

# Towards an Ecosystem Based Fisheries Management – Norwegian Experiences



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by

Peter Gullestad, The Norwegian Directorate of Fisheries

International Workshop on Biodiversity  
Mainstreaming

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# Biodiversity and Food Security



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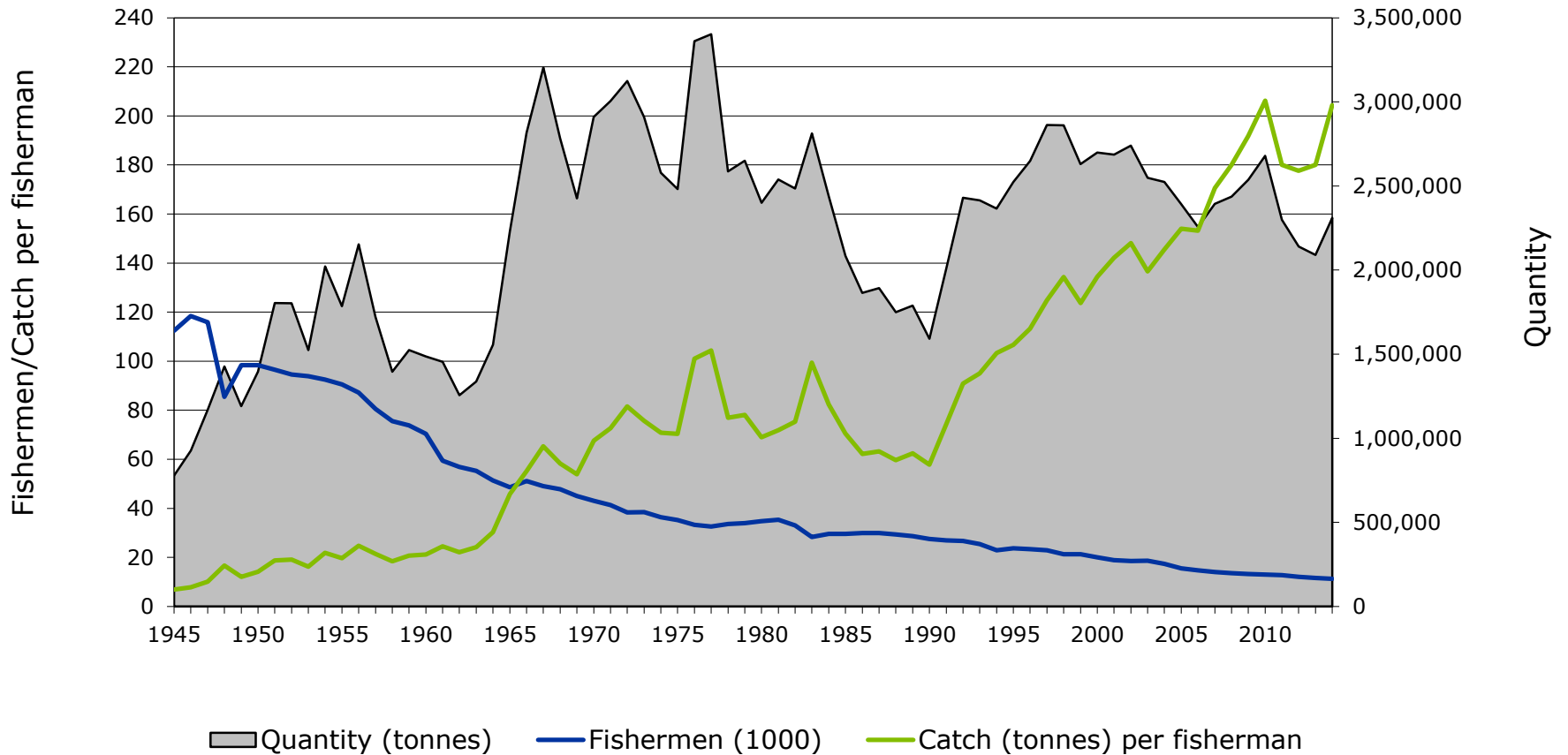
- Global population increases from 7 to 9 billion people in 2050 – food supply is going to be critical
- 70 % of our planet's surface is ocean, accounting for 50 % of it's biological production – but only a few percent of global food production
- Fisheries is food production – mainstreaming biodiversity implies reconciling biodiversity and seafood production
- Good reason for long-term optimism – fisheries fundamentally depends on rich and clean oceans!

# Norwegian catches versus fishermen

## 1945 – 2014\*



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# Gradual change in Norwegian fishery policy objectives 1970 – 2015:



