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Report of the FC Working Group on Greenland Halibut Management Strategy Evaluation (WGMSE) 28-29 January 2010 Brussels, Belgium

Report of the FC Working Group on Greenland Halibut Management Strategy Evaluation (WGMSE)

(FC Doc. 10/2)

28-29 January 2010
Brussels, Belium

1. Opening of the Meeting

The Fisheries Commission Coordinator of the NAFO Secretariat (Ricardo Federizon) opened the meeting, on behalf of the Executive Secretary, at 1010 hrs on Thursday, 28 January 2010. He welcomed the delegates to the Headquarters of the Directorate-General for Maritime Affairs and Fisheries of the European Commission (Annex 1).

2. Election of Chairs

Sylvie Lapointe (Canada) and Antonio Vazquez (EU) were elected co-Chairs representing the Fisheries Commission (FC) and Scientific Council (SC), respectively. The Chairs presided over the subsequent agenda items.

3. Appointment of Rapporteur

Ricardo Federizon was appointed Rapporteur.

4. Adoption of Agenda

The revised agenda from the previously circulated draft agenda was adopted (Annex 2).

5. Overview of Management Strategies Evaluation (MSE) and Efforts to date

Four PowerPoint presentations were made on the topic of MSE:

- Doug Butterworth (Japan) – *Overview of MSE*. Dr. Butterworth presented the elements and the underlying mechanism of the MSE. Through (non-fishery) illustration, he highlighted some of the benefits of the MSE approach, specifically the risk-management aspect which is a primary driver for this exercise.

- Jean-Claude Mahé (EU) – *Management Strategies in the European Fisheries*. Mr. Mahé talked about the Recovery Plans and Management Plans on various fish stocks being implemented and evaluated in Europe, and the reference points used in the evaluation.

- Peter Shelton (Canada) – *MSE as a Tool for Management of NAFO Greenland Halibut*. Dr. Shelton outlined the work of the SC on the MSE and presented initial results of the MSE test runs on the Greenland halibut stock based on operating models conditioned by Extended Survival Analysis (XSA) analytical method.

- Doug Butterworth (Japan) – *Bridging the Gap through MSE*. Dr. Butterworth illustrated how, in cases where two assessment methods (XSA and Statistical Catch-at-age, SCAA) present different views of the stock, MSE can be used as a means to manage the risk associated with this uncertainty.

Discussions and debate engendering from the presentations primarily centered on the use of SCAA method in conditioning a suite of operating models.

6. New Management Strategies Specifications for Evaluation

Canada proposed an approach in moving forward by suggesting that this Working Group (WG) draws from the 2007-2009 MSE study initiated by the Scientific Council. This entails consideration of alternative management strategies and related harvest control rules, selection of appropriate performance indicators and determination of

acceptable levels of risks (for particular performance statistics), and evaluation of outputs of the risk management framework utilizing one or more analytical assessment methods.

a) Operating models (OMs)

An operating model represents a particular "scenario" which describes the fisheries and fish stock dynamics. Some of its input parameters (model conditioning) can be estimated using an analytical assessment method like XSA. A set of plausible OMs based on realistic input parameter(s) will be tested. It was **agreed** that two sets of operating models – one conditioned by XSA and other conditioned by SCAA -- using the same input data will be tested.

b) Management Procedures

It was **agreed** to analyze a simple model-free harvest control rule (HCR). The change in the perceived status of the stock (from a multi-year trend of research surveys) would be used to adjust the TAC, from year (*y*) to year (*y+1*), according to Equation 2 in SCR Doc 09/37 (Shelton and Miller, 2009):

$$TAC_{y+1} = TAC_y \times (1 + \lambda \times slope)$$

This HCR could be refined at the next meeting of this WG in light of the intersessional work to be carried out (see items 7 and 8).

c) Performance Statistics (PS)

Performance statistics allow evaluating the success of the proposed HCR across the accepted set of OMs. The suite of PS to be used was not yet selected, but it was **agreed** that four properties would be evaluated in a risk management context:

i) the risk of steep decline be kept moderately low

ii) the risk of annual average catch variation of greater than 15% be kept moderately low

iii) the magnitude of the average catch in the short, medium term and long term be maximized

iv) the risk of failure to meet an interim target within a prescribed period of time should be kept moderately low

A number of mathematical expressions were proposed to capture PS (i) and (iv):

a) P_{20}/P_0, where P_{20} = population in year 20 and P_0 = population in year 0, where year 0 is the current year

b) P_{lowest}/P_0, where P_{lowest} = lowest population level during evaluation period

c) P_{lowest}/P_{min}, where P_{min} = historical minimum

d) P_{20}/P_{target} , where P_{target} = pre-defined recovery target

e) P_5/ P_0

f) P_{20}/P_{MSY}, where P_{MSY} = population size equivalent to maximum sustainable yield.

In each of them, population can be measured as total numbers, total biomass, exploitable numbers (ages 5 – 9), exploitable biomass, survey index or spawning biomass.

Similarly the primary PS (ii) and (iii) above can be captured by:

g) Average annual catch over short, medium and long term

h) Average annual variation in catch over short, medium and long term.

The summary of the management strategies specifications for evaluation is contained in FCWGMSE Working Paper 10/3 (Rev) presented in Annex 3.

7. Developing Workplan for Next Steps

Two consultants would be hired to do a run of the MSE (with the parameters agreed in item 6) – Dr. D Butterworth to develop the SCAA-conditioned operating models, and Dr. D Miller to develop the XSA-conditioned operating models. The consultants' service fees would be shouldered by EU (for Dr. Butterworth) and by Canada (for Dr. Miller). The consultants' reports deadline is mid-April to allow the Contracting Parties time to review and evaluate the test results in time for the scheduled May 2010 Meeting to be held in Halifax.

