

## **Annex 4: Technical Minutes**

---

### **NWWG Review Group 1**

**May 23-25 2005, ICES Headquarters**

Present:

RG Chair: Steve Cadrin

Reviewers: Frans van Beek, Tiit Raid

WG Chair: Einar Hjørleifsson

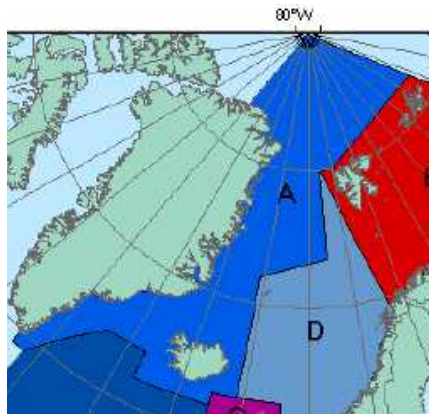
Others (part time): Mette Bertelsen, Poul Degnbol, Jesper Boje

### **General Comments**

- 1) The RG compliments the WG and WG chair for their dedication and accomplishments.
- 2) The RG had several comments on the WG report that applied to multiple sections. Each stock assessment chapter had different format and organization and graphics, diagnostics and tables were not standardized, making technical review less efficient. Most stocks did not have a quality handbook. The RG understands that the WG is overloaded with work, but feels that the work associated with the initial development of a handbook would make the documentation of subsequent WG assessments much easier, and would avoid the many clarifications needed by the RG.
- 3) One technical theme in many of the assessment is the difficulty estimating maturity and size at age from either fishery or survey data. In some stocks the uncertainty in biological parameters was greater than in the estimation of abundance. This issue may require a coordinated effort of a group of species experts to develop a protocol for estimating maturity and weight at age.
- 4) The RG noted that information on management, enforcement and how ACFM advice is applied would help the technical review, formulation of advice and drafting of the ACFM report.

### **NWWG Introduction**

- 1) The RG complimented the WG on a useful description of the ecosystems, particularly the description of the North Atlantic current, the recent rise in temperature and the associated changes in fish distributions. Such changes are important for productivity of fishery resources, effecting the capacity to rebuild to biomass reference points (potentially derived from productivity observed in different conditions) and imposing technical difficulties (changes in fishery and survey catchabilities, biological parameters, etc.).
- 2) The RG questioned if seal predation was increasing as in other areas of the North Atlantic.
- 3) On a related note, distribution of the Greenland cod resource, along the east and west coasts of Greenland raises a concern about the western boundary of the NWWG eco-region 'A: Greenland and Iceland Seas' (Figure 1). This boundary would exclude the historically productive cod resource west of Greenland (e.g., ~500kt of landings west of Greenland).
- 4) Some important stocks are missing from the ACFM report to effectively provide fishery-based advice.

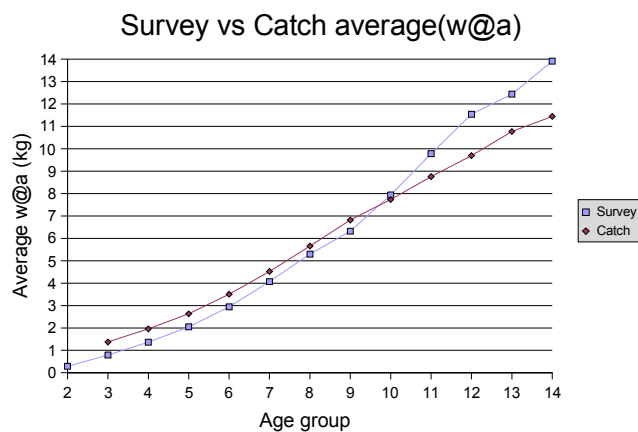


**Figure 1. Boundaries of the Greenland and Iceland Seas ecoregion (A).**

**Icelandic Saithe**

The RG accepted the updated CAMERA calibration and the associated estimates of abundance at age. The assumption of fixed exploitation pattern for 1985-2004 was questioned as an unrealistic assumption, but model residuals did not suggest a problem, and CAMERA results were very similar to those from ADAPT which only assumes selectivity of the oldest age. The RG also questioned why the autumn survey was not included in the calibration as an additional tuning series.