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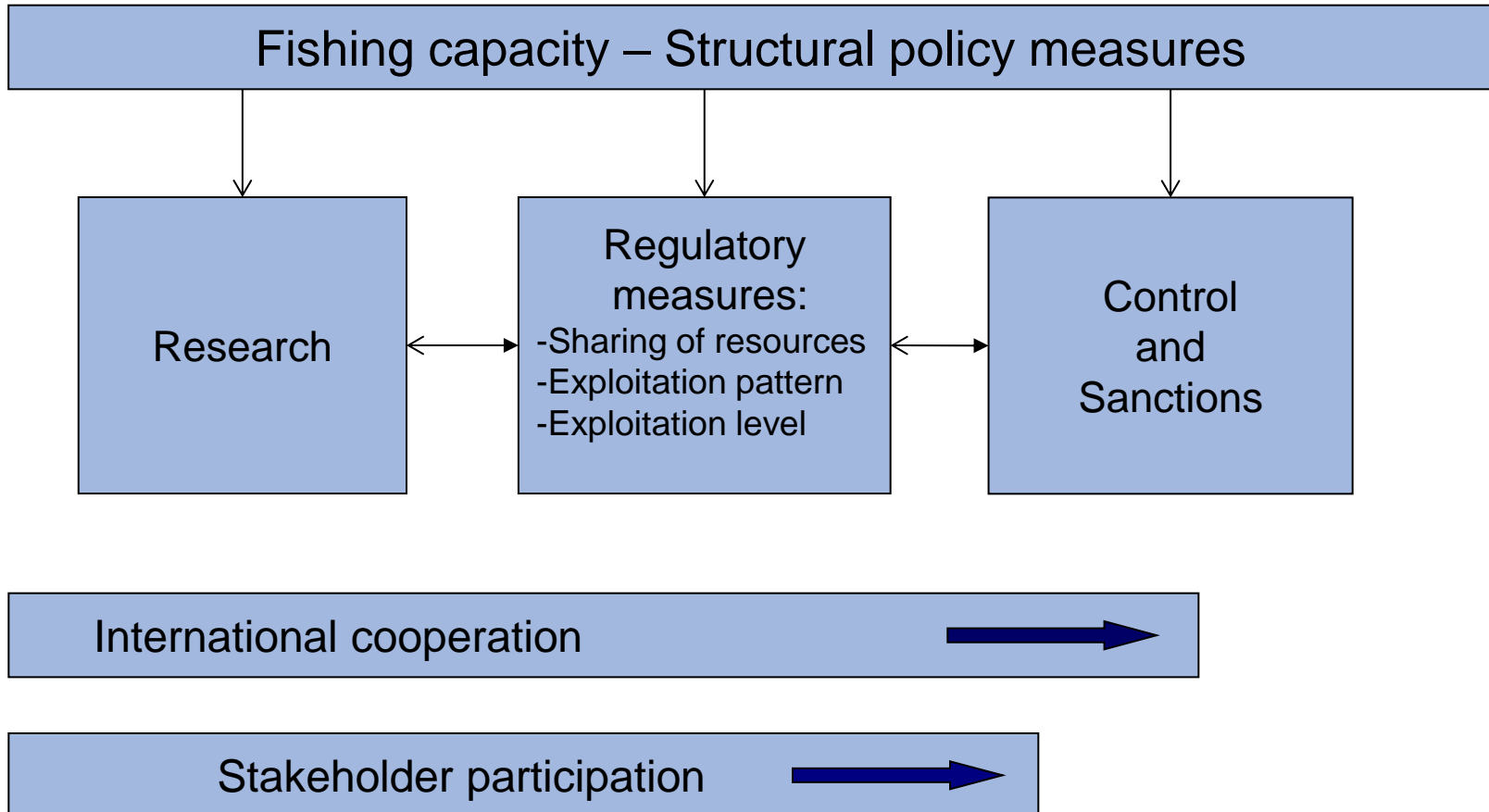
Objectives in 1970, in order of priority:

- 1) Employment and rural settlement
- 2) Profitability (achieved by means of subsidies)
- 3) Ecological sustainability (slowly emerging)

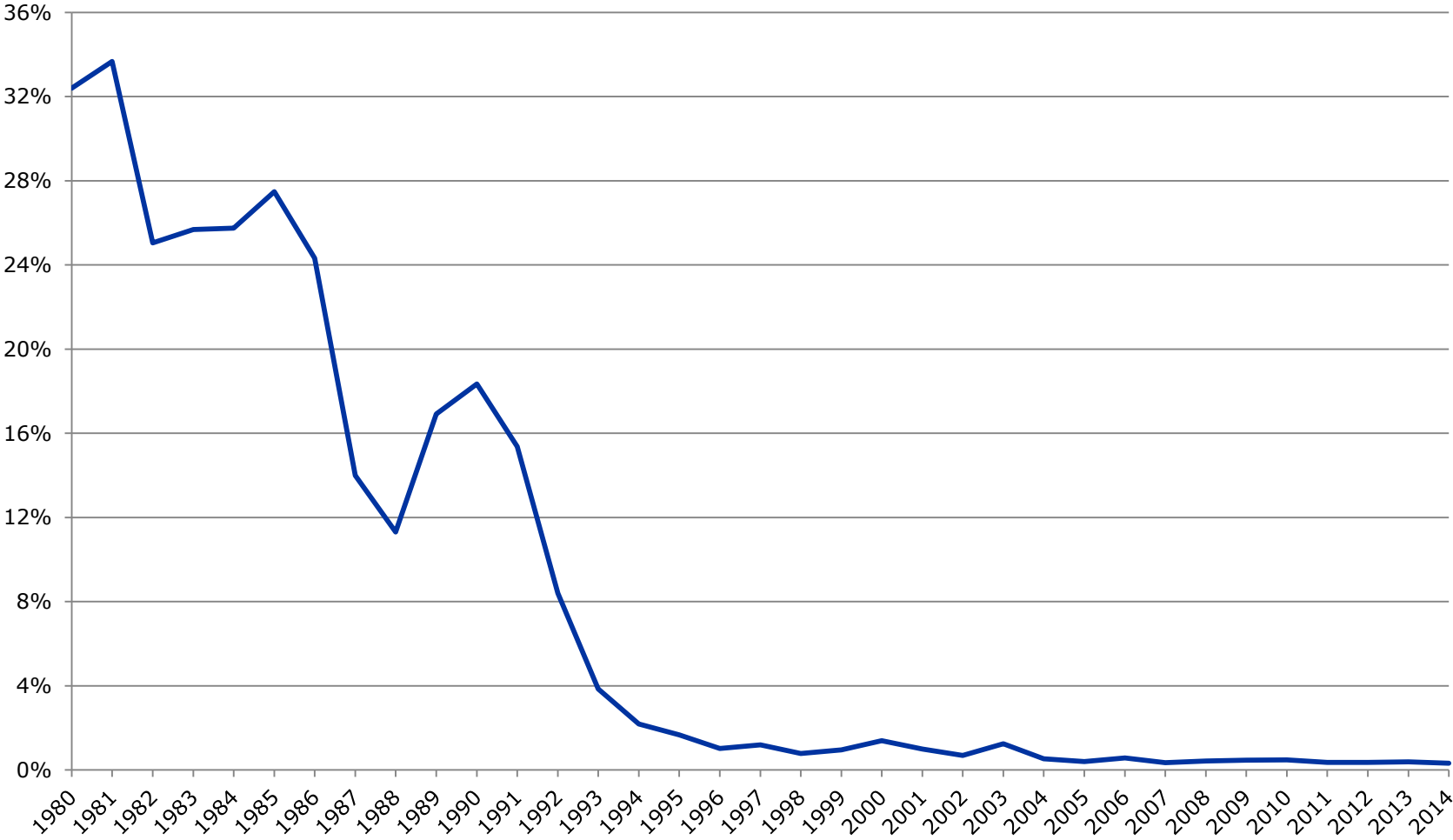
Objectives in 2015, in order of priority:

