



FISKEBÅT

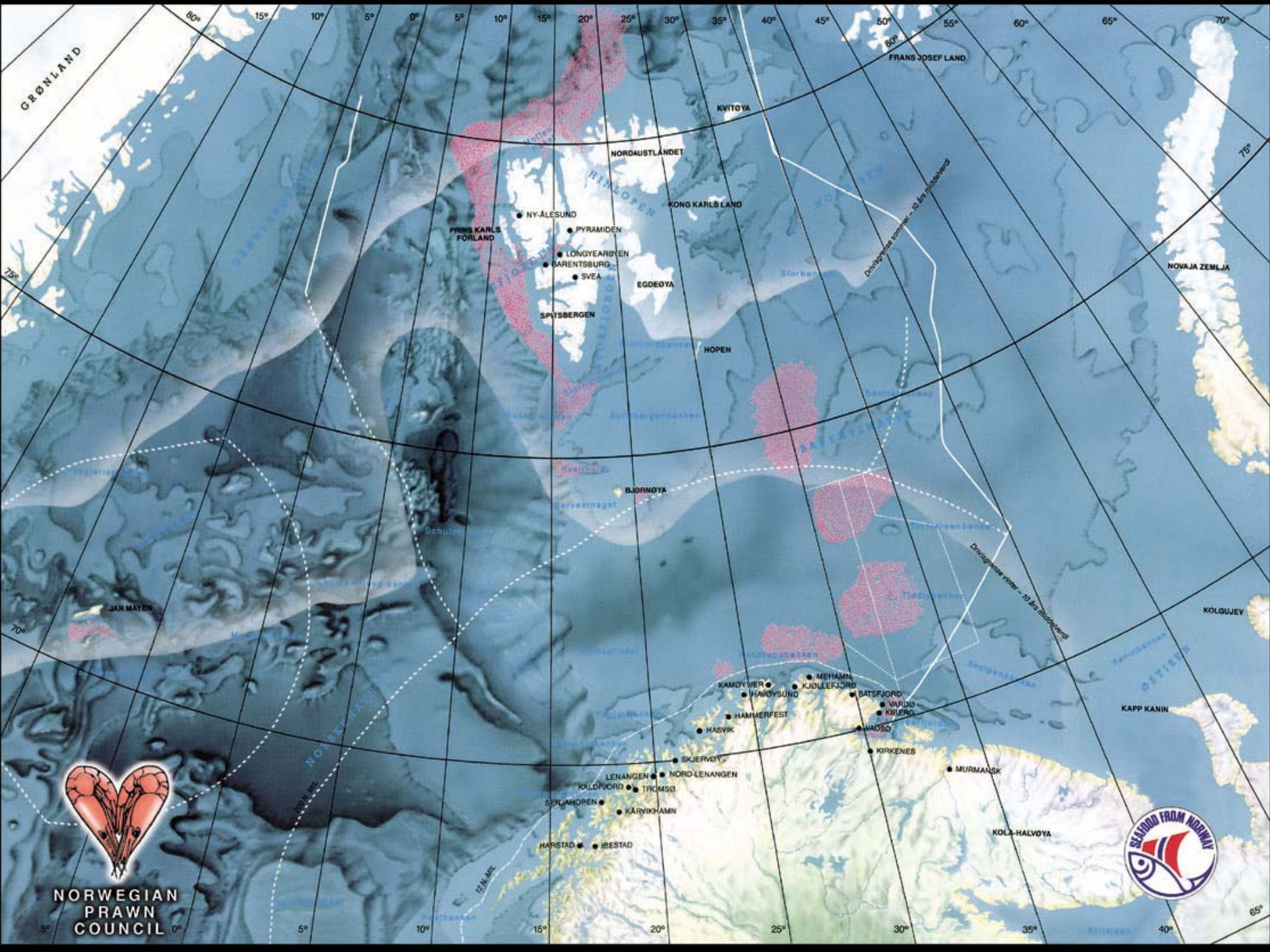
By-catch criteria in the Barents Sea shrimp fishery

Bio-economic views from Norwegian industry
Åge Remøy, shipowner

Norwegian northern shrimp fishery

Catches Barents Sea and Svalbard:

- 2001: 44.100 tons
 - 2002: 50.800 tons
 - 2003: 34.405 tons
 - 2004: 32.649 tons
-
- 20-40 Norwegian vessels fishing for shrimp, of which 10 all year round, and rest for 3-6 months pr year. Part of activity in Greenland, Jan Mayen, Flemish Cap