The RG did not accept the revised estimates of SSB that used survey-based mean weights and maturity data, and chose to use the same procedure as last year (SPALY). The RG felt that a better justification was needed to revise the methods. Surveys catch few old fish and can only be used to estimate time-averaged mean weights for the older ages. Furthermore, the mean weights of old fish are curiously heavier than those in the catch (Figure 2).

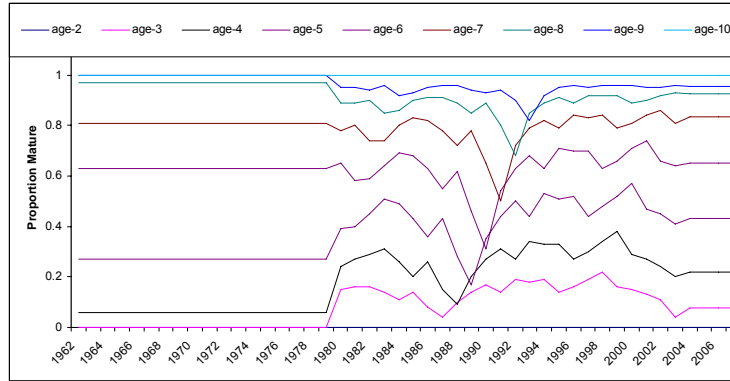


**Figure 2. Weight at age of Icelandic saithe from survey and fishery samples.**

Maturity predictions also had a severe residual problems, in which model predictions were less than observations for all ages in recent years. Poor estimation of weight and maturity at age added considerable uncertainty to estimates of SSB.

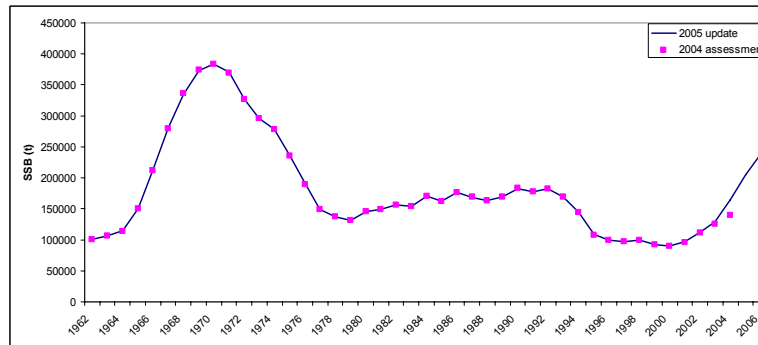
Unfortunately the SPALY calculations were not updated, and the WG chair had to reconstruct the 2004 assessment during the meeting of the reviewgroup, update estimates of SSB and revise projections.

In order to double check the input for the maturity at age that was the basis of the SSB estimates in the last years assessment (Referred to as 2004 assessment) a recalculation was performed, using population numbers at age in the 2004 assessment, catch-weight-at-age in the 2004 assessment, and modelled-maturity-at-age based on observed catch at age in the 2004 assessment (Figure 3). The WG chair verified that the reconstructed maturity at age is the same as used in the 2004 Assessment.



**Figure 3. Maturity of Icelandic Saithe based on predictions from fishery samples.**

In the absence of an updated modelled maturity at age in the catches the RG decided to use the average modelled maturity at age from the years 2002 and 2003 (Figure 3) as a basis for the input for maturity at age in the year 2004-2007. The reason that the 2004 value is not used is because it a predicted value, without any observation in that year. The calculated SSB indicates some change in the SSB from the 2004 and the 2005 assessment (Figure 4). The SSB in 2005 is greater than  $B_{pa}$ , is expected to increase in 2006 and will likely be greater than  $B_{pa}$  in 2007 if fished below  $F_{pa}$ .



**Figure 4. Estimated SSB for Icelandic Saithe.**

The RG questioned why Floss was not considered as a candidate for  $F_{lim}$ , because  $B_{lim}$  is defined as  $B_{loss}$ . Quality control plots were provided by the WG chair (Figure 5).