- 1) Ecological sustainability; a prerequisite for achieving
- 2) Profitability without subsidies
- 3) Employment and rural settlement

# The main elements of fisheries management



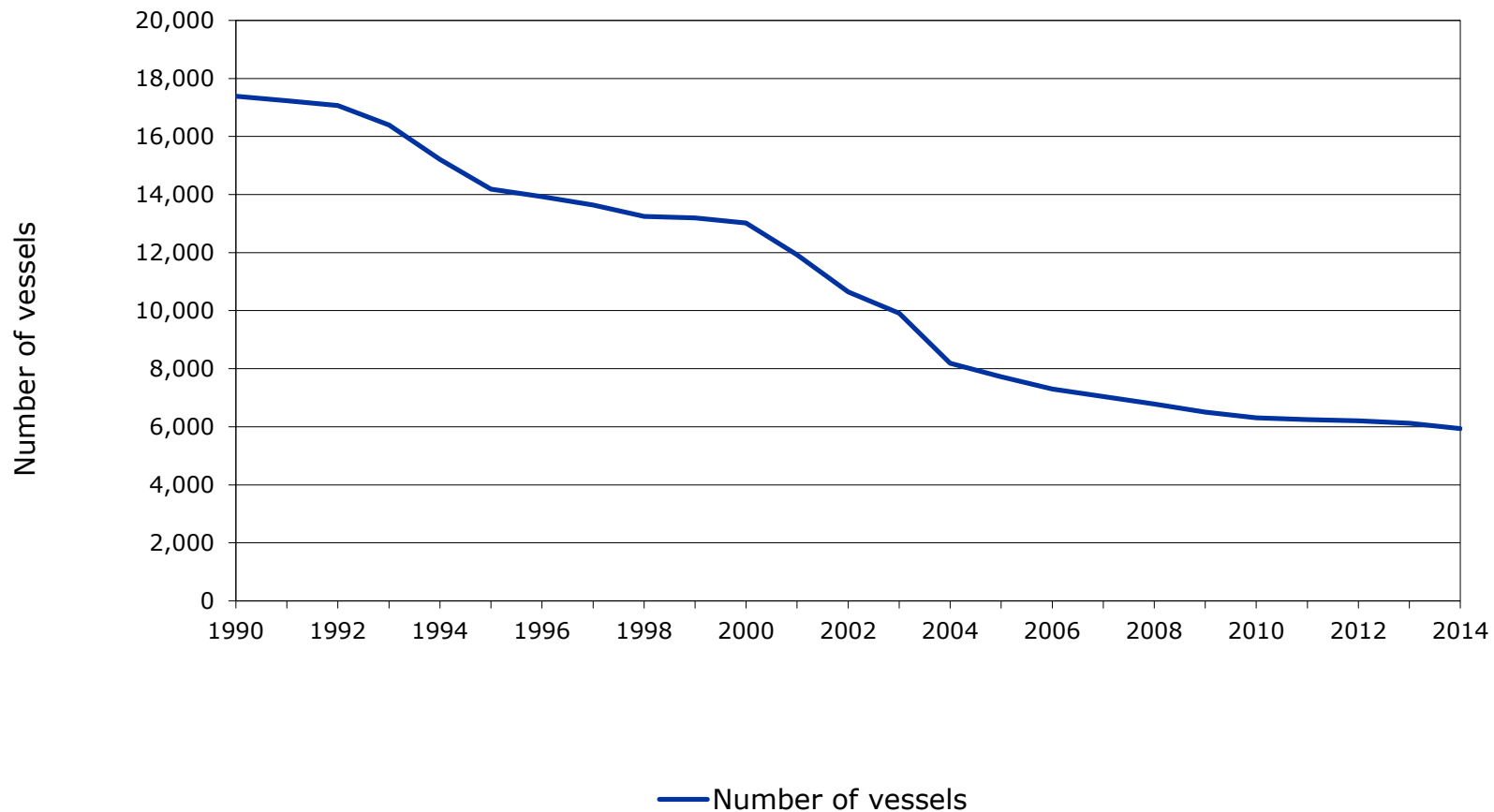
# Fisheries subsidies as a percentage of first hand value 1980 – 2014



