Shrimp in Greenland Waters

Management Strategies for Commercial Marine Species in Northern Ecosystems

Bergen 27-29 august 2003

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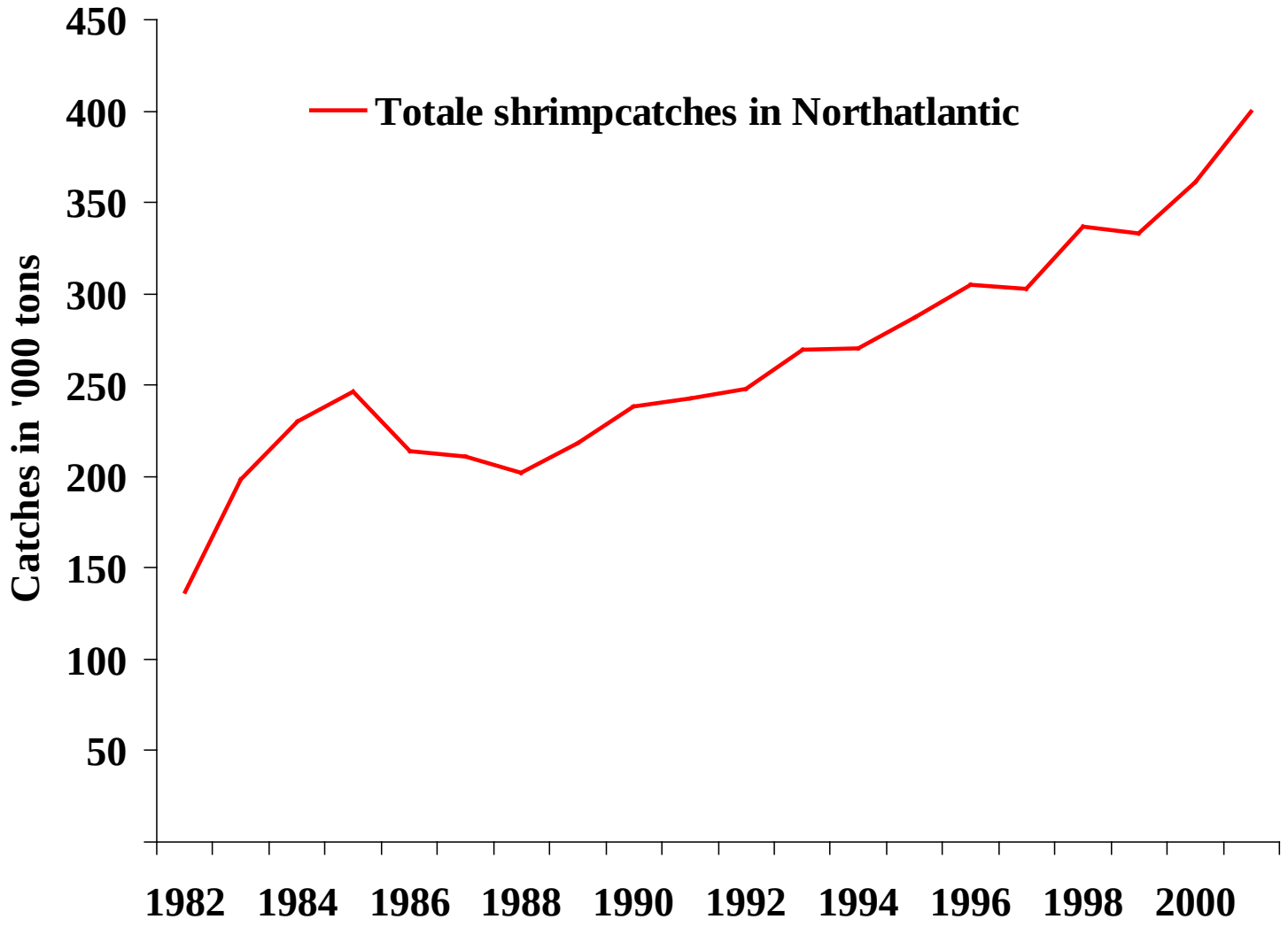
August 2003

Shrimp as they (sometimes) appears on the bottom

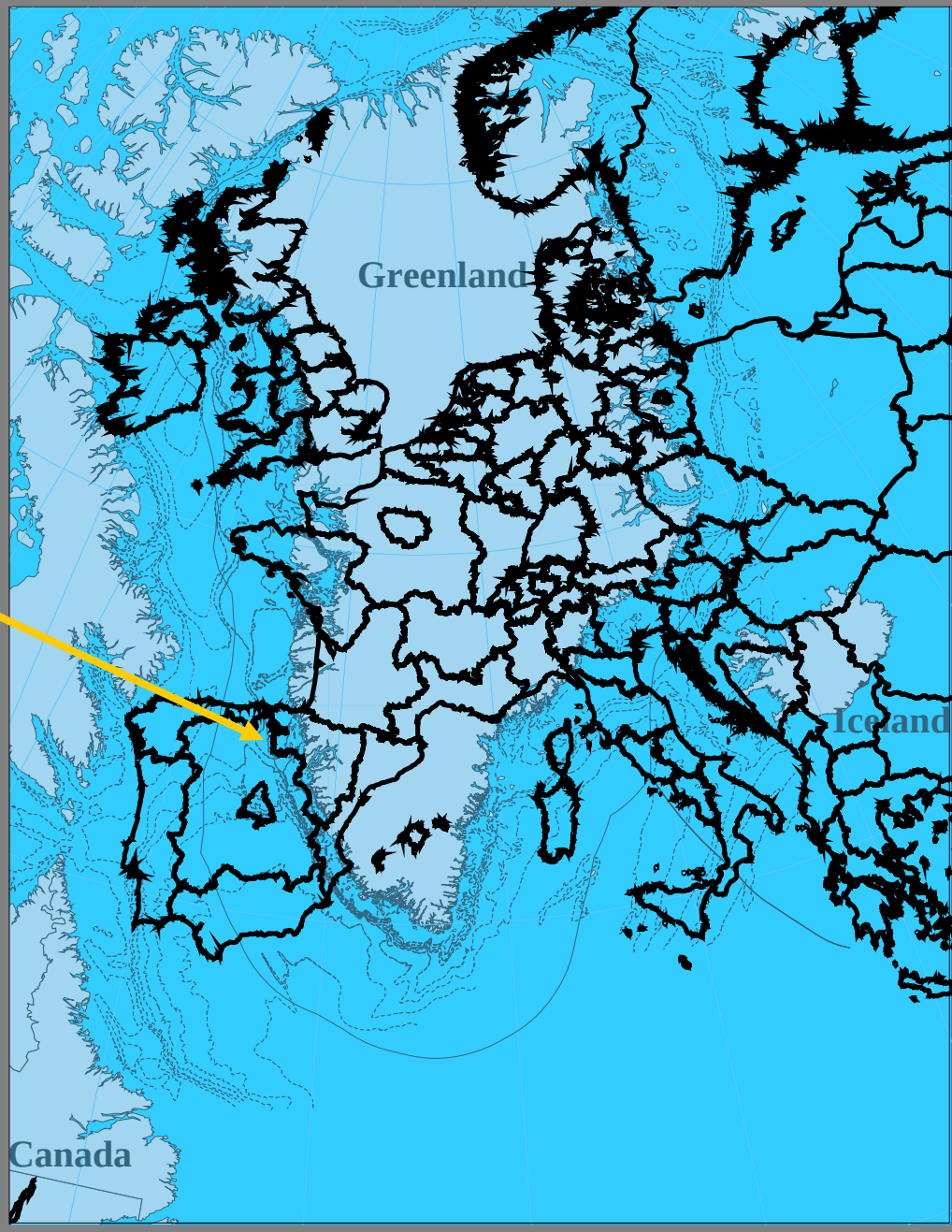

Totale shrimpcatches in Northatlantic
Catches in '000 tons
450
400
350
300
250
200
150
100
50
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000