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Shrimp fishery regulations

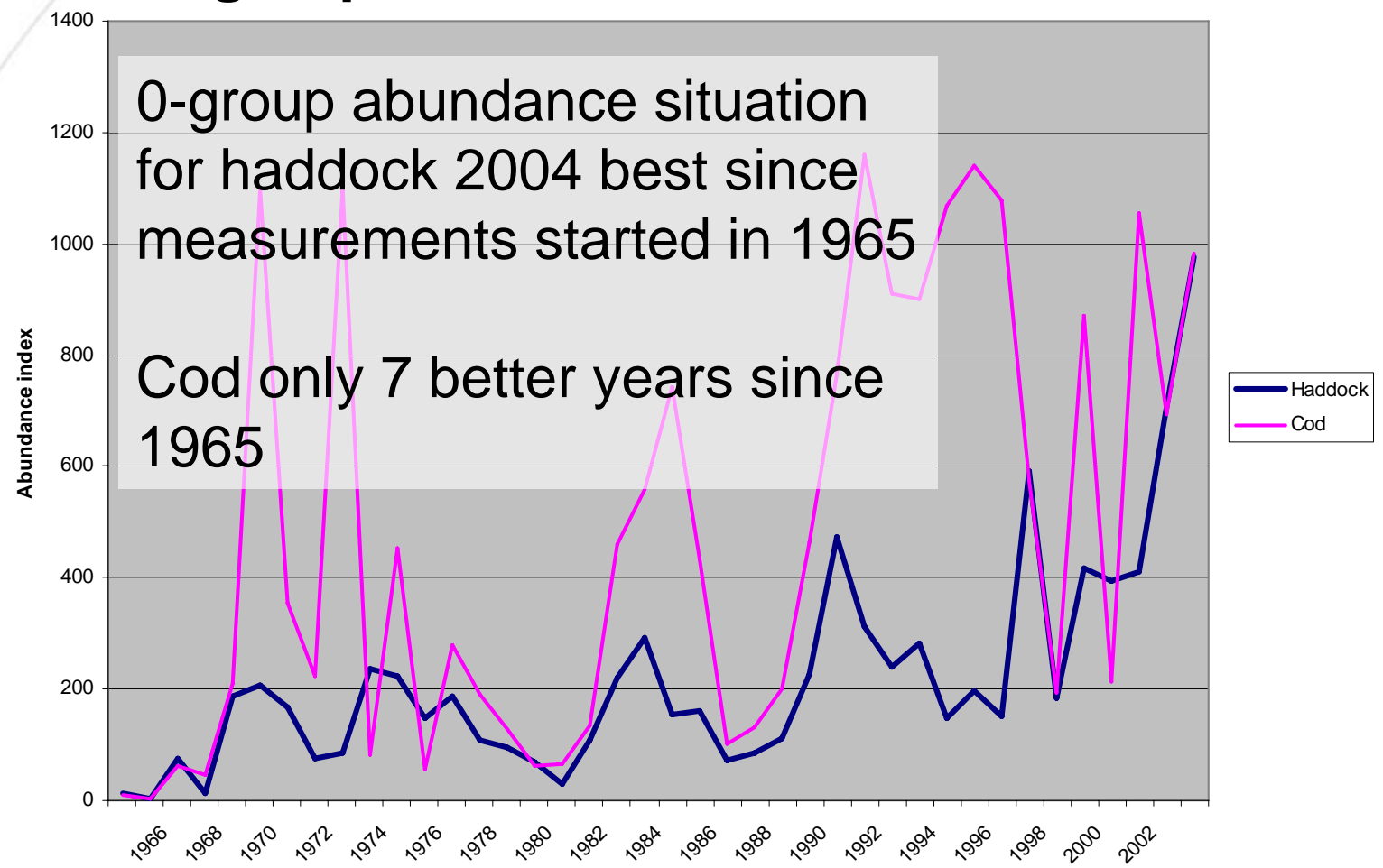
- Sorting grids with 19 mm. bar space, removes fish >17-18 cm (fish age 1-1,5 year)
- Minimum shrimp size
- Svalbard: National effort regulation (fishing days)
- Ship license scheme, including license reduction programme (fleet structuring)
- Nature! (ice-conditions and catches)

Shrimp fishery regulations

- Maximum bycatch limits of:
 - 800 juveniles of cod and haddock combined pr ton of shrimp
 - 300 juveniles of greenland halibut pr ton of shrimp
 - 1.000 juveniles of redfish pr ton of shrimp
- Fishery prohibited and area closed if above any one of these. Very many and large areas closed recent years, causing big problems for the shrimp fishery.