# Number of fishing vessels 1990 - 2014



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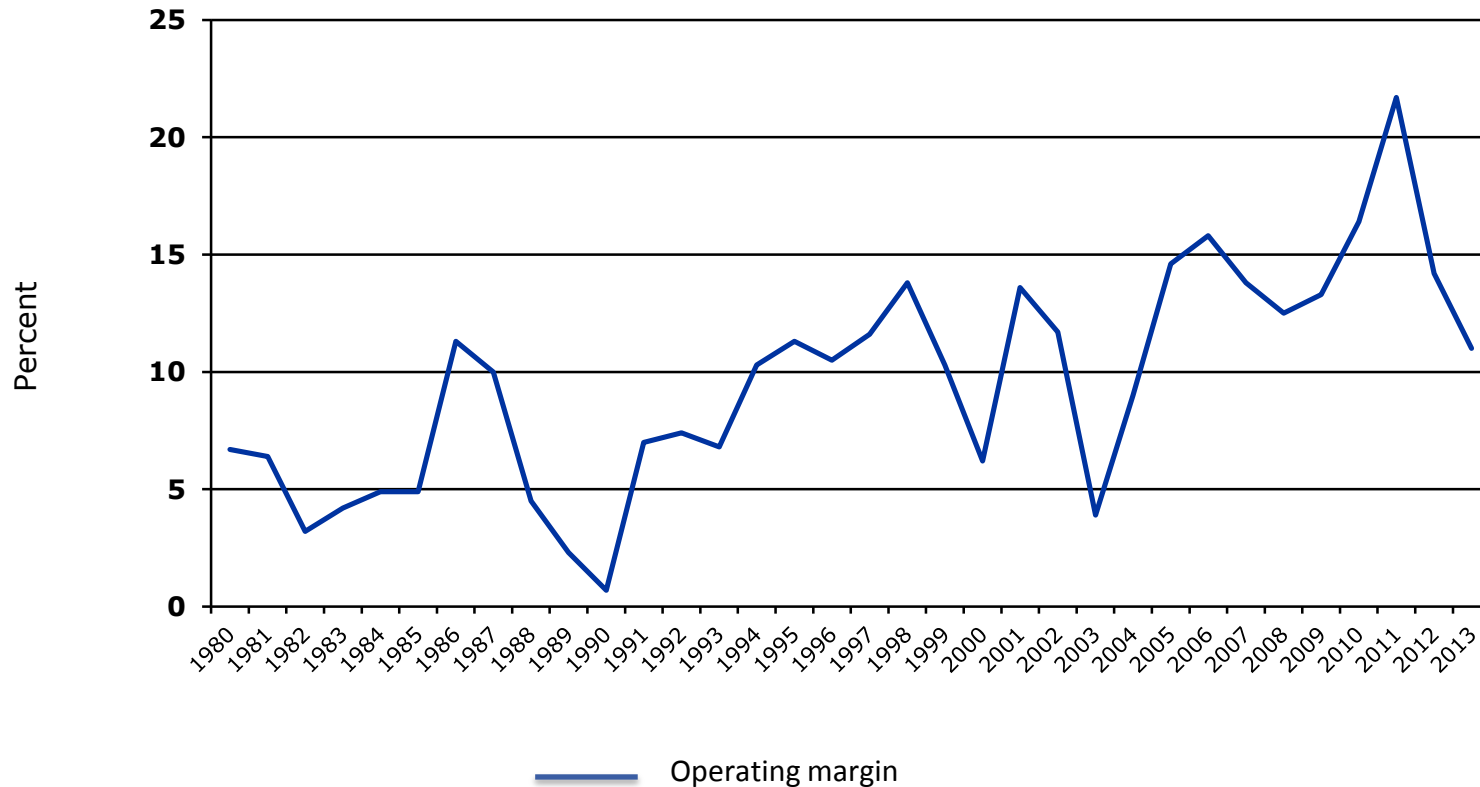