Greenland

Population: 56.000

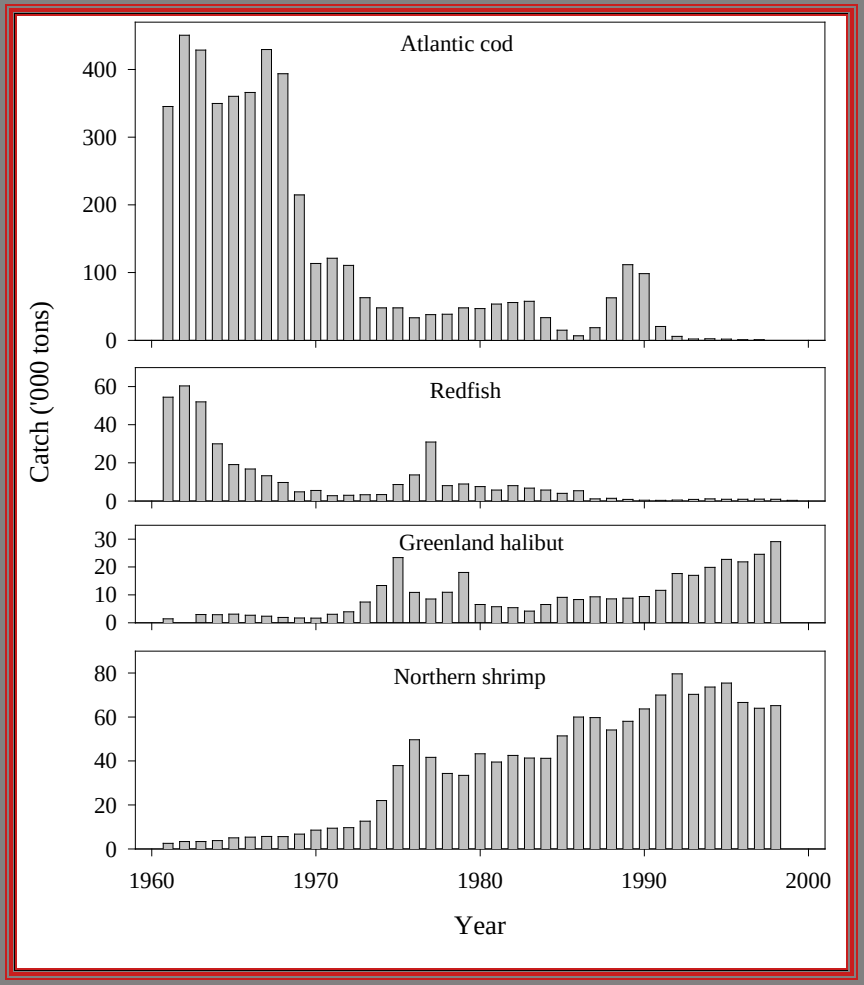
West : 52.500

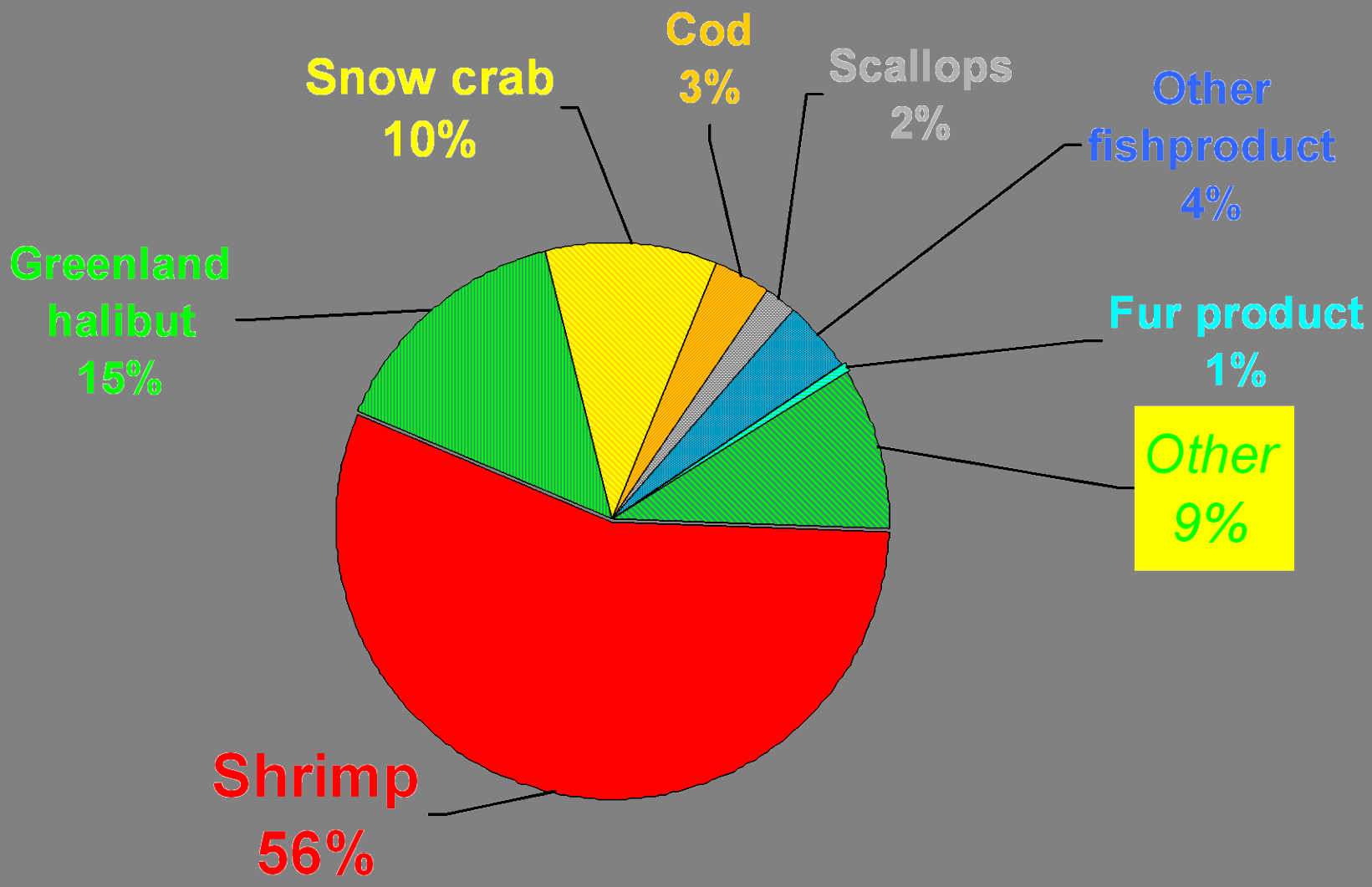
East: 3.500



- and Europe

Fishery in Greenland





Export in 2002 - 2.140 mill in total

Other exploited stock
annual catch in numbers

• Thick-billed Murre	ca. 250.000	Marine
• Eider	ca. 100.000	
• Narwhal	ca. 700	
• White whale	ca. 700	
• Mink whale	ca. 150	
• Fin whale	ca. < 10	
• Harp seal	ca. 90.000	
• Ringed seal	ca. 100.000	
• Caribou + Moskos	ca. > 15.000	Terrestial
• Ptarmigan	ca. 50.000	
• Sheep farming	??	