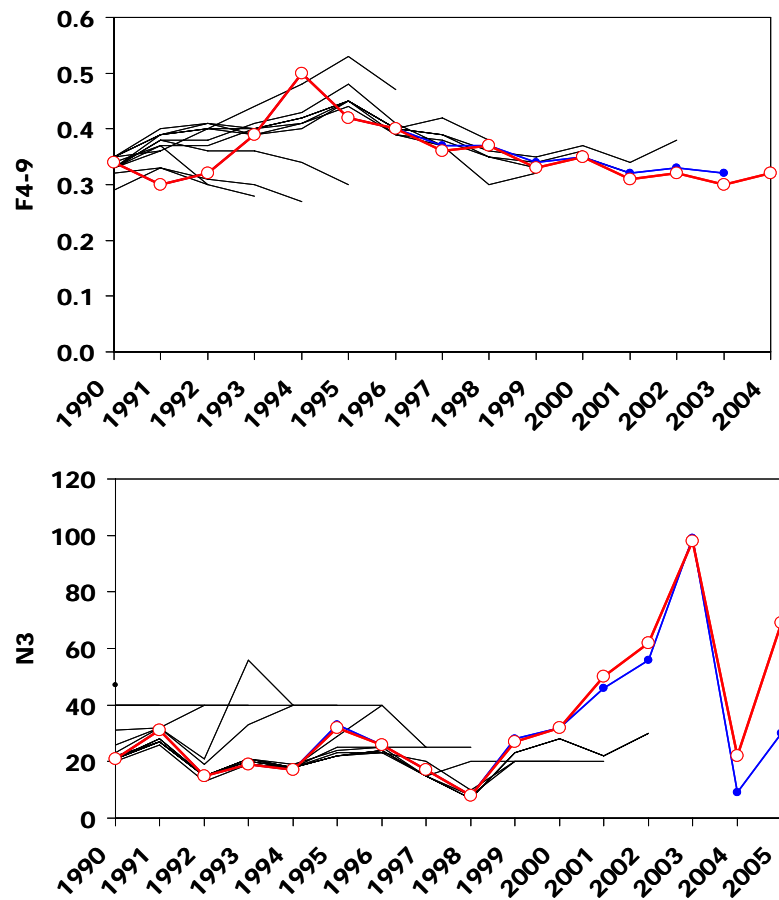


Figure 5. Quality control plots for Icelandic Saithe.

The revised projection (based on SPALY) is in Table 1. This table is not in the summary sheet. I think also it is wrong because  $F_{pa}$  is at 0.30 and here it is 0.15.

Table 1. Revised forecast for Icelandic Saithe, based on SPALY assessment.

Projection of stock and spawning stock biomass (thousand tonnes) in 2005-2007 for different management strategies.

2005				2006				2007				2008		Basis	Fmultiplier
Stofn 4+	Hrygnstofn	F	Afli	Stofn 4+	Hrygnstofn	F	Afli	Stofn 4+	Hrygnstofn	F	Afli	Stofn 4+	Hrygnstofn		
Stock 4+	Spawning stock		Catch	Catch	Stock 4+	Spawning stock		Catch	Stock 4+	Spawning stock		Stock 4+	Spawning stock		
343	205	0.319	75	0	381	228	0.000	0	447	307	0.000	508	384	Zero catch	0
				83	381	228	0.319	83	353	231	0.319	318	219	Fsq	1
				9	381	228	0.030	12	437	299	0.030	484	363	Fpa*0.1	0.094
				22	381	228	0.075	27	422	287	0.075	451	335	Fpa*0.25	0.234
			Fpa	42	381	228	0.150	49	399	268	0.150	403	292	Fpa*0.5	0.469
				61	381	228	0.225	67	378	251	0.225	362	257	Fpa*0.75	0.703
				71	381	228	0.269	75	366	241	0.269	340	238	Fpa*0.9	0.844
				78	381	228	0.299	80	358	235	0.299	326	226	Fpa	0.938
				85	381	228	0.329	85	351	229	0.329	314	215	Fpa*1.1	1.031
				94	381	228	0.374	91	340	220	0.374	296	200	Fpa*1.25	1.172