\* Preliminary figures

# The fishing fleet – average operating margin 1980-2013



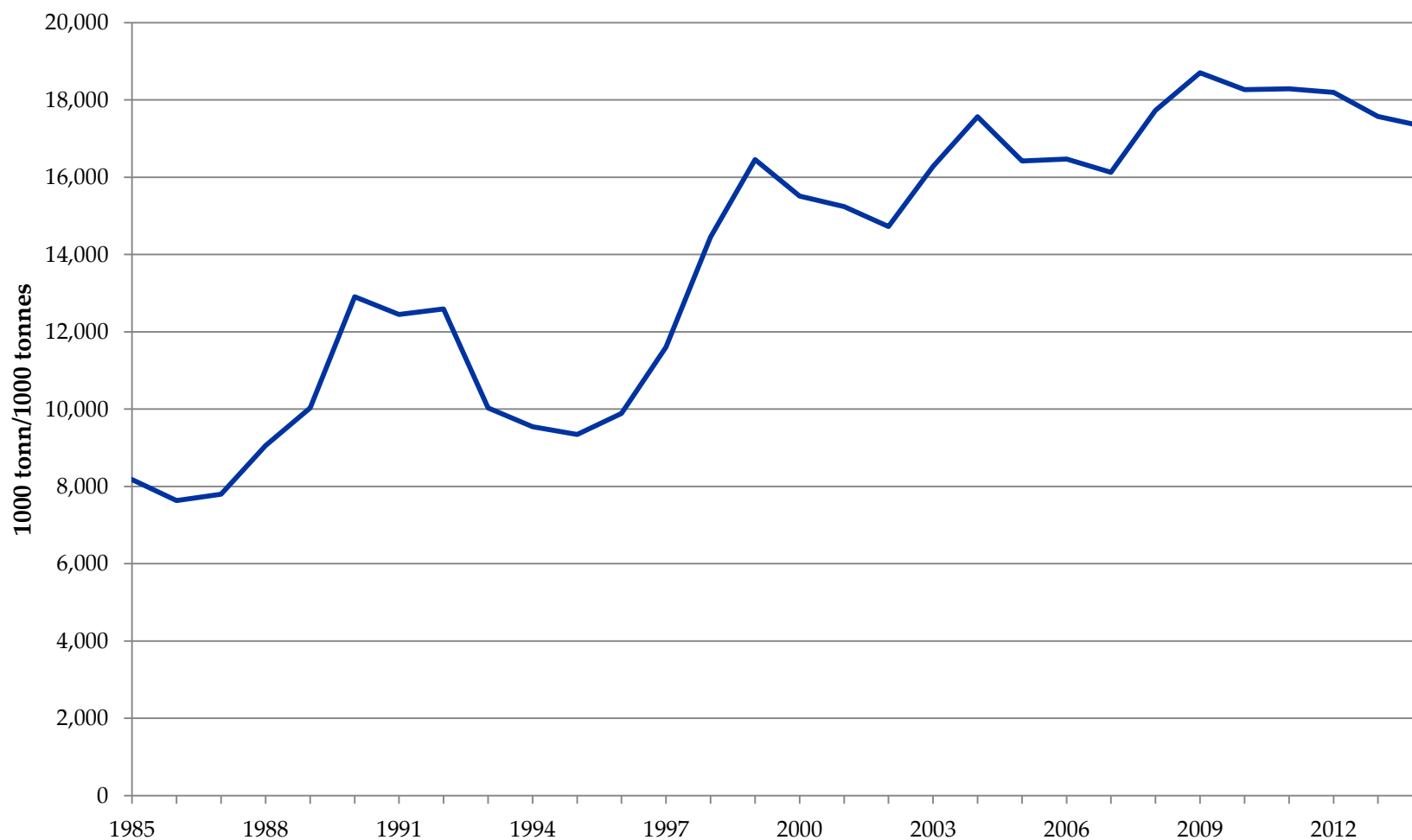
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# Aggregate spawning stock of the 5 economically most important pelagic species 1985 – 2014



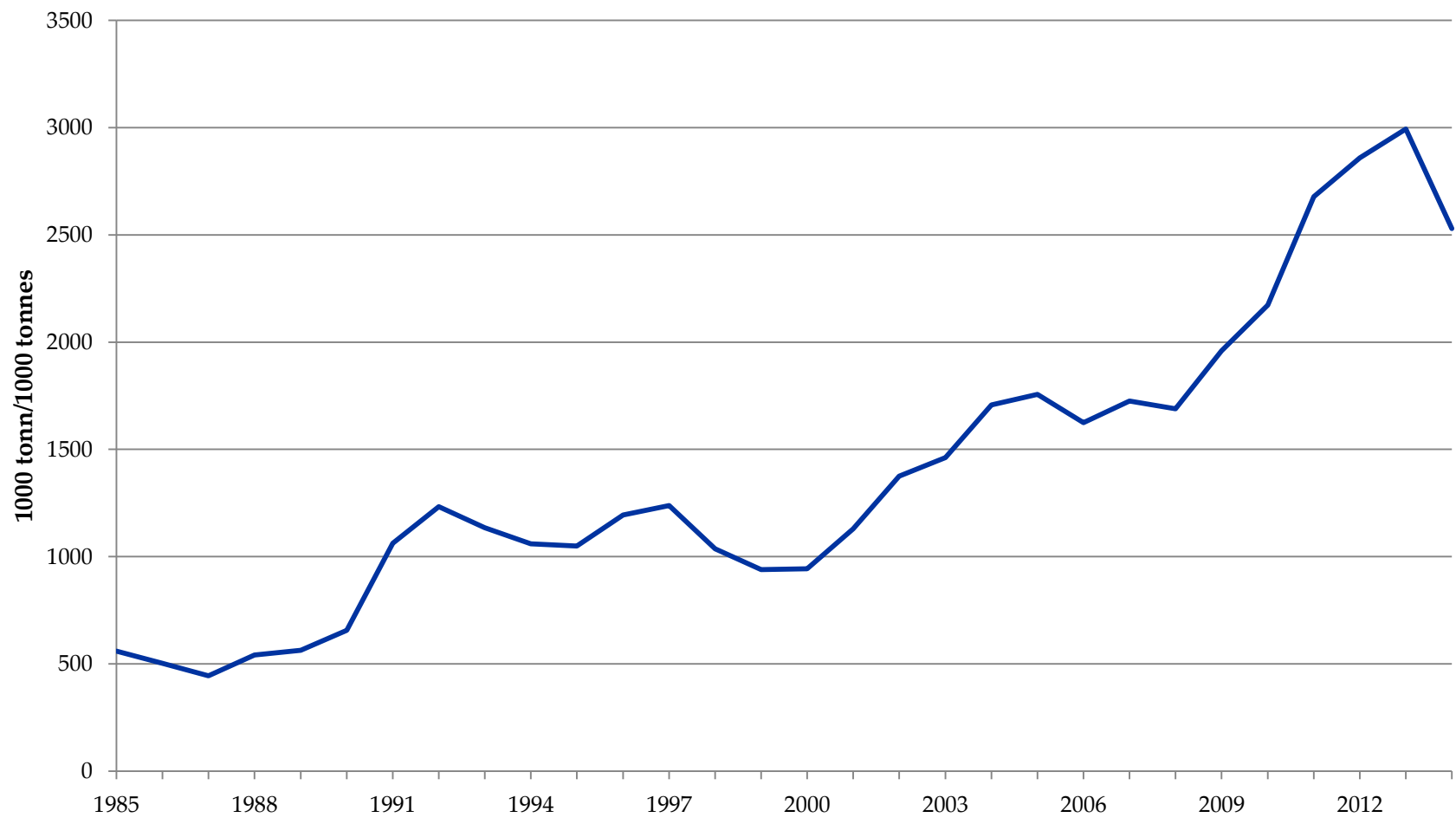
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# Aggregate spawning stock of the 5 economically most important groundfish species 1985 – 2014