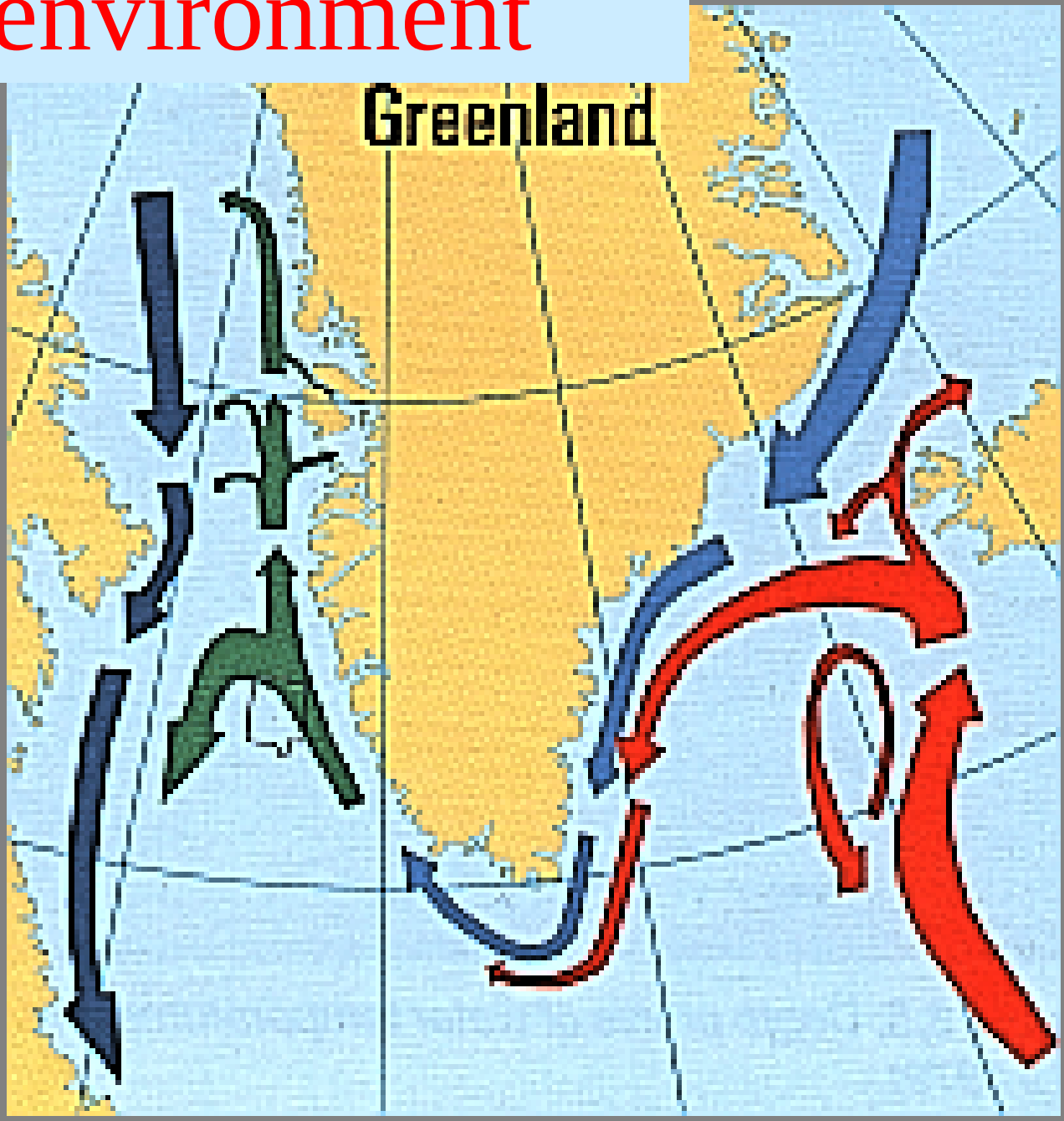
Our marine environment

Irminger Current - warm current

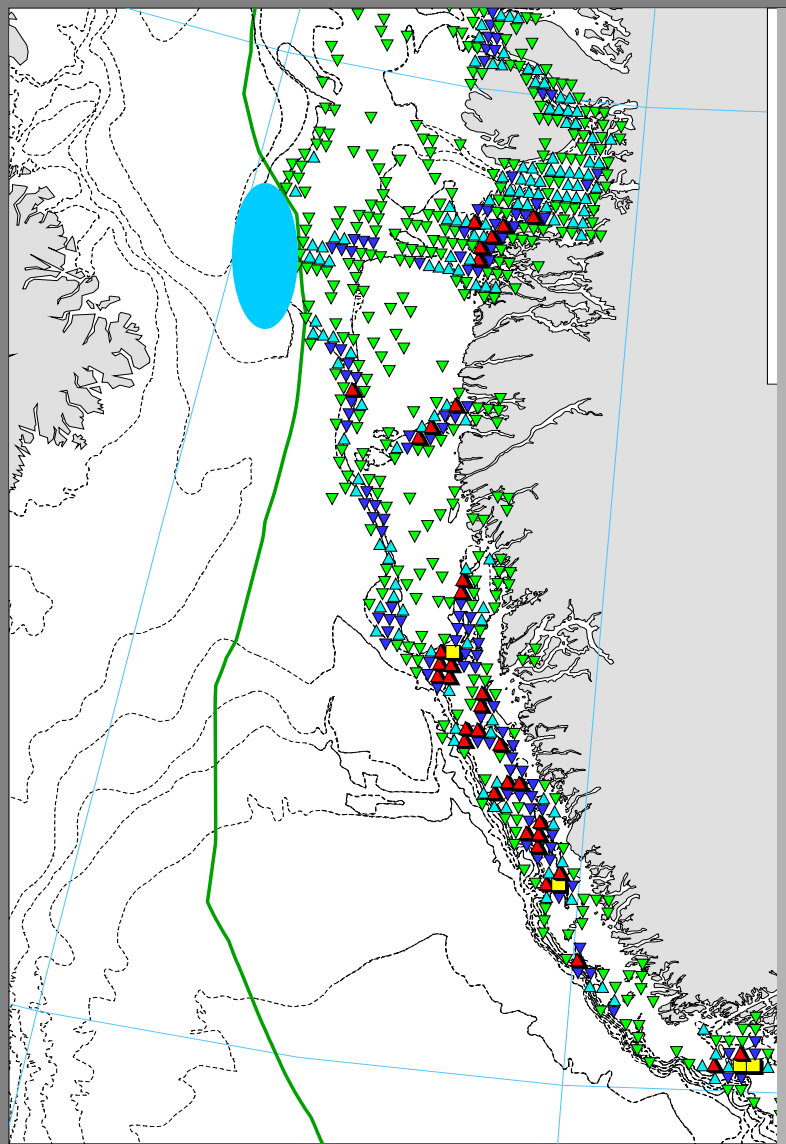
East Greenland Current - cold current

West Greenland Current - mix of cold and warm

Baffin Land Current - cold current



Shrimp catches
East and West Greenland



The government politic for regulation

- The shrimp stock off West Greenland is assessed as a single population.
- The fisheries is regulated by:
  - Quotas (TAC)
    - Offshore fleet – in- or nearshore fleet - Canadian fleet
  - Technical measures
    - Mesh size / Grid
  - Observer program
  - By-catch

NATAARNAQ
SISIMIUT
Royal Greenland

GR6-376
GR-6 207

GR 8-309
OYYH

Assessment and advice of northern shrimp

- The biological advice for shrimp in the North Atlantic has traditionally been based on:
  - Qualitative assessment of trends in various indices
  - single-species assessment
  - one-year advice
  - no or few attempt on prediction models

Mathematical models

- Describe the development in the stock
- Include the influence of cod
- Predictions
- Risk calculation

Carsten Hvingel Ph.d. project:

Alternative assessment framework based on biological model of shrimp dynamic

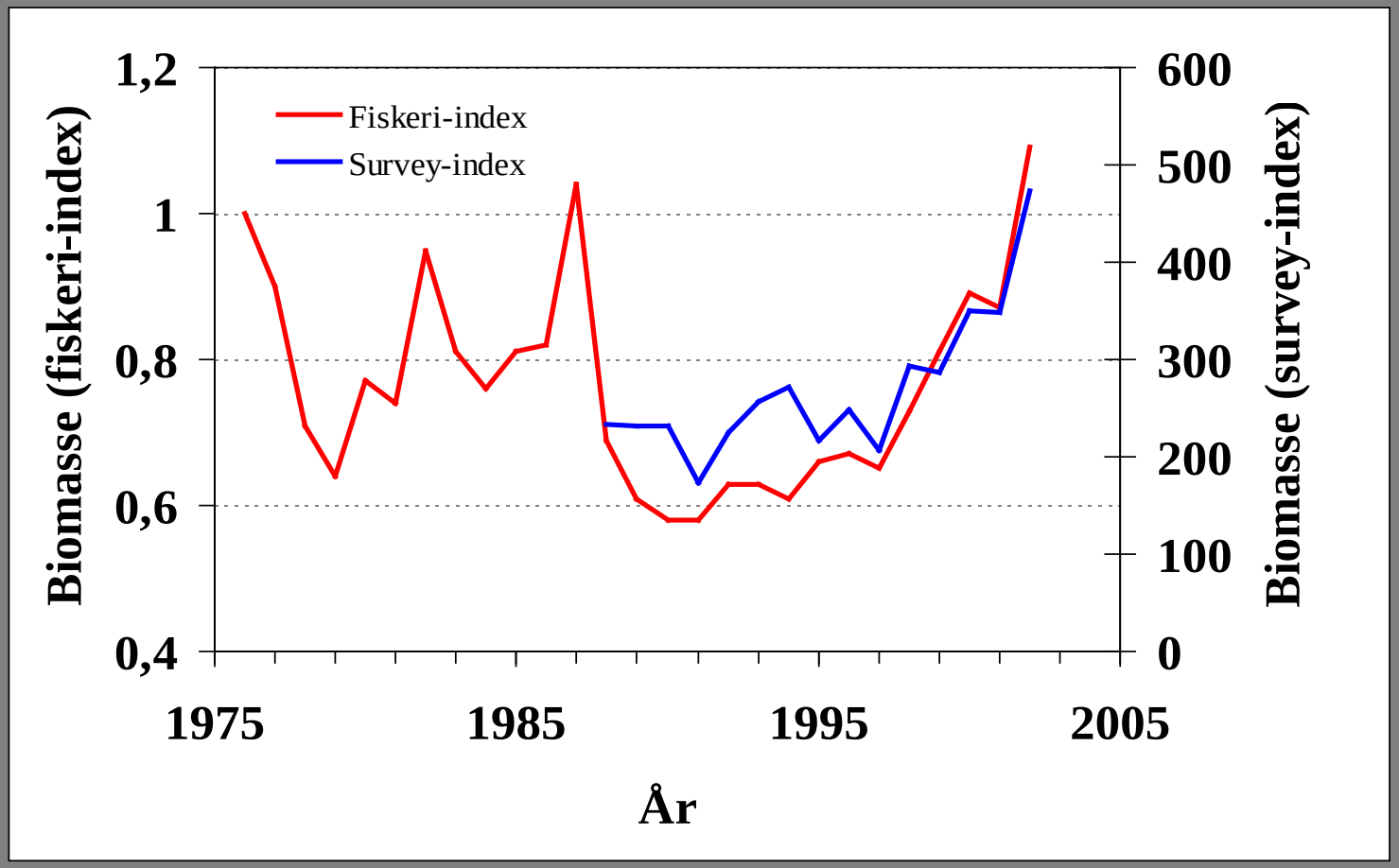
- Bayesian methods

Data

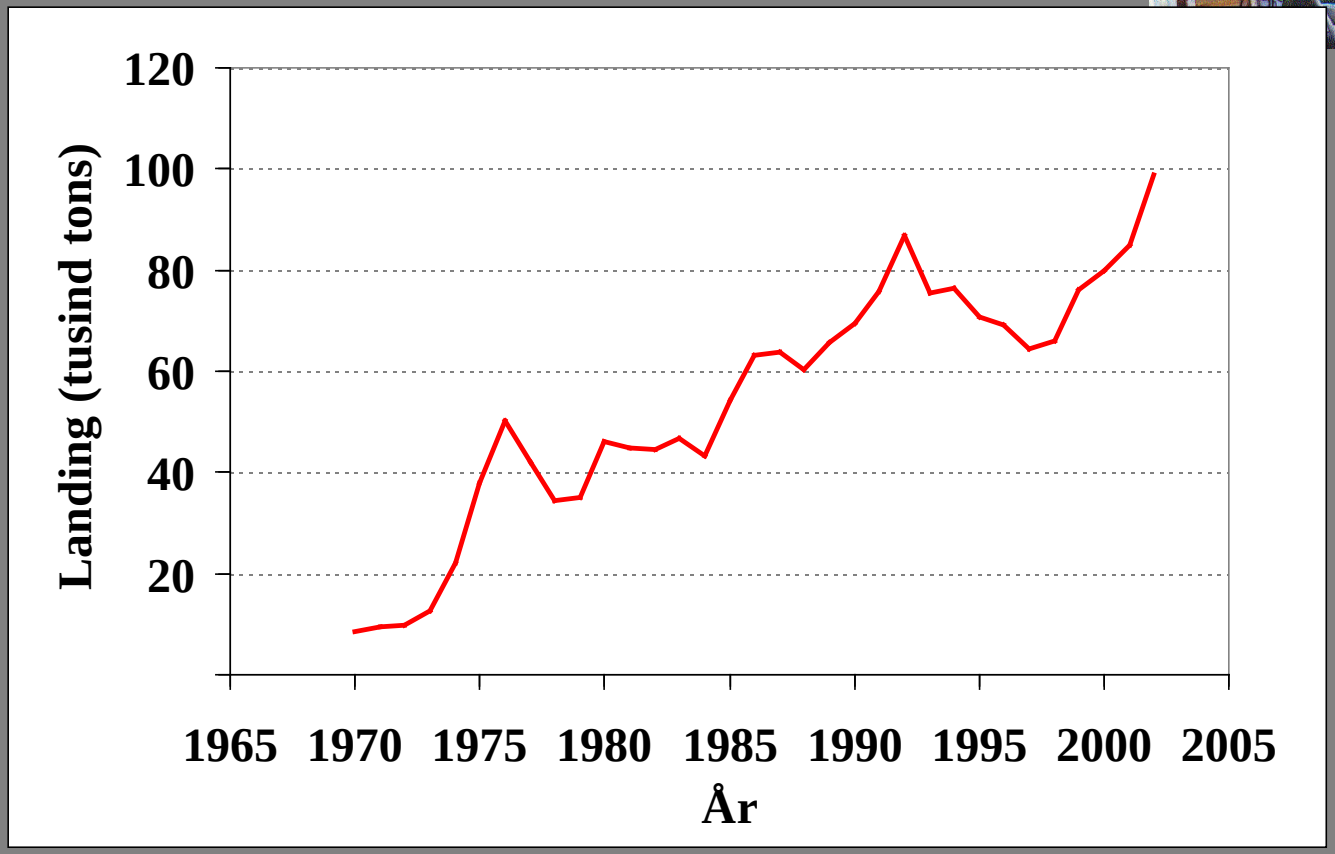
- Biomass indicies
- Catch
- Cod predation
- Uncertainty

- Not included in the model at time being:
  - size/age distribution – recruitment - SSB