### Icelandic Haddock

The RG considered the two alternative calibrations (using spring and fall surveys) as giving the same general perception of increasing SSB and the state of the stock (high SSB) is robust to calibration differences. The apparently abundant 2003 yearclass present problems for calibrations, because calibrations are extrapolating beyond the previously observed range of survey data. Both calibrations involve large positive residuals in recent years (i.e., both survey indicate greater abundance than the models). Unfortunately the status of the fishery is sensitive to calibration results, with the spring calibration indicating  $F < F_{pa}$  and the fall calibration indicating  $F > F_{pa}$ . Given the greater number of survey stations in haddock habitat, the spring calibration was chosen as the accepted assessment.

The RG feels that the model description was somewhat lacking (e.g., which survey ages were included in the calibrations? Was age-1 catch included in the model?, and requests a more detailed description in next year's report. The RG also suggests including both spring and fall surveys in the calibration to avoid two valid perceptions of stock status.

Although the spring-based calibration was the accepted assessment, the RG felt that some caution was needed in interpretation. Abundance and growth of the 2003 yearclass is not well estimated and different calibrations offer different results. For an alternative perspective on outlook, A forecast table was provided by the WG chair based on the fall-based calibration (Table 2). Based on the contribution of the 2003 yearclass to the forecasted yield associated with  $F_{pa}$  in 2006 (30,000 t) and the forecast based on the fall calibration, the RG proposed advice for 2006 a 110 000t TAC.

Steve, I thought this was not what we had done. You cannot accept the spring calibration and base the prediction on the autumn calibration. We took the unusual arbitrary decision to subtract 30 000 tonnes from the prediction (these were expected to be relative small fish from the strong yc) which would otherwise possibly highgraded and because larger fish instead would be landed fishing mortality would increase to above  $F_{pa}$

**Table 2. Forecast for Icelandic haddock based on the fall survey calibration.**

TAC	2006			2007			2008		
	SSB	B3+	F4-7	SSB	F4-7	bio307	SSB	bio308	F
90	174	280	0.424	226	0.334	316	255	316	0.292
95	174	280	0.452	222	0.363	311	247	307	0.324
100	174	280	0.481	218	0.393	307	239	298	0.358
105	174	280	0.511	215	0.425	303	231	289	0.396
110	174	280	0.542	211	0.46	298	224	280	0.438
115	174	280	0.573	207	0.496	294	216	271	0.485
120	174	280	0.605	204	0.535	290	208	262	0.538
125	174	280	0.638	200	0.576	285	200	252	0.598
130	174	280	0.671	196	0.62	281	192	243	0.666
135	174	280	0.706	193	0.667	277	184	234	0.743
140	174	280	0.741	189	0.717	272	176	225	0.834

Quality control plots were provided by the WG chair (Figure 6).