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# Red Listed species and vulnerable habitats

The official Norwegian Red List for marine species was published for the first time in 2006 and revised in 2010 and 2015. The situation with regard to redlisting has improved, in particular from 2010.

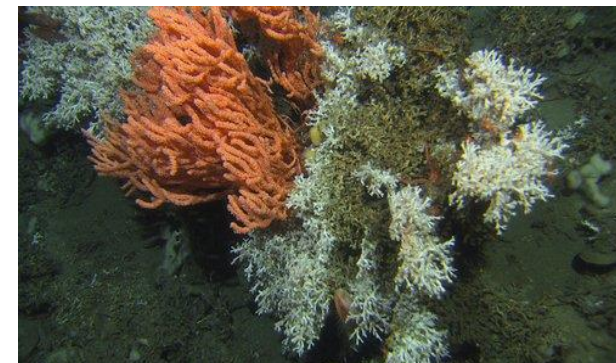
The marine species relevant to Norwegian fisheries on the 2015 Red List are:

- Basking shark
- Blue ling
- Blue skate
- Coastal sprat
- European eel
- European oyster
- Golden redfish
- Hooded seal
- Northern wolffish
- Picked dogfish
- Polar cod
- Porbeagle



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Sularevet, the world's largest known cold water coral reef, was protected from trawling in 1999. Today 10 reefs are protected in Norwegian waters, the number will probably increase to 23 in the near future.



# Biodiversity and sustainable use



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- The Fisheries Act of 1983, in force until 2009, focused on the commercially exploited resources
- The subsequent Marine Resources Act of 2009, applies to all living marine resources. The Act states that its purpose is to ensure sustainable and economically profitable management of the resources, and several provisions describe conservation of biodiversity as an integral part of sustainable management

# A pragmatic approach to move towards an Ecosystem Based Fisheries Management (EBFM)

- Two tables – one for stocks (74) and one for fisheries (57) – with a number of columns each giving information graded by importance for each stock/fishery on issues relevant to the development of an EBFM
- The tables give simultaneously a condensed survey of both “fisheries” and “biodiversity” issues relevant to the development of an EBFM. The tables form the basis for decisions on where the development of new or improved management measures should be prioritized the next year
- The tables and supporting documents, available to the general public on internet, are updated and discussed annually with stakeholders. New lines (stocks/fisheries) or issues (columns) may be added as appropriate

