



NORDIC MARINE THINK TANK

Forage fish in the marine environment and their management

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Raw material for the fish meal and fish oil industry

- Globally, the industry processes 16–20% of total world capture fisheries production
- Directed catches ~65 % in weight
- Trimmings and other residues from the filleting industry ~35% in weight
- Small pelagics species dominate landings for reduction purposes;



Forage fish

Biological classification that considers role in the marine ecosystem

- *Prey for upper trophic-level predators*
- *Transfer a large proportion of energy in the ecosystem and therefore support or regulate a variety of ecosystem services*



Raw material for the fish meal and fish oil industry

- Low cost and in high quantities
- Only some of the species are forage fish.
- Mix the forage fish concept with low cost/high quantity criteria



The Northeast Atlantic

- Far dominated by Nordic fisheries
- Species in directed catches *inter alia*
 - Capelin,
 - Sandeel,
 - Herring,
 - Sprat
 - Norway pout
 - Blue whiting
 - Boarfish





Forage fish

Example:

- Sprat: Key role in the Central Baltic Sea but not in Bothnia Sea

Based on occurrence and transfer of energy





Dynamics of Forage Fish stocks

- Influence in some cases productivity of other stocks directly
- Population size usually strongly environmentally driven
- Often exhibit large annual, inter-annual, or decadal-scale fluctuations.



Management of Forage Fish stocks

- Objectives for management are Maximum Sustainable Yield (MSY) and sustainable production of the stocks
- Tools include as for other fisheries
 - TAC
 - Effort restrictions
 - Closed areas and seasons
 - ITQ and similar measures



Management Challenges

- Species interactions included in the setting of limitations on the fishery;
- Fishing often with non-selective gears
- Bulk landings: the species composition established by sampling
- Risk for exploiting undersized and other unwanted fish higher than if more selective gears are used



Future Management of Forage Fish stocks

- Increased use of Management Plans
- Changing management decisions towards a more rational and transparent process;
- Possibilities for more industry self-management;
- The fisheries for meal and oil are prime candidates to lead the development.



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Thank you for your attention



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