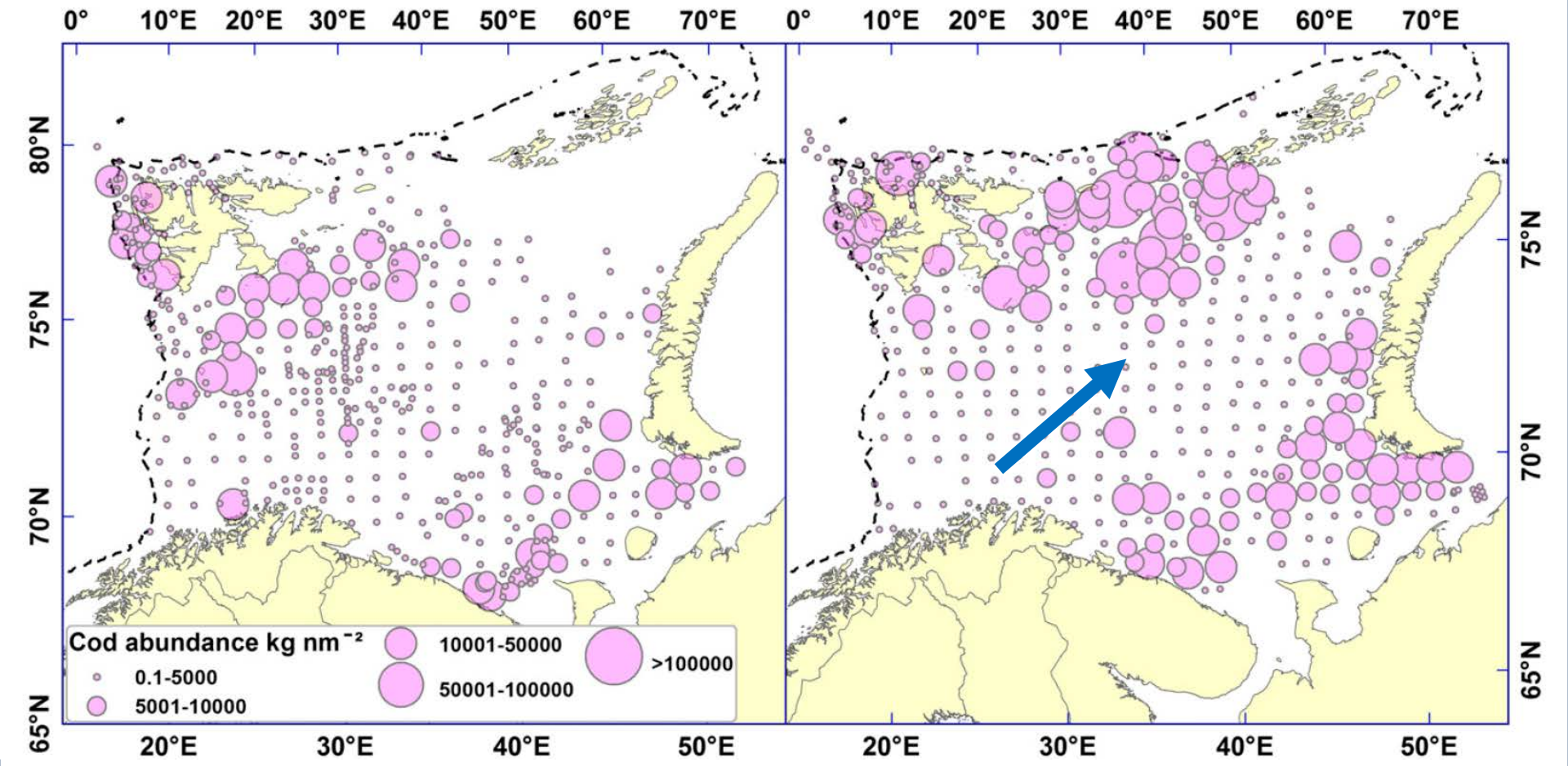
Fikk 190 makrellstørjer på én gang