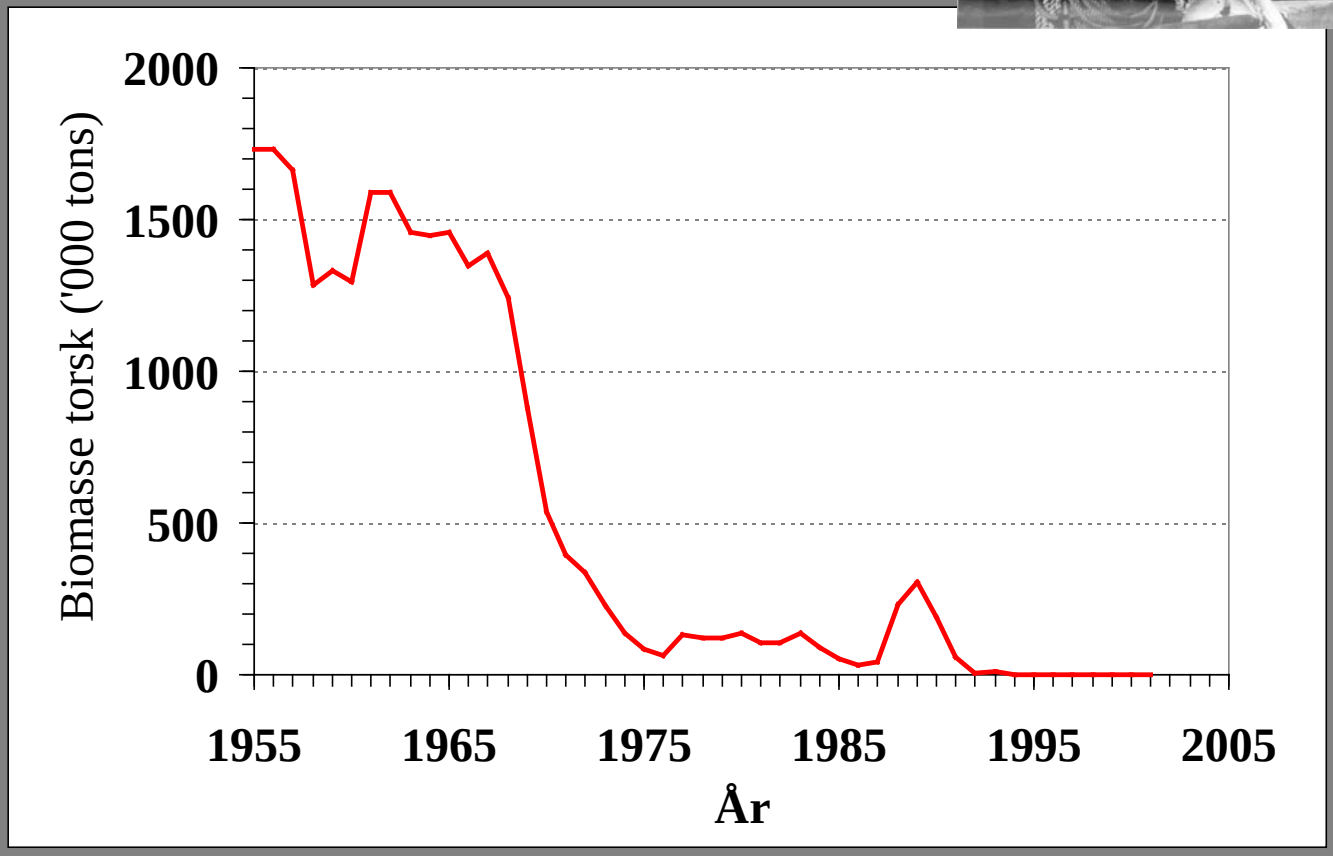
Biomass


Biomasse (fiskeri-index)
1,2
1
0,8
0,6
0,4
Fiskeri-index
Survey-index
600
500
400
300
200
100
0
Biomasse (survey-index)
1975
1985
1995
2005
År

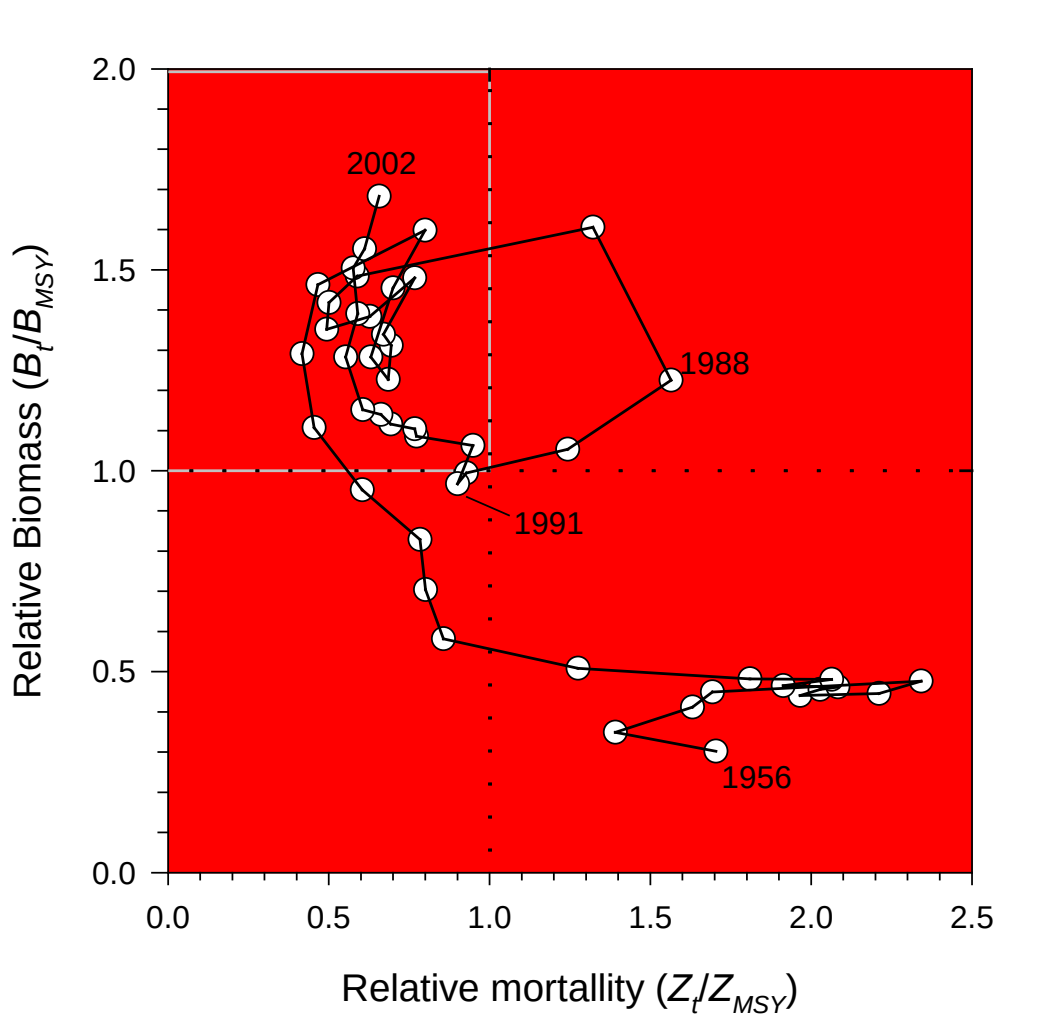
Catch


Landing (tusind tons)
120
100
80
60
40
20
1965
1970
1975
1980
1985
1990
1995
2000
2005
År

Biomass of cod



Development in shrimp stock



Risk associated with five optional catch levels

Catch option ('000 tons) in 2003	80	90	100	110	120
Risk of falling below B_{MSY}	<1%	<1%	<1%	<1%	1%
Risk of exceeding Z_{MSY}	1%	3%	10%	20%	34%

Status
Shrimp West-Greenland

- The stock biomass has increased since the early-1990s and reached its highest level recorded in 2002.
- Biomass is well above B_{MSY} and mortality by fishery and cod predation is well below Z_{MSY}.
- In addition a large 1999-year class is expected to contribute to the fishery in 2003.