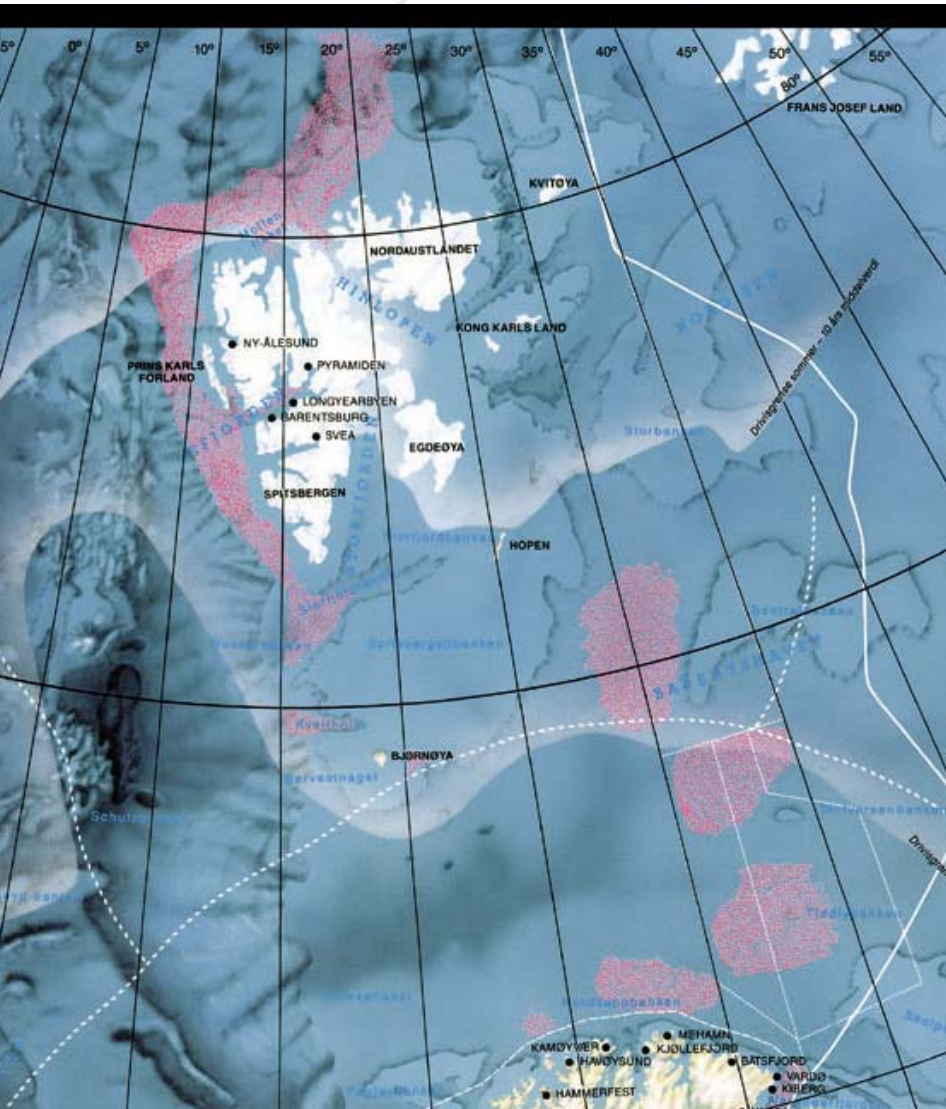
Current biological situation

0-group abundance index 1965 - 2004

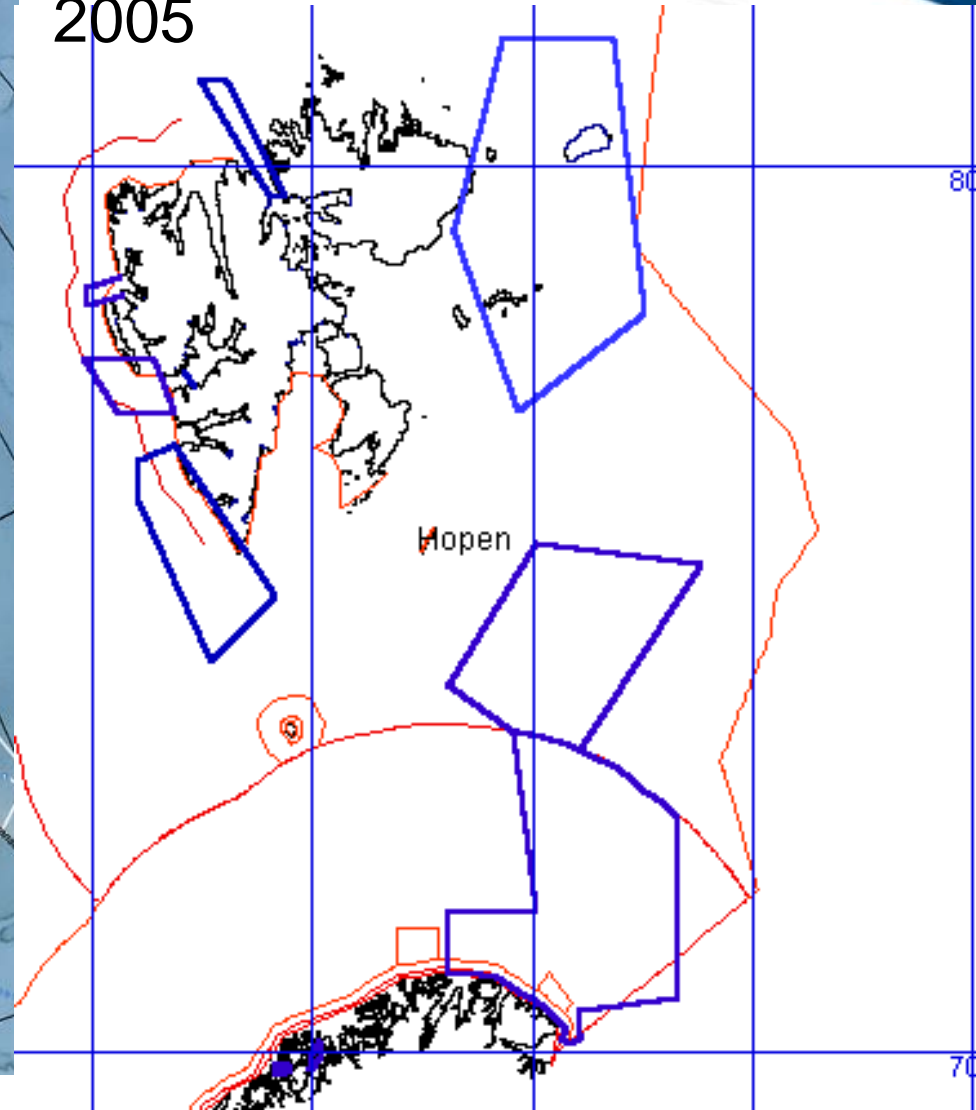


Result 0-group abundance+juvenile bycatch limits

Roughly distribution area



Closed february 2005



Endangered pleasures?

Norweg



What is meant by bio-economic considerations?

- Management of fish and shrimp resources is not only a question of biology
- Must consider human activity, including economical aspects
- We feel that too much emphasis has been put on juvenile protection, without due consideration to other biological and certainly economic factors

The bio-economic model for calculating juvenile by-catch criteria

- Developed in early 1990s
- Attempts to assess the connection between losses of shrimp catches and gains in juvenile protection
- Method: comparing present value of shrimp catches lost, compared to future value of fish catches gained

The bio-economic model for calculating juvenile by-catch criteria

- Considers factors such as:
 - Prices cod, haddock, shrimp
 - Expected future catch volume pr. "saved" juvenile (including natural mortality expectations)
- Developed for cod and haddock.
- Now also have redfish and greenland halibut criteria. Model less useful for stocks outside safe biological limits (shrimp will always "win" as future value of little is little...)

Using bio-economic model

- Calculations based on average cod, haddock and shrimp prices 2004 and using varying future catch expectancies from "saved" juveniles, indicates following by-catch criteria:
 - Cod 1.100-1.600 pr ton shrimp
 - Haddock 2.500-4.400 pr ton shrimp
(model calculates species by species)
- Future yield per recruit/saved juvenile optimistically estimated...
- Relative price-moves in 2005 may alter above conclusions, but clear result towards more liberal juvenile by-catch criteria

Conclutions

- Juvenile by-catch criteria is not a strictly biological issue, economic factors must be considered
- Support biological decision-making factors with economic by use of, or inspired by ideas of the bio-economic model
- Take current 0-group stock assessments into consideration
- Need for annual juvenile by-catch criteria adjustments?

Conclutions

- Need to consider more liberal criteria the further north you go? (assuming less juvenile survival further north)
- Need a system of automatic reopening of fishing areas after some time, unless new measurements indicates continued closure