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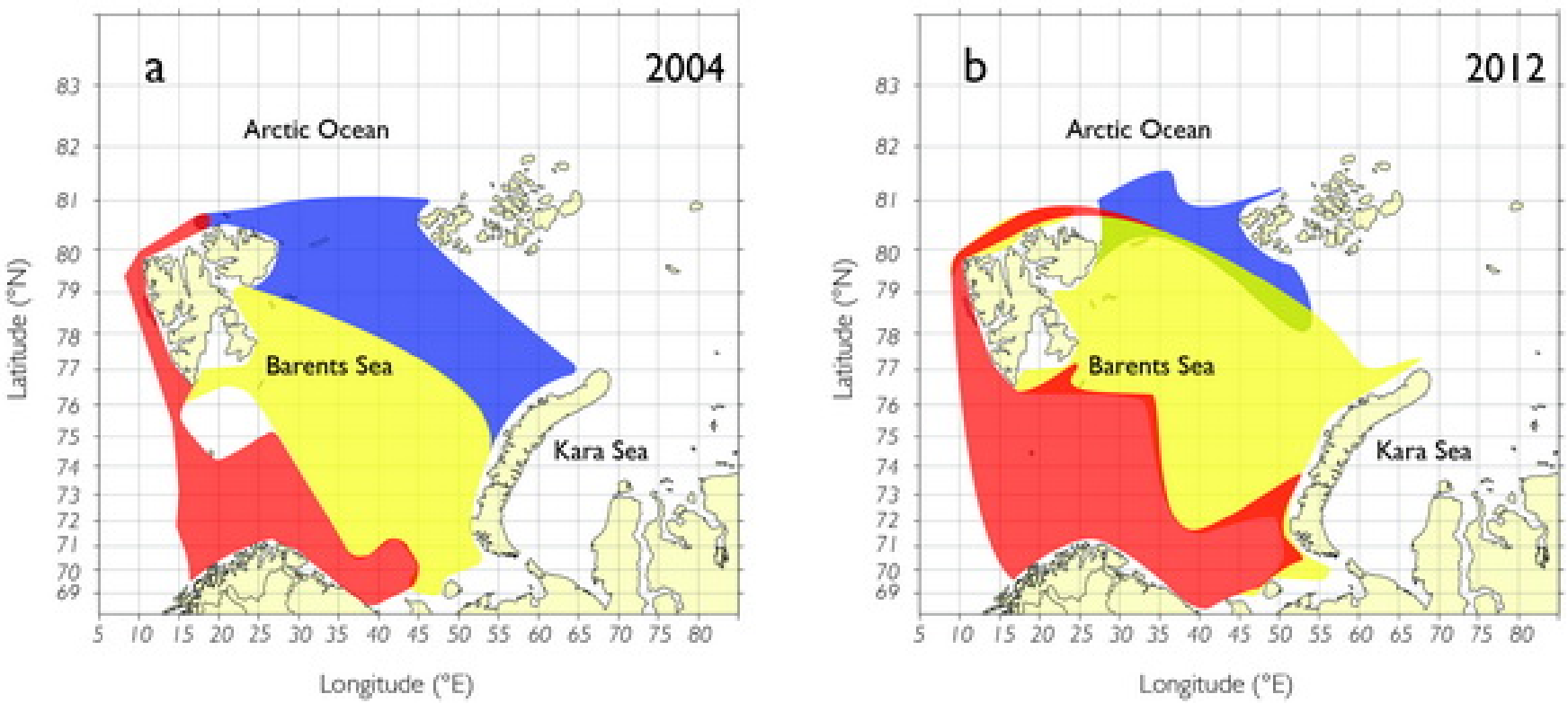