Advice for 2003 Westgreenland

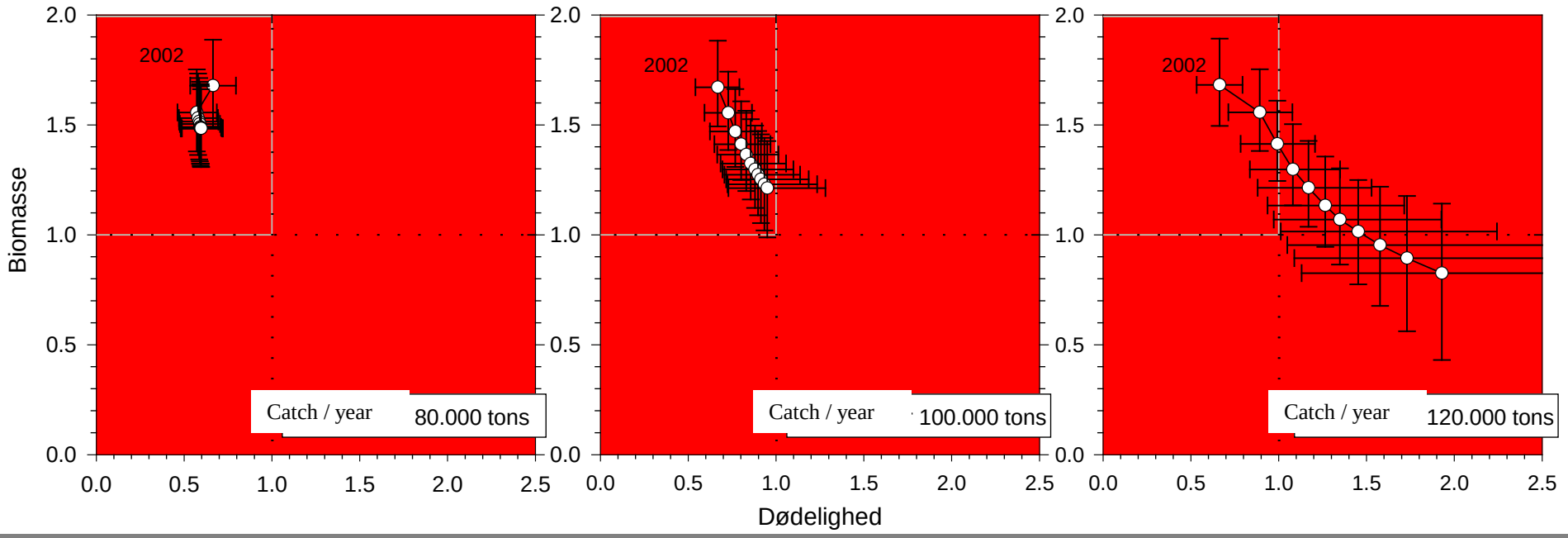
- If catches exceed 100 000 tons in 2003 there is a greater than 10% risk of exceeding a mortality, that is considered to be a limit reference point.

- NAFO Scientific Council recommends that total catch in Div. 0A and SA 1 in 2003 should not exceed 100 000 tons.

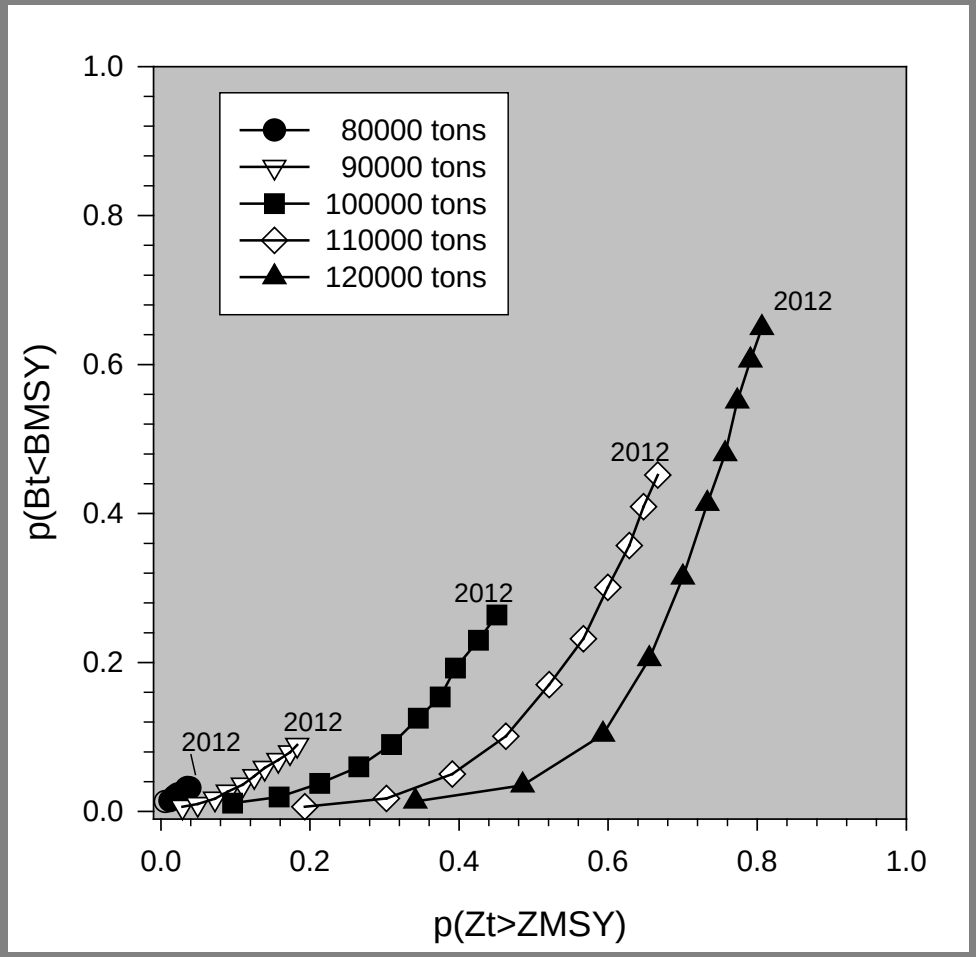
After 2003??

Future expected development

(…with a cod stock on present level!)