# An excerpt from the 2015 Stock Table



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| June 2015<br>STOCK<br>Go to Fishery Table | Status of knowledge<br>1-3 | Key role<br>1-2 | State of stock<br>0-6 | Fishing mortality<br>0-5 | Red/Black-listed<br>0-6 | Pollution<br>0-2 | Catch value<br>1-5 | Recreational value<br>1-3 | Recreational share<br>1-4 | Shared stock<br>1-4 | Management objective<br>0-4 | Measures implemented<br>1-3 | Priority new measures<br>1-3 | Comment box                     |
|-------------------------------------------|----------------------------|-----------------|-----------------------|--------------------------|-------------------------|------------------|--------------------|---------------------------|---------------------------|---------------------|-----------------------------|-----------------------------|------------------------------|---------------------------------|
| Sprat high seas                           | 2                          | 2               | 1                     | 2                        | 1                       | 1                | 4                  | 3                         | 4                         | 2                   | 3                           | 1                           | 1                            |                                 |
| Sprat coastal                             | 2                          | 2               | 0                     | 0                        | 2                       |                  | 3                  | 3                         | 4                         | 3                   | 3                           | 1                           | 3                            |                                 |
| Blue whiting                              | 1                          |                 | 1                     | 2                        | 1                       |                  | 2                  | 3                         | 4                         | 1                   | 1                           | 1                           | 2                            | Unsolved multilateral question  |
| Capelin I, II                             | 1                          | 1               | 1                     | 2                        | 1                       | 1                | 2                  | 3                         | 4                         | 1                   | 1                           | 1                           | 1                            |                                 |
| Capelin IIa, Va, XIV                      | 2                          | 1               | 0                     | 0                        | 1                       |                  | 3                  | 3                         | 4                         | 1                   | 1                           | 1                           | 1                            |                                 |
| Mackerel                                  | 2                          |                 | 1                     | 2                        | 1                       |                  | 1                  | 1                         | 4                         | 1                   | 1                           | 1                           | 2                            | Unsolved multilateral question  |
| Herring IIIa, IVa,b                       | 1                          | 2               | 1                     | 2                        | 1                       | 1                | 3                  | 2                         | 4                         | 1                   | 1                           | 1                           | 1                            |                                 |
| Herring I, II, IVa                        | 1                          | 1               | 2                     | 2                        | 1                       |                  | 1                  | 2                         | 4                         | 1                   | 1                           | 1                           | 2                            | Unsolved multilateral question  |
| Silvery pout                              | 3                          |                 | 3                     | 3                        | 1                       |                  | 4                  | 3                         | 4                         | 2                   | 3                           | 3                           | 1                            |                                 |
| Horse mackerel                            | 2                          |                 | 0                     | 4                        | 1                       |                  | 3                  | 3                         | 4                         | 2                   | 3                           | 2                           | 1                            |                                 |
| Sandeel                                   | 2                          | 1               | 5                     | 2                        | 1                       |                  | 3                  | 3                         | 4                         | 2                   | 2                           | 2                           | 1                            |                                 |
| Greater argentines                        | 2                          |                 | 3                     | 3                        | 1                       | 0                | 3                  | 3                         | 4                         | 2                   | 2                           | 1                           | 1                            |                                 |
| Norway pout                               | 2                          | 2               | 1                     | 2                        | 1                       |                  | 3                  | 3                         | 4                         | 2                   | 3                           | 1                           | 1                            |                                 |
| Blue ling                                 | 3                          |                 | 5                     | 0                        | 4                       | 0                | 4                  | 3                         | 4                         | 2                   | 3                           | 1                           | 1                            |                                 |
| Tusk                                      | 2                          |                 | 3                     | 4                        | 1                       | 0                | 3                  | 2                         | 4                         | 2                   | 2                           | 1                           | 1                            |                                 |
| Whiting                                   | 2                          |                 | 3                     | 3                        | 1                       | 1                | 4                  | 2                         | 4                         | 1                   | 1                           | 1                           | 1                            |                                 |
| Haddock IV                                | 1                          |                 | 1                     | 2                        | 1                       | 1                | 3                  | 2                         | 4                         | 1                   | 1                           | 1                           | 1                            |                                 |
| Haddock I, II                             | 1                          |                 | 1                     | 2                        | 1                       | 0                | 1                  | 2                         | 4                         | 1                   | 1                           | 1                           | 1                            |                                 |
| Ling                                      | 2                          |                 | 3                     | 3                        | 1                       | 0                | 2                  | 2                         | 4                         | 2                   | 2                           | 1                           | 1                            |                                 |
| Pollack                                   | 3                          |                 | 5                     | 0                        | 1                       | 0                | 3                  | 1                         | 2                         | 3                   | 3                           | 3                           | 2                            | Minimum size                    |
| European hake                             | 2                          |                 | 3                     | 3                        | 1                       | 0                | 3                  | 2                         | 3                         | 3                   | 3                           | 3                           | 2                            |                                 |
| Saithe IIIa, IV                           | 1                          |                 | 4                     | 2                        | 1                       | 0                | 2                  | 1                         | 3                         | 1                   | 1                           | 1                           | 1                            |                                 |
| Saithe I, II                              | 1                          |                 | 3                     | 4                        | 1                       | 0                | 1                  | 1                         | 3                         | 3                   | 1                           | 1                           | 1                            |                                 |
| Greater forkbeard                         | 3                          |                 | 3                     | 3                        | 1                       |                  | 4                  | 3                         | 4                         | 2                   | 3                           | 3                           | 1                            |                                 |
| Coastal cod I, II                         | 2                          |                 | 5                     | 5                        | 1                       | 2                | 2                  | 1                         | 2                         | 1                   | 2                           | 1                           | 1                            |                                 |
| Coastal cod IIIa, IV                      | 2                          |                 | 6                     | 5                        | 1                       | 2                | 4                  | 1                         | 1                         | 1                   | 3                           | 1                           | 3                            |                                 |
| Cod IIIa, IV                              | 1                          |                 | 2                     | 2                        | 1                       |                  | 3                  | 2                         | 4                         | 1                   | 1                           | 1                           | 3                            | Revision of the management plan |
| Cod I, II                                 | 1                          |                 | 1                     | 2                        | 1                       | 1                | 1                  | 2                         | 4                         | 1                   | 1                           | 1                           | 1                            |                                 |
| Greenland halibut                         | 2                          |                 | 3                     | 4                        | 1                       | 2                | 2                  | 3                         | 4                         | 2                   | 2                           | 1                           | 1                            |                                 |
| Atlantic halibut I, II                    | 2                          |                 | 3                     | 0                        | 1                       | 2                | 3                  | 2                         | 2                         | 3                   | 2                           | 1                           | 3                            |                                 |
| Atlantic halibut IIIa, IV                 | 2                          |                 | 5                     | 5                        | 1                       | 2                | 4                  | 2                         | 2                         | 3                   | 3                           | 1                           | 3                            |                                 |
| European plaice I, II                     | 3                          |                 | 3                     | 3                        | 1                       | 0                | 4                  | 2                         | 4                         | 3                   | 3                           | 3                           | 1                            |                                 |
| European plaice IV                        | 1                          |                 | 1                     | 2                        | 1                       | 1                | 4                  | 3                         | 4                         | 1                   | 1                           | 1                           | 1                            |                                 |
| European plaice IIIa                      | 3                          |                 | 3                     | 3                        | 1                       | 1                | 4                  | 3                         | 4                         | 1                   | 1                           | 1                           | 1                            |                                 |
| Flatfishes n.e.i.                         | 3                          |                 | 3                     | 3                        | 1                       | 0                | 4                  | 2                         | 3                         | 3                   | 3                           | 3                           | 1                            |                                 |