North-East Arctic Cod



Kjelsbu et al. 2014 PNAS

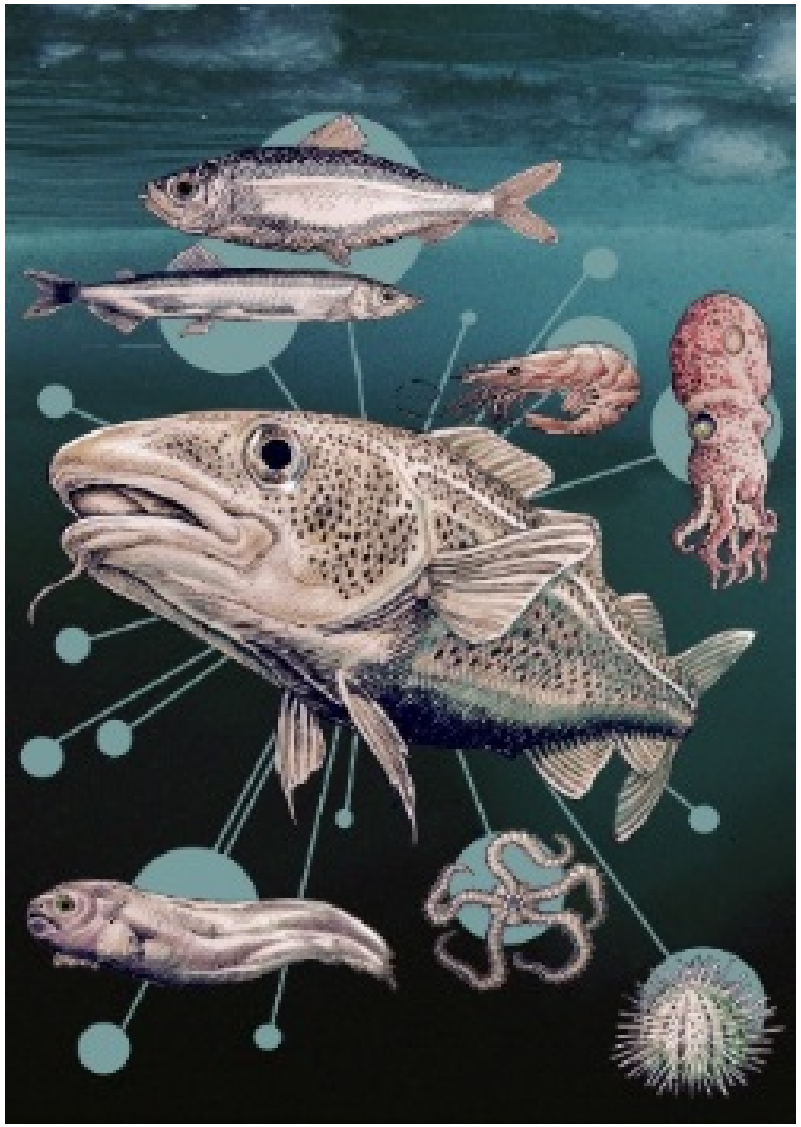
Climate change is pushing boreal fish northwards



Fish communities in the Barents Sea
Ecosystem Survey in the Barents Sea in 2004 (a) and 2012 (b)

Fossheim et al. 2015 Arctic Report Card; Fossheim et al. 2015 Nature Climate Change

PROCEEDINGS B



Climate change alters the structure of arctic marine food webs due to poleward shifts of boreal generalists

Susanne Kortsch[1], Raul Primicerio[1], Maria Fossheim[2], Andrey V. Dolgov[3] and Michaela Aschan[1]

[1]Norwegian College of Fishery Science, UIT the Arctic University of Norway, 9037 Tromsø, Norway
[2]Institute of Marine Research (IMR), 9294 Tromsø, Norway
[3]Knipovich Polar Research Institute of Marine Fisheries and Oceanography (PINRO), 6 Knipovich Street, 183038 Murmansk, Russia



Kortsch et al. 2015



SI_ARCTIC - The Arctic Ocean Ecosystem

5-yr project (2014-2018) funded by the Norwegian Ministry of Trade, Industry and Fisheries

- Changes in the Arctic Ocean ecosystem
- Ecosystem-based advice
- Design a long-term monitoring program

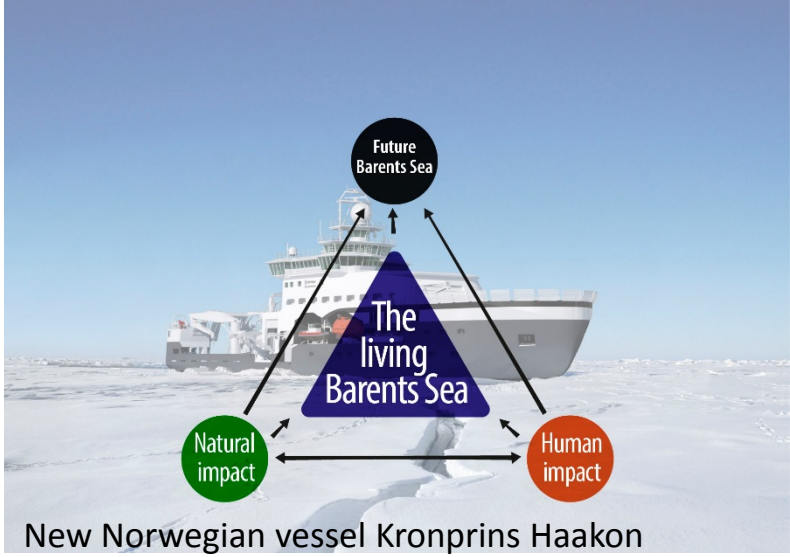
Project coordinator: Randi.Ingvaldsen@imr.no

