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**Principles of the ecosystem approach to
fisheries management**

Joint Norwegian-Russian symposium

Murmansk 16-17 August 2005

Fisheries management in the Barents Sea

- Joint Norwegian/Russian Fisheries Commission (JNRFC)
- Traditional fundament for decisions by JNRFC on fish quotas :
 - Joint Norwegian /Russian investigations in the Barents Sea
 - Results evaluated by ICES (AFWG, ACFM)

Fisheries management in the Barents Sea. An ecosystem approach?

- ICES advice on TAC for Northeast Arctic cod in 2006: 471 000 tonnes.
- Will an eventual decision at the meeting of JNRFC in autumn 2005 on such a TAC for 2006 have a foundation in an ecosystem approach to fisheries management?

Fisheries management in the Barents Sea. An ecosystem approach?

- No:
 - Assessment of cod is made on basis of a single stock population model (XSA;VPA).
 - Must have a large holistic model taking into account as many parameters as possible (oceanography, plankton, pray and predators etc
- Not a constructive starting point for an implementation of the ecosystem approach in the Barents Sea

Fisheries management in the Barents Sea. An ecosystem approach?

- Yes:
- There are elements of an ecosystem approach in such a catch recommendation:
 - Basis of a long term management plan
 - The consumption of capelin by cod is taken into account when the TAC for capelin is set
 - Measurements for protecting young fish (sorting grids etc)
- Implementation of the ecosystem approach should not be a break, but an extension of the present work

Changing landscape of fisheries management policy (1)

- 2001: The commission appointed study group:
 - Main principles for long term sustainable management for living marine resources
- Result: The JNRFC has decided upon long term management plans for several stocks.
 - Management plans evaluated by ICES to be in accordance with the precautionary approach to fisheries management

Changing landscape of fisheries management policy (2)

- Aim shifted from quota next year to a view of the long term harvest and stock development
- New element in the changing landscape: "Ecosystem approach"
 - At present no single definition, no single way to implement the "ecosystem approach"
- A suitable definition for the Barents Sea may be that the ecosystem approach puts emphasis on a management regime that maintains the health of the ecosystem alongside appropriate human use of the marine environment, for the benefit of current and future generations

Possible ways forward for implementing the ecosystem approach to management of fisheries in the Barents Sea:

- With regard to the assessment and prognoses of fish stocks :
 1. Incorporation of ecosystem information in population parameters in the assessment
 2. Multi-species modelling

Incorporation of ecosystem information in assessment models

- Mandate given by the in 2003 by JNFC to Nor/Rus scientists:
 - ..make a scientific assessment of optimal harvest (maximum sustainable yield) from the most important commercial species in the Barents Sea...The assessments shall include all ecosystem elements available for evaluation....
- Implemented by IMR/PINRO to a 3 +7 year joint project (approximately 40 persons from IMR and PINRO)
 - (This project will be presented later at this symposium)

Towards an ecosystem approach

- Multi-species models for use in the management of commercial fish species in the Barents Sea:
- Candidate models:
 - STOCKOBAR
 - EcoCod
 - Gadget
 - Bifrost (operational since 1998, capelin-cod)
 - (or a combination of these models)
- Discussion in 2007/08 on choice of model(s) and species that will be implemented in management

Towards an ecosystem approach.

Elements beyond fish assessment

- No single way to implement ecosystem approach.
 - Depends on historical practices and regional, national and global conditions.
- A challenge for the JNRFC may be a gradual shift of focus from the health of the commercial fish stocks to the health of the ecosystem (alongside appropriate use of the marine environment)

Towards an ecosystem approach

- Elements commonly related to ecosystem health
 - Pollution
 - Fishing industry is dependant upon a clean Barents Sea to sell the fish products
 - Biodiversity
 - Ecological impacts of fishery on the ecosystem
- JNRFC should decide if it wants to incorporate these fields in the ecosystem approach (Joint Nor/Rus investigations have started in this field (ecosystem survey))

Summary: Principles for the implementation of the ecosystem approach in the Barents Sea

- Evolution, not revolution
- Objectives from the operational single (and multi) species model should be a basis
- Gradual incorporation of ecosystem information into assessment models
- Gradual extension of use of multi-species models
- Increased emphasis on ecosystem health