# An excerpt from the 2015 Fisheries Table



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| Num. | June 2015 FISHERY |                           |                             |             | SPECIES SELECTIVITY       |                      |            |         | Size selectivity | Discarding | Incidental mortality | Effect on seabed | Comment box |
|------|-------------------|---------------------------|-----------------------------|-------------|---------------------------|----------------------|------------|---------|------------------|------------|----------------------|------------------|-------------|
|      | Gear              | Target specie(s)          | Catch area                  | Nationality | Endangered marine species | Other marine species | Sea mammal | Seabird |                  |            |                      |                  |             |
| 1    | Demersal trawl    | Cod, haddock, saithe etc. | I and II                    | Both        | 1                         | 1                    | 1          | 1       | 1                | 3          | 1                    | 3                |             |
| 2    | Demersal trawl    | Saithe                    | IIIa and IV                 | Norwegian   | 1                         | 1                    | 1          | 1       | 1                | 1          | 1                    | 2                |             |
| 3    | Demersal trawl    | Mixed fisheries           | IIIa and IV                 | Norwegian   | 3                         | 2                    | 1          | 1       | 3                | 2          | 1                    | 2                |             |
| 4    | Demersal trawl    | Mixed fisheries           | IIIa and IV                 | Foreign     | 3                         | 3                    | 1          | 1       | 3                | 3          | 1                    | 2                |             |
| 5    | Demersal trawl    | Norway pout               | IIa, IV                     | Both        | 1                         | 2                    | 1          | 1       | 3                | 1          | 1                    | 2                |             |
| 6    | Demersal trawl    | Blue whiting              | IIa, IV                     | Both        | 1                         | 2                    | 1          | 1       | 3                | 1          | 1                    | 2                |             |
| 7    | Demersal trawl    | Sandeel                   | IVa,b                       | Both        | 1                         | 1                    | 1          | 1       | 2                | 1          | 1                    | 1                |             |
| 8    | Demersal trawl    | Flatfishes                | IIIa and IV                 | Foreign     | 0                         | 0                    | 1          | 1       | 0                | 3          | 1                    | 2                |             |
| 9    | Demersal trawl    | Greater argentines        | IIa                         | Norwegian   | 1                         | 0                    | 1          | 1       | 0                | 0          | 1                    | 3                |             |
| 10   | Demersal trawl    | Northern shrimp           | I and II                    | Both        | 1                         | 2                    | 1          | 1       | 2                | 2          | 1                    | 3                |             |
| 11   | Demersal trawl    | Northern shrimp           | IIIa and IV                 | Both        | 2                         | 3                    | 1          | 1       | 3                | 3          | 1                    | 3                |             |
| 12   | Midwater trawl    | Mackerel                  | IIa and IVa,b, VIa and IIIa | Both        | 1                         | 2                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 13   | Midwater trawl    | Horse mackerel            | II a, IVa and VIa           | Both        | 1                         | 2                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 14   | Midwater trawl    | Herring                   | I, IIa, IVa                 | Both        | 1                         | 2                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 15   | Midwater trawl    | Herring                   | IVa and IVb                 | Both        | 1                         | 2                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 16   | Midwater trawl    | Capelin                   | I and II                    | Both        | 1                         | 2                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 17   | Midwater trawl    | Beaked Redfish            | I and II                    | Both        | 1                         | 1                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 18   | Midwater trawl    | Blue whiting              | IIa, IVa, Vb, VI, VIIb,c    | Both        | 1                         | 1                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 19   | Midwater trawl    | Greater argentines        | IIa                         | Norwegian   | 1                         | 3                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 20   | Midwater trawl    | Antarctic krill           | CCMLAR                      | Norwegian   | 1                         | 1                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 21   | Kelp trawl        | North European kelp       | IIa, IV                     | Norwegian   | 1                         | 1                    | 1          | 1       | 1                | 1          | 1                    | 2                |             |
| 22   | Purse seine       | Mackerel                  | IIa and IVa,b, VIa and IIIa | Both        | 1                         | 1                    | 1          | 1       | 1                | 1          | 2                    | 1                |             |
| 23   | Purse seine       | Horse mackerel            | IIa, IVa                    | Both        | 1                         | 2                    | 1          | 1       | 1                | 1          | 2                    | 1                |             |
| 24   | Purse seine       | Herring                   | I, IIa, IVa                 | Both        | 1                         | 1                    | 1          | 1       | 1                | 1          | 2                    | 1                |             |
| 25   | Purse seine       | Herring                   | IVa and IVb                 | Both        | 1                         | 1                    | 1          | 1       | 1                | 1          | 2                    | 1                |             |
| 26   | Purse seine       | Capelin                   | I and II                    | Both        | 1                         | 2                    | 1          | 1       | 1                | 1          | 2                    | 1                |             |
| 27   | Purse seine       | Capelin                   | IIa, Va, XIV                | Both        | 1                         | 1                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 28   | Purse seine       | High seas sprat           | IVb                         | Both        | 1                         | 1                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 29   | Purse seine       | Coastal sprat             | IIa, IIIa, IV               | Norwegian   | 1                         | 1                    | 1          | 1       | 1                | 1          | 1                    | 1                |             |
| 30   | Purse seine       | Saithe                    | I and IIa                   | Norwegian   | 2                         | 2                    | 1          | 1       | 2                | 1          | 1                    | 1                |             |
| 31   | Purse seine       | Saithe                    | IIIa and IV                 | Norwegian   | 2                         | 1                    | 1          | 1       | 2                | 1          | 1                    | 1                |             |

# Solving challenges in the right order



- Reduction of overcapacity, rebuilding of important commercial stocks and improved profitability in fisheries, has in itself eliminated or reduced many biodiversity concerns
- In addition, the strengthening of the economic capacity of the industry, and thus the political space, has been crucial to be able to constructively meet remaining biodiversity challenges

Thank you for your attention