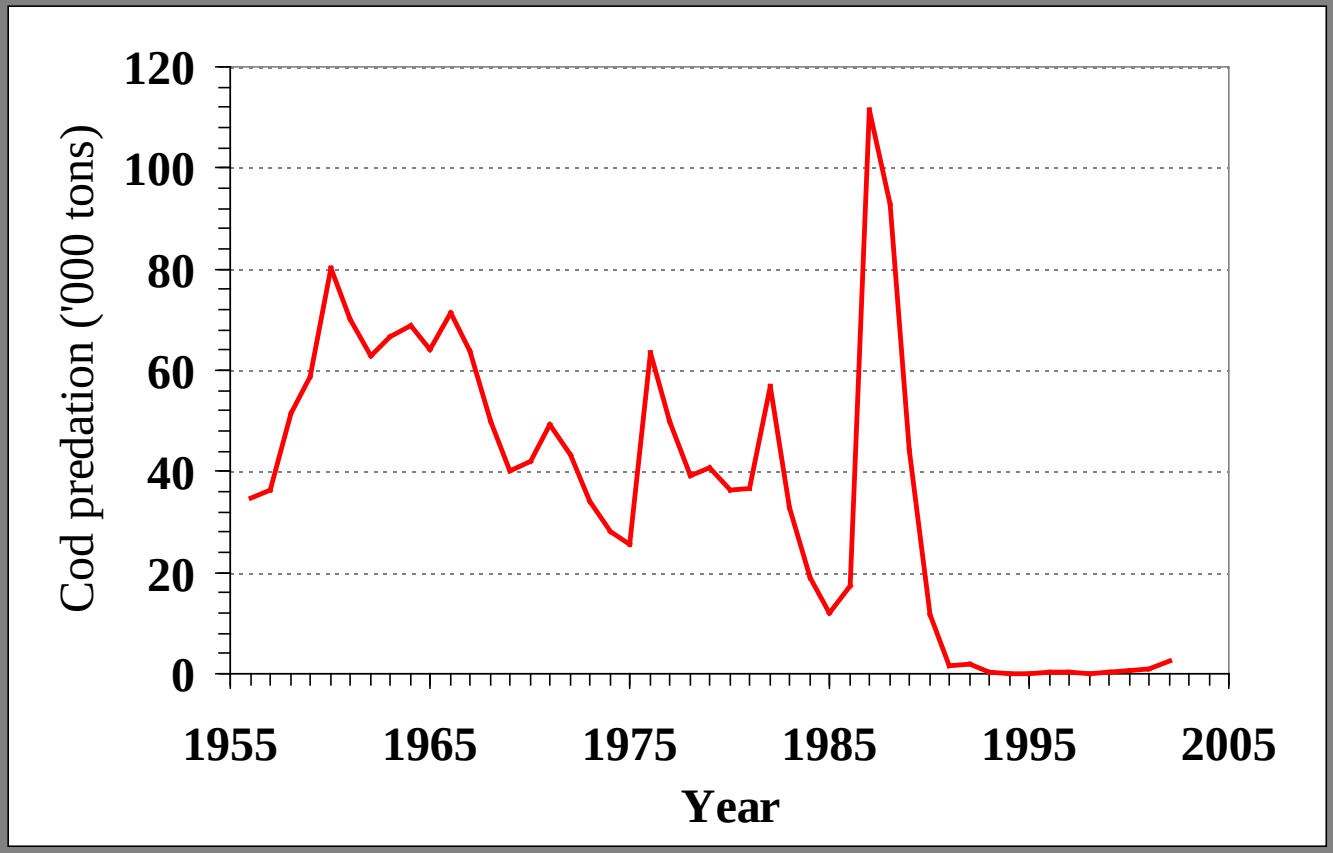
Risk evaluation



Risk for suboptimal stocksize

Risk for unsubstainable fishery

Estimated consumption of shrimp by cod



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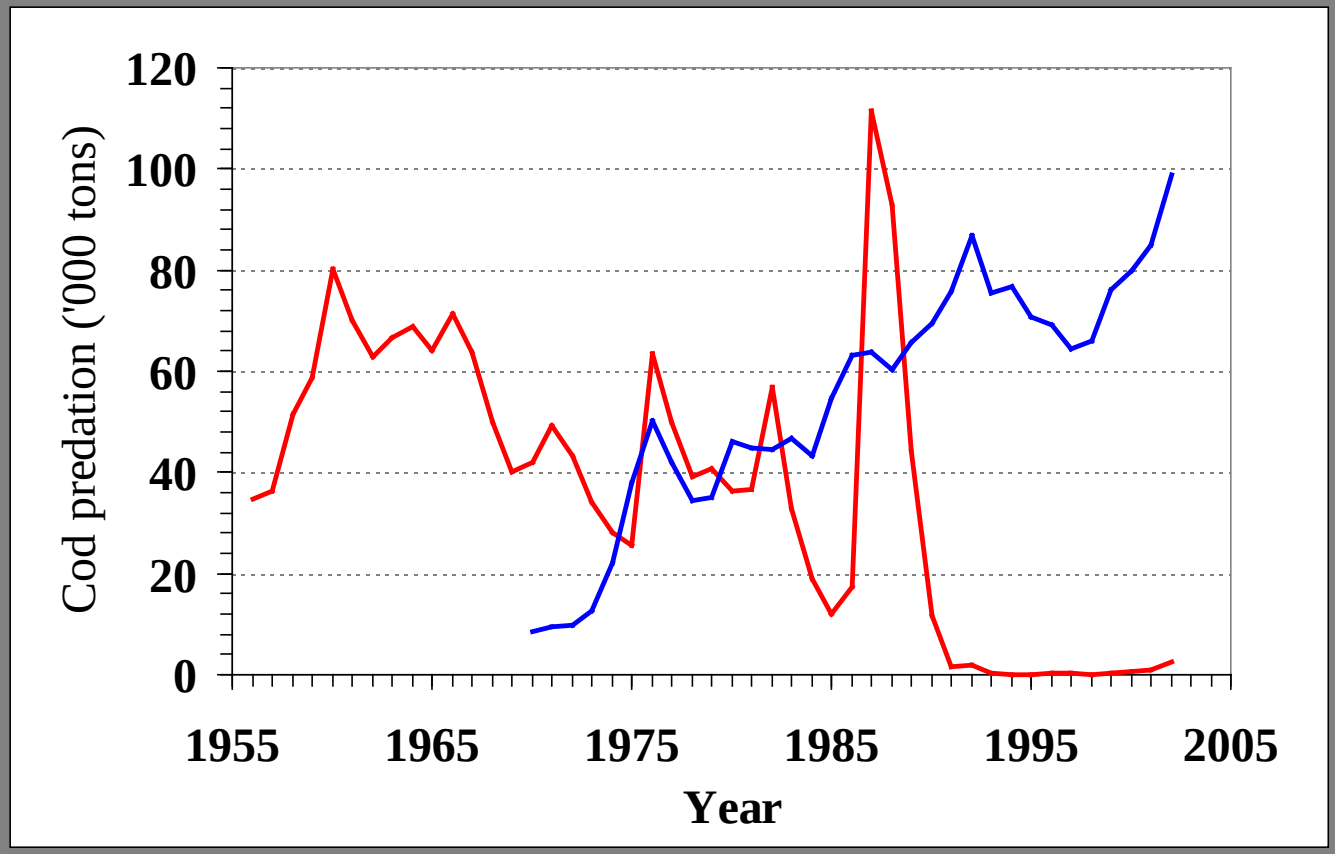
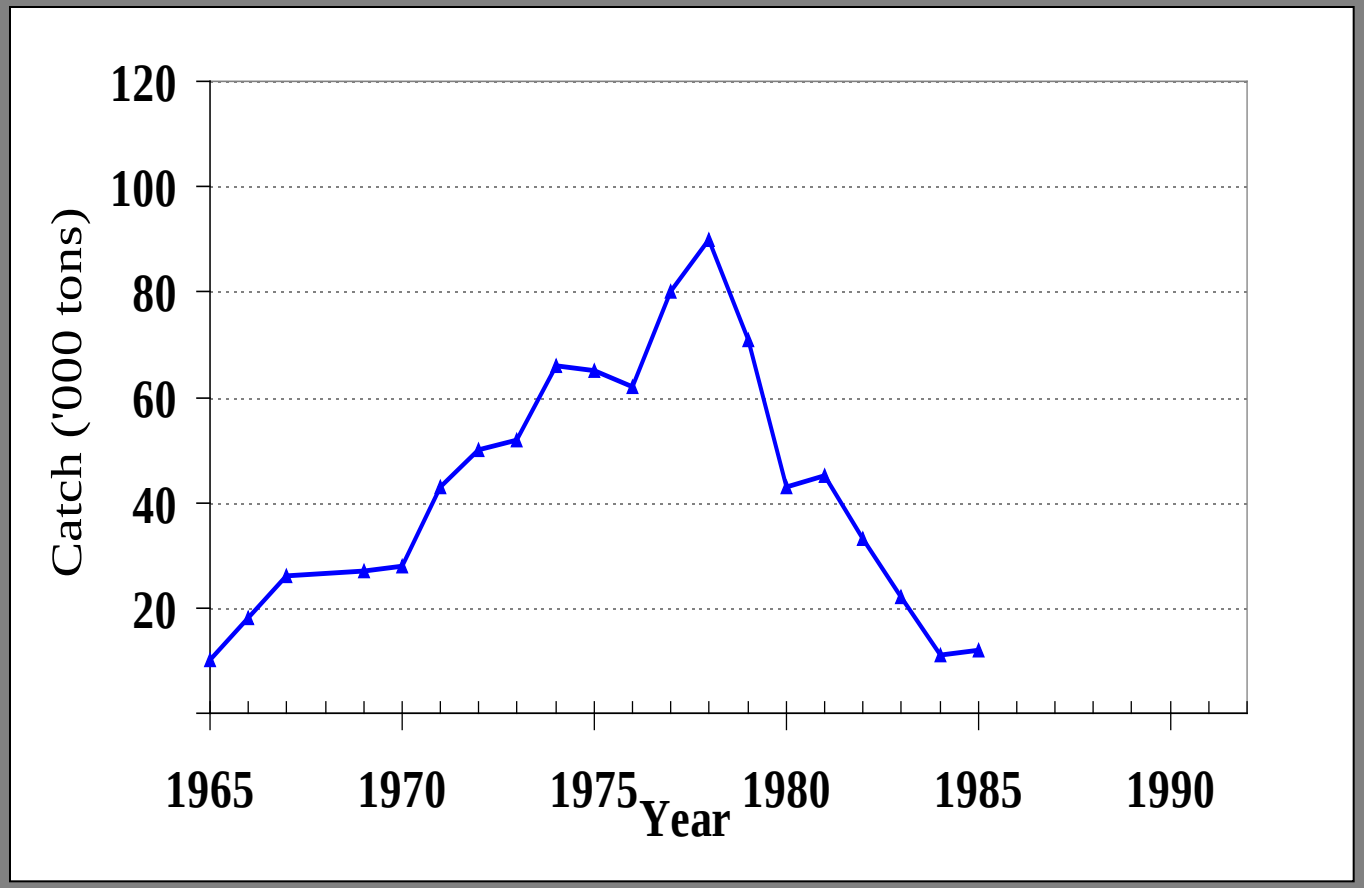
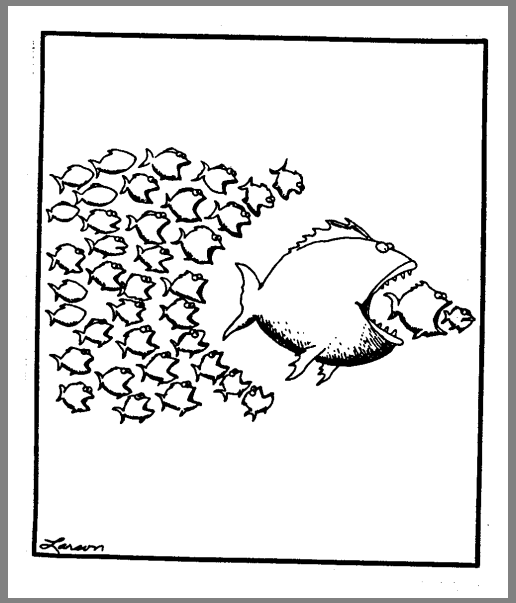
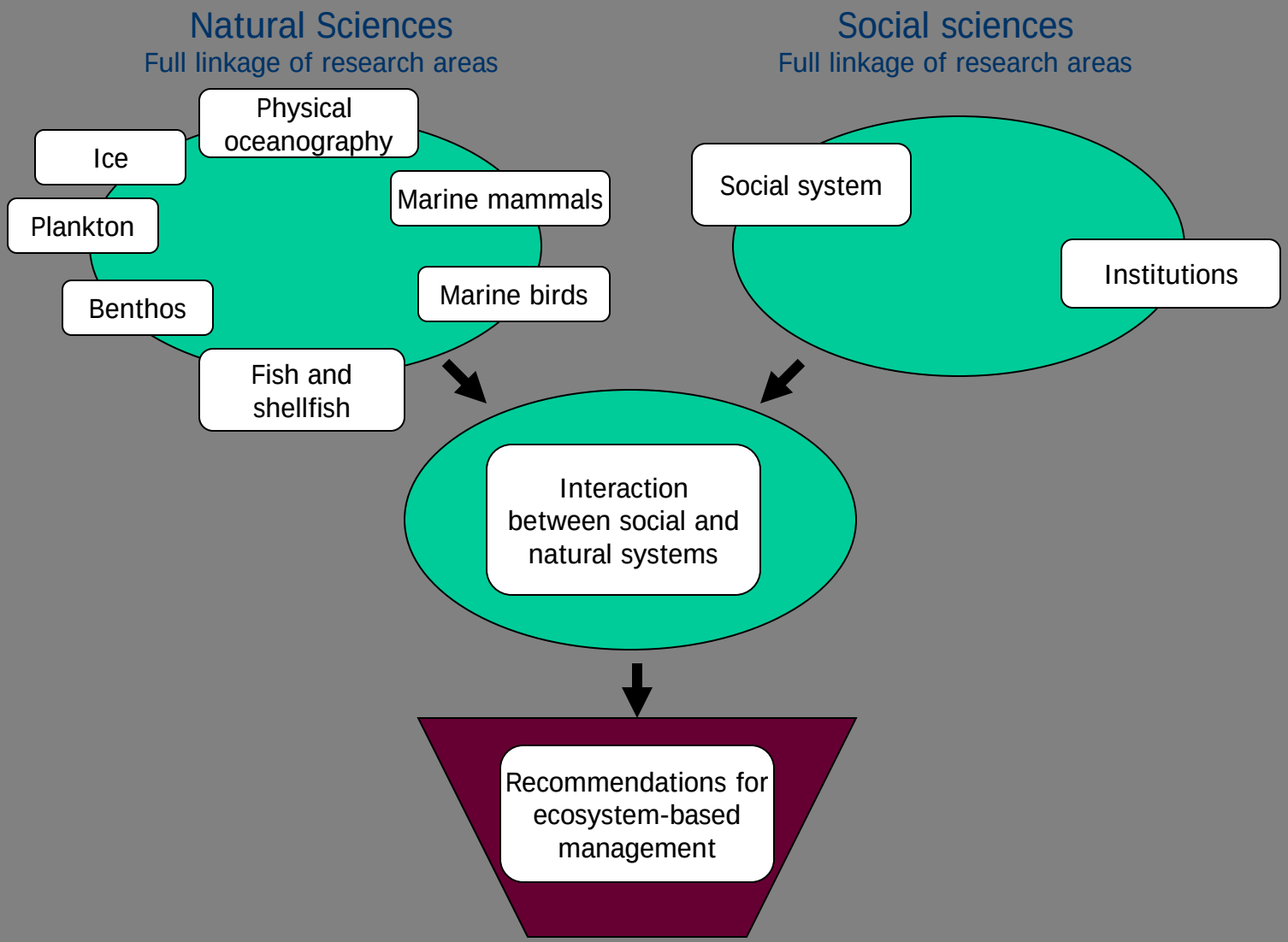


Catch of shrimp in Alaska 1965-85



We do see changes!!

- What is influencing these changes?
  - interaktioner:
    - cod / shrimp / snow crab / seals / whales / sea birds
    - whom eat whom – takeout in generel
      - incl. fishery and hunting
    - How must – and what does it mean
  - temperature – ice
  - bycatches
  - trawling og effect on bottom habitat



Ecogreen (Goal:to establish a scientific basis for a long term ecosystem based management of renewable resources)