gisk institutt

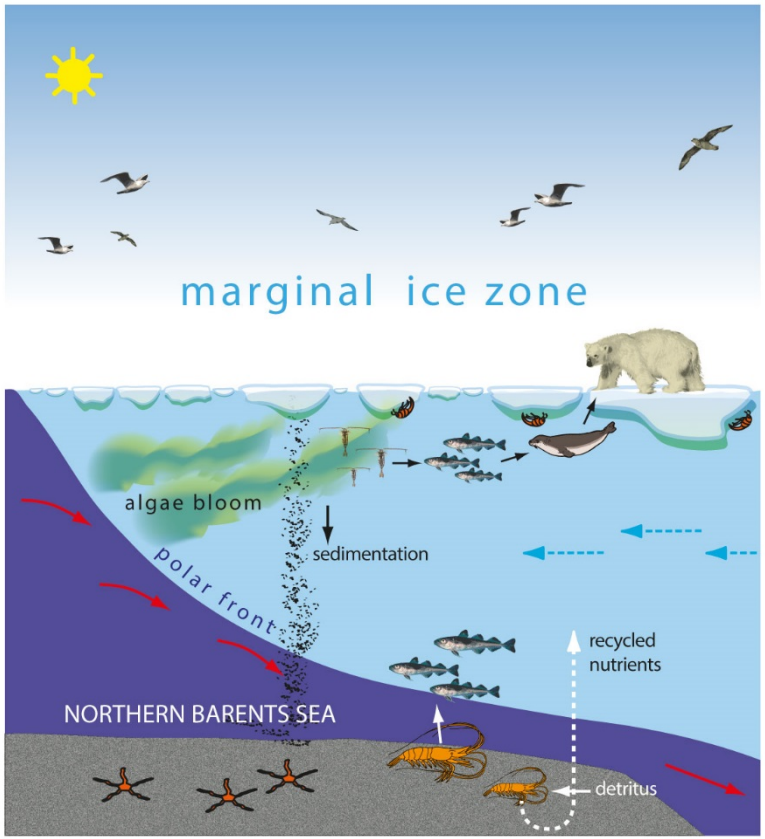
The Nansen Legacy
- a national initiative (2018-23)

Prepare for future sustainable use of the northern Barents Sea by investigating:

- The production of te ecosystem
- Ecosystem response to natural- and human driven changes
- Tools for management and weather forecasts in the Arctic