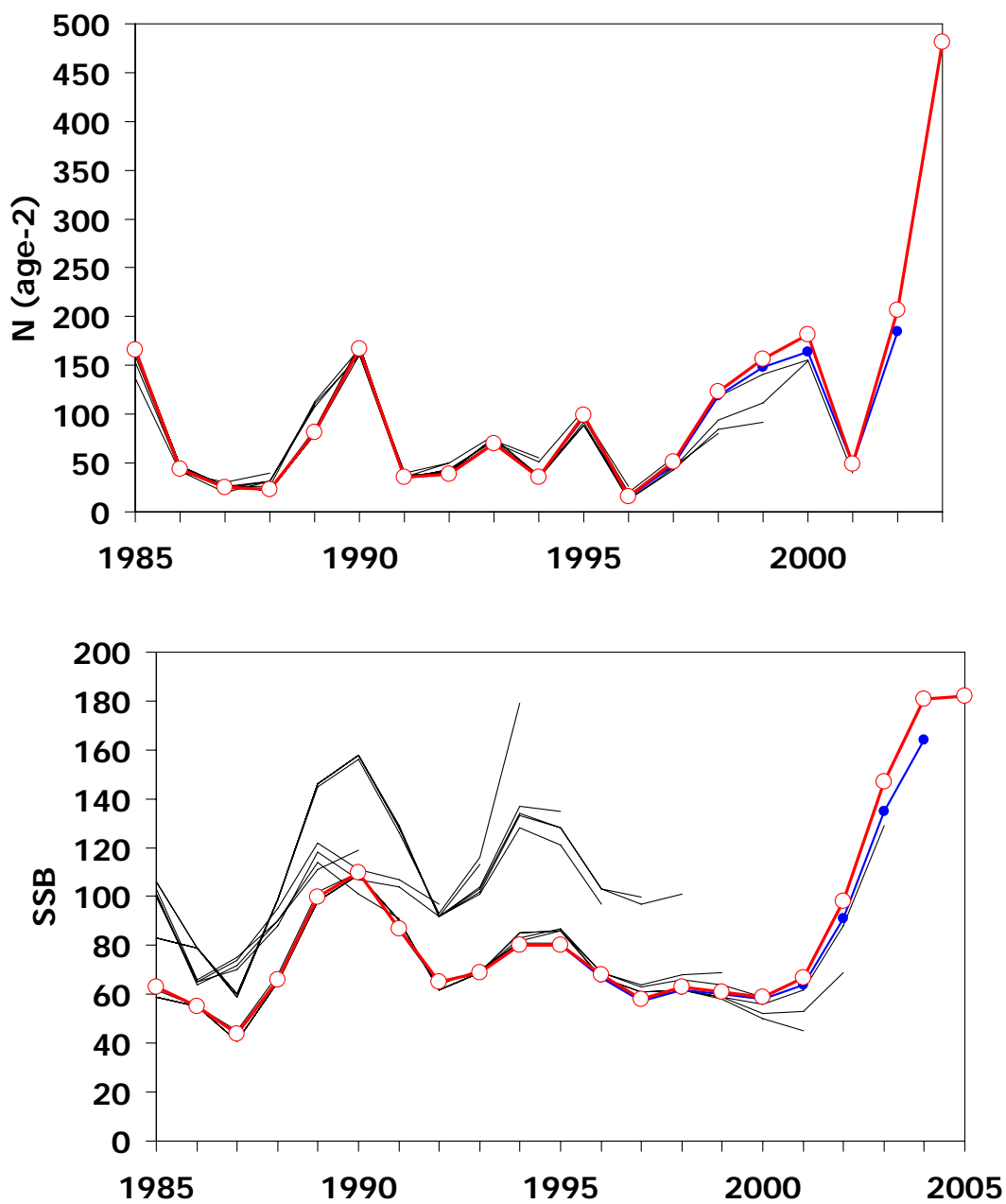


Figure 6. Quality control plots for Icelandic Haddock.

## **Icelandic Cod**

### *Data:*

- 1 ) The RG noted the need to evaluate discards.
- 2 ) The RG noted that episodic immigrations is included in the model (e.g., 1984 year class at age-6) based on anomalies in the catch at age and weight at age indicating immigration from Greenland.
- 3 ) Given the above-average 2003 year class in Greenland, the WG should consider such immigrations in the near future.
- 4 ) The relative absence of capelin in the system was considered in discussions of declining weight and maturity at age and the difficulty estimating weight at age in the absence of a capelin biomass estimate.

### *Model:*

- 1 ) The RG appreciated the summary of ADCAM model input and settings in the WG report. One detail that was questioned was the starting age-structure assumption (i.e., for 1955).
- 2 ) The observed movements between Greenland and Icelandic cod were discussed by the RG. The RG recommended an exploratory joint analysis of the two resources, including movement between areas and dynamics within areas.