Between this meeting and the next meeting in May, it was expected that due to urgency and in spite of timing issues, the Scientific Council could provide the advice requested below (see item 8).

It was recognized that the May 2010 meeting will require three days, instead of the originally planned two days. The practical follow-up meeting dates to be held in Halifax, Canada are May 2-4, subject to the confirmation of the Contracting Parties. The follow-up meeting would be extended by one day to allow for a meeting of scientists, which would occur on May 2 prior to the general discussion of the Working Group, to consolidate the preliminary reports of the consultants and of the Scientific Council.

8. Communication with the Scientific Council

Recognizing that the SC has done an evaluation of alternative assessment models, e.g. SCAA, in enabling the determination of the robustness of the assessment model currently used, a request to the SC was formulated to review and comment on the set of plausible operating models to be used in the evaluation of harvest control rules for Greenland halibut in Subarea 2 + Division 3KLMNO (FC WGMSE Working Paper 10/4 Revised, Annex 4). Two assessment methods are under consideration for conditioning Operating Models (OMs), SCAA and XSA. The SCAA-conditioned OMs shall be reviewed to determine their plausibility. A set of XSA-conditioned OM have already been agreed by SC as plausible representations of the real system. If there are any changes or additions to these XSA-based OMs, SC should also review these. SC is requested to conduct this review as soon as possible, so as to provide a sound footing for the substantial amount of work that has to be done prior to the next meeting in May. This review is expected to be conducted through correspondence and remote-conferencing.

The WG recognized that requests to Scientific Council should emanate from Fisheries Commission and not from a Working Group. In this regard and in consideration of the timings of the SC and FC meetings, it was agreed that when this report is adopted, the issue would be brought to the attention of the FC Chair who would formally communicate to the SC Chair the Request on behalf of the Fisheries Commission.

9. Recommendations to the Fisheries Commission of the Proposed Approach

This item was deferred to the next WG meeting scheduled in May 2010.

10. Other Matters

There was no other matter to discuss.

11. Adoption of Report

This report was adopted through correspondence after the meeting.

12. Adjournment

The Chairs thanked EU for hosting the meeting and the participants for their work over the course of the meeting.

The meeting was adjourned at 1830 hrs on Friday, 29 January 2010.

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Annex 2. Agenda

1. Opening of the Meeting
2. Election of Chairs
3. Appointment of Rapporteur
4. Adoption of Agenda
5. Overview of MSE and Efforts to date
6. New management strategies specifications for evaluation:

   a) Operating models
   b) Management procedures
   c) Performance statistics

7. Developing Workplan for Next Steps
8. Communication with the Scientific Council
9. Recommendations to the Fisheries Commission of the Proposed Approach
10. Other Matters
11. Adoption of Report
12. Adjournment

Annex 3. Chairs' Record of Decision

(FCWGMSE WP 10/3, Revised)

New management strategies specifications for evaluation:

a) Operating models

2 equal sets of operating models – one conditioned on SCAA and other conditioned on XSA, using the same input data.

b) Management procedures

Agreement on a simple harvest control rule, which is model free – A TAC adjustment strategy that uses the change in perceived status of the stock (from a multi-year trend of research surveys) to adjust the TAC (from year y to year y+1).

As a starting point, use a model-free harvest control rule as given in equation 2 on page 4 of SCR Doc. 09/37 (Shelton and Miller, 2009). This can be refined at the May WG in light of intersessional work to be carried out.

c) Performance statistics

Agreement on 4 primary performance statistics to be evaluated in a risk management context:

- the risk of steep decline be kept moderately low
- the risk of annual average catch variation of greater than 15% be kept moderately low
- the magnitude of the average catch in the short, medium term and long term be maximized
- the risk of failure to meet an interim target within a prescribed period of time should be kept moderately low

Development of work plan for next steps

Hire 2 consultants – D. Butterworth to develop and test SCAA and D. Miller to develop and test XSA operating models in MSE context.

Technical discussion to finalize details.

Deadline for consultants' preliminary reports – mid April.

Working group meeting extended by 1 day to allow for a meeting of scientists to consolidate preliminary reports (May 2-4 to be confirmed).

Annex 4. Request to Scientific Council

(FCWGMSE WP 10/4, Revised **now** FC Doc. 10/3)

Scientific Council is requested to review and comment on the set of plausible operating models to be used in the evaluation of harvest control rules for Greenland halibut in Subarea 2 + Div. 3KLMNO by the FC WG. Two assessment methods are under consideration for conditioning operating models, SCAA and XSA. The operating models conditioned on SCAA should be reviewed by SC to determine their plausibility. A set of operating models conditioned on XSA have already been agreed by SC as plausible representations of the real system (NAFO SCR 09/37). If there are any changes or additions to these XSA-based operating models, SC should also review these.

All the operating models will be based on the same input data as the current base XSA model (CAV – current assessment view).

The use of SCAA in the MSE should be reviewed by the SC. The run referenced as "SCAA w. XSA data" in Figure 7 of SCR Doc 09/25 which used almost identical inputs to the current base XSA model, and the associated documents provide all specifications of the approach. For review purposes, these documents together with two further variants of the SCAA2 run will be provided. Both these variants will use exactly the same inputs to the current base XSA model, with one estimating the slope of selectivity at large age and the other setting this slope to be flat. Requests for possible further analyses regarding SCAA will be developed, if necessary, at the May meeting of the Working Group.

Recognizing the SC work schedule, SC is requested to conduct this review as soon as possible.