New Norwegian vessel Kronprins Haakon



Principal investigator: Marit.Reigstad@uit.no

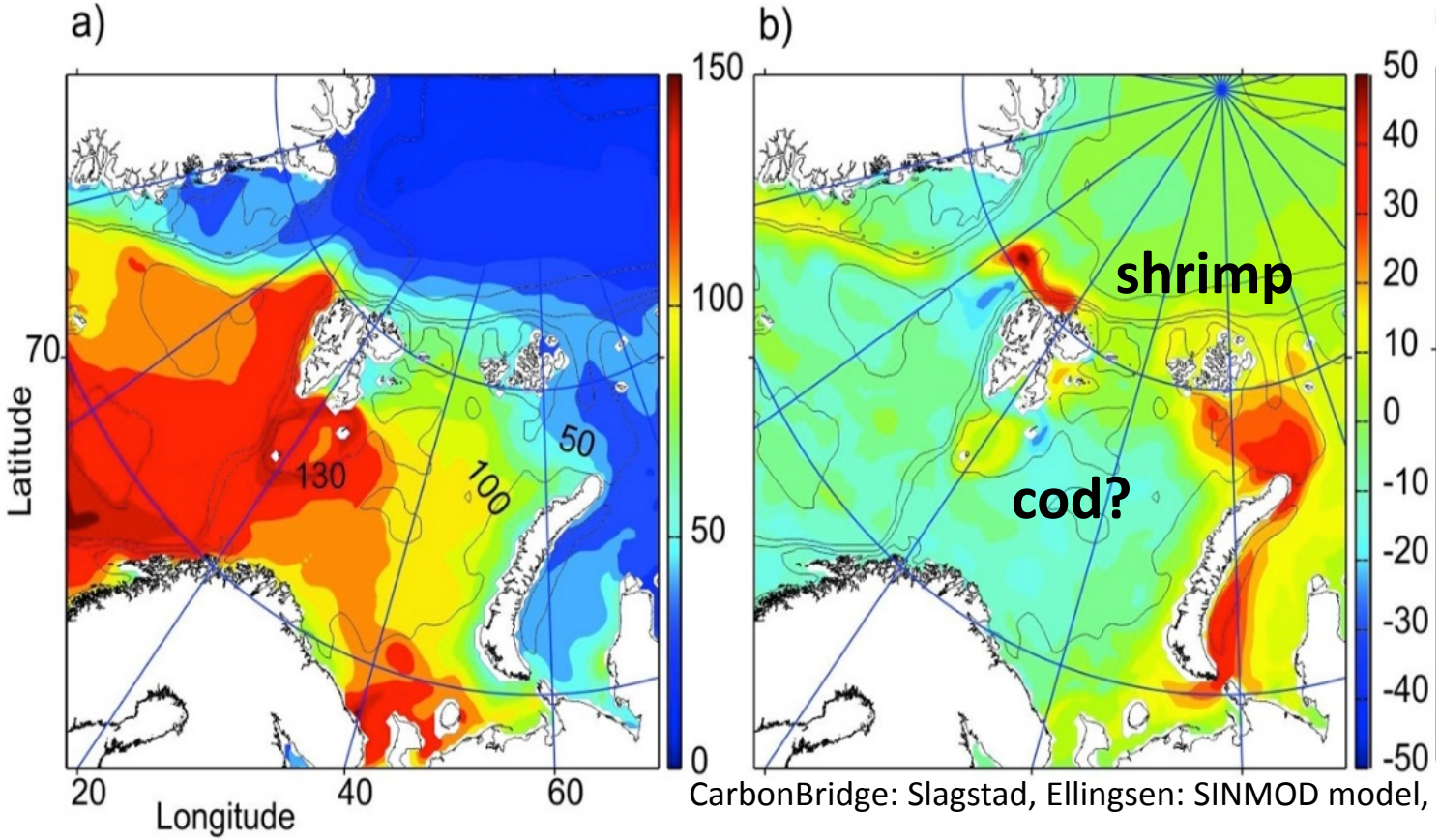
CarbonBridge (NFR project 2014-2017)

Primary productivity is projected and observed to increase in the Arctic.

Model results:

Present day

2050: deviation from present day



CarbonBridge: Slagstad, Ellingsen: SINMOD model, IPCC A1B scenario

Project coordinator: Marit.Reigstad@uit.no

Coreplan (2016 – 2018)

Integrated coastal resource management and planning – Ecosystem services and coastal governance

- Integrated and sustainable use of the coastal zone
- Climate change demands adaptation
- Case studies in Norway and Canada

Project coordinator: Ann-Magnhild.Solas@nofima.no

www.coreplan.no







High uncertainty when predicting the future

- UN Framework Convention on Climate Change introduced the national adaptation plan (NAP)
- From national climate adaptation strategies to national action plans in Europe
- White Paper Meld. St. 33 (2012–2013) «Klimatilpasning i Norge»
- Focus on cities, transport and agriculture
- Little is mentioned about fisheries and aquaculture

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Climate-ADAPT sharing adaptation information

Climate-ADAPT-Sharing adaptation information across Europe

European Climate Adaptation Platform

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Item	Status	Links
National adaptation strategy (White paper)	Adopted	• White Paper (2013)
Action plans	National action plan not made yet	
Impacts, vulnerability and adaptation assessments	Completed	• Norwegian report on Climate Change Adaptation (2010) • Climate projections for Norway (2015) http://www.miljodirektoratet.no/no/Publikasjoner/2015/September-2015/Klima-i-Norge-2100/ (in Norwegian)

Project

ClimeFish : Co-creating a decision support framework to ensure sustainable fish production in Europe under climate change

Description:

The overall goal of ClimeFish is to help ensure that the increase in seafood production comes in areas and for species where there is a potential for sustainable growth, given the expected developments in climate, thus contributing to robust employment and sustainable development of rural and coastal communities. ClimeFish also contributes to establishing fisheries and aquaculture management plans coherent with the precautionary approach, in co-creation with the operators and other stakeholders. ClimeFish has eight specific objectives:

- Investigate the effects of climate change on fisheries and aquaculture at European and regional scale, and collect and harmonize relevant data.
- Develop novel forecasting models to simulate and analyse changes in distribution and production in the fisheries and aquaculture sectors.
- Identify risks and opportunities based on analysis of market and non-market costs and benefits of affected

Keywords

Aquaculture, co-creation, cost-benefit analysis, decision support system, early warning, ecosystem services, fish production, fishery, forecasting models, guidelines, invasive species, lakes, management plan, migration patterns, ponds, population dynamics, reproduction, seafood, species interaction, voluntary European standard

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How ClimeFish will contribute to adaptation:

- Unique datasets collected, harmonized and made available on EU ODP
- Decision Support Framework (DSF) allowing stakeholders to anticipate, prepare and adapt to different CC scenarios, available on Climate-ADAPT
- A European voluntary standard (CWA) for how to make climate-enabled management plans related to seafood production
- Informed and engaged stakeholders
- Scientist happy even outside their comfort zone

ClimeFish

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Thank you for your attention!