### *Assessment:*

- 1 ) The RG noted the need for biomass reference points to help evaluate stock status. The RG encouraged the stock-recruit analyses and the application of medium term projections to evaluate the probability of rebuilding to  $B_{MSY}$ . Unfortunately,  $B_{MSY}$  has little meaning in the management system for Icelandic cod (and in the ICES system in general). Evaluation of  $B_{MSY}$  should be further developed and considered by ICES as a rebuilding target.
- 2 ) The RG discussed the performance of the harvest control rule and the need for ICES to re-evaluate its effectiveness with respect to conformance to the precautionary approach. The relatively large  $F$ 's produced by the management system since 1995 (0.51-0.77) as compared to those expected by simulations of the harvest control rule (0.4) probably result from assessment inaccuracies, and implementation problems. ICES's evaluation of the harvest control rule was based on simulations that lacked assessment and implementation error, and was therefore overly optimistic. Given that the control rule produces  $F$ 's that consistently exceed  $F_{max}$  and often exceed  $F_{med}$ , it should be re-evaluated with respect to precautionary limits. Alternative control rules (e.g., the proposal for 22% exploitation rate of current exploitable biomass) should also be considered.
- 3 ) Quality control plots were provided by the WG chair (Figure 7).

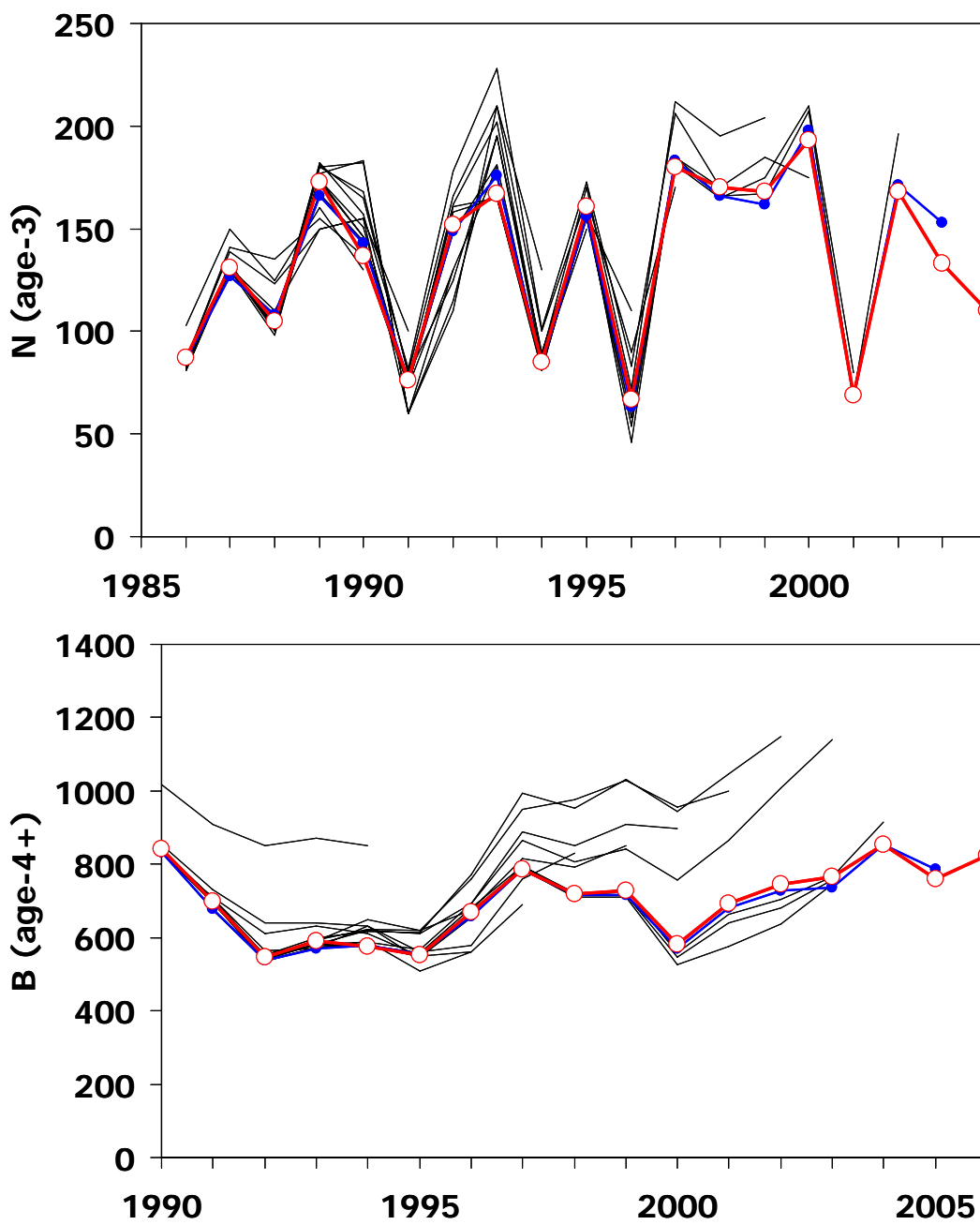


Figure 7. Quality control plots for Icelandic Cod.