Michaela.Aschan@uit.no



Visit homepage http://climefish.eu/

ClimeFish

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News

PhD Position in Ecological Modelling

Postdoctoral Fellow in Fisheries Management

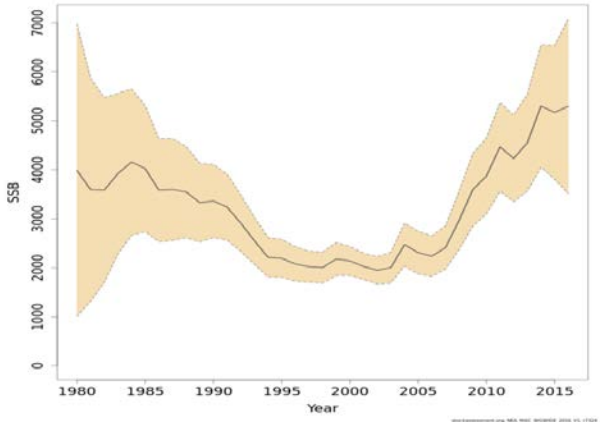


Norwegian EU minister visited the ClimeFish stand in Tromsø



Scientific Committee Meeting

Commercial catches of mackerel





2005

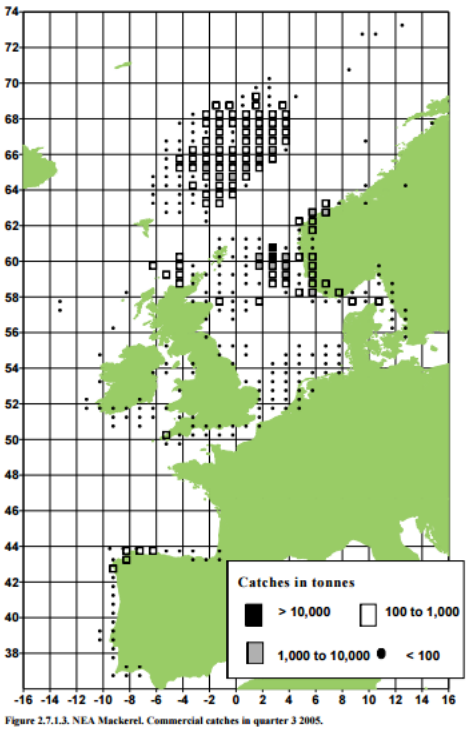
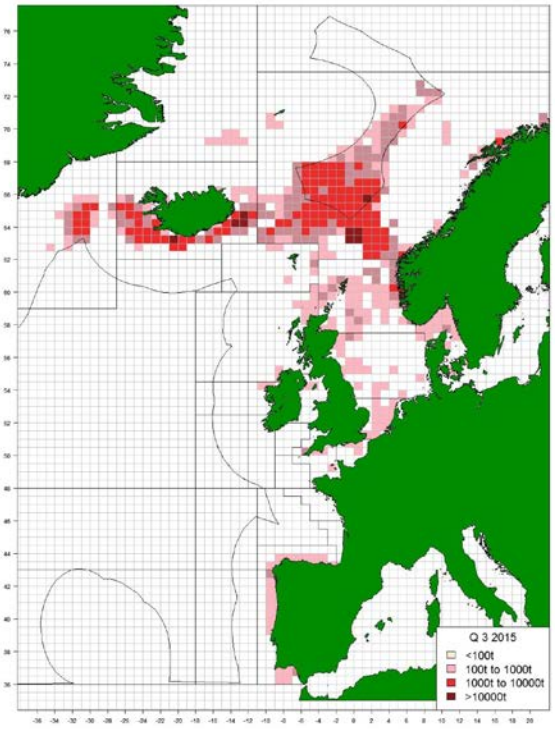


Figure 2.7.1.3. NEA Mackerel. Commercial catches in quarter 3 2005.

2015



Imr.no

ClimeFish

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