## Greenland Cod

### *Data:*

- 1) The RG requested information on seal predation, particularly to determine if seal abundance is increasing as in other areas of the North Atlantic.
- 2) The RG questioned the perception of strong recruitment of the 2003 yearclass in eastern and western areas. Survey data suggested biomass was greater in the east (NWWG Figures 5.1.2 and 5.1.3), but abundance was greater in the west (NWWG Tables 5.1.5-5.1.6). Feedback from the WG through the WG chair indicated that eastern area had larger fish and confirmed that abundance of the 2003 yearclass was greater in the western area. The RG suggests an investigation of the environmental conditions associated with the production of this yearclass.

*Model:* The RG complimented the WG on its creative use of the historical assessment to scale the survey, but had some minor questions and recommended caution in interpreting the results too precisely. The RG questioned the simple regression relationship for age-2 abundance, but log-log relationships for older ages.

The observed movements between Greenland and Icelandic cod were discussed by the RG. The RG recommended an exploratory joint analysis of the two resources, including movement between areas and dynamics within areas.

*Assessment:* The expected increase in SSB from recruitment of the 2003 yearclass demonstrates the critical need for biomass reference points. For example the 2004 ACFM advice was for no fishery until SSB substantially increases. Although SSB is expected to increase tenfold in the medium term (assuming no fishing), the increase will only be temporary and not close to historic levels. If the fishery remains restricted, and the 2003 yearclass can survive to produce subsequent strong yearclasses the stock may truly recover.

## Greenland Halibut

### *Data:*

- 1) The RG noted that information on life history and stock structure is needed. For example results from recent and historical tagging experiments would be a valuable addition to the WG report. The RG noted the continuous distribution of halibut across statistical area boundaries between east Greenland (XIVb) and Icelandic waters (Va). However, the Faeroe resources and fishery are distinctly different than those in Va. Did we conclude this? Why give that advice for both separately
- 2) The RG viewed the stable size distribution as unusual, but not 'incredible,' and noted that size distribution may be a misleading indicator of mortality if there is emigration to deeper habitats by larger fish.
- 3) The RG noted the qualification of the Faroese survey by the WG, and removed it from ACFM report because of its limited coverage of the Greenland halibut resource.

*Model:* The RG discussed the possibility of reviving an age-structure assessment model. The WG chair reported that the historical XSA was rejected because fishery-independent tuning was not available. Now that a survey is available, archived samples can be aged. However, ageing of Greenland halibut is difficult, and age determination methods should be evaluated.

*Assessment:*

- 1) The WG chair reported that there was some concern about the 2004 ACFM advice, which was based solely on CPUE in area Va, because those data do not represent the fishery or the resource in other areas.
- 2) The RG questioned the approach of basing stock status on CPUE when a survey is available. The CPUE offers a longer, but possibly biased, perspective.
- 3) The RG noted that the area XIV CPUE is heterogeneous among national fleets and should not be used to determine stock status because of advances in fishing technology. The RG agreed to base stock status on surveys in Va and XIV, confirming trends with CPUE where possible, noting that there may be geographic patterns in abundance that are not indicated by the surveys.

**Redfish Overview**

- 1) The combined Icelandic TAC for *Sebastes marinus* and *S. mentella* was discussed as an unnecessary impediment to effective management. The RG felt that it was ironic to spend so much time and resources on determining the status of *S. mentella* oceanic and deep-sea components, when 2 clearly identified species with different fisheries are not being managed separately. Managing redfish species separately is clearly more important than managing fishery components separately.
- 2) The RG disagreed with the practice on including catches of *S. mentella* by pelagic gear in the demersal *S. mentella* assessment merely because the catch was taken inside the 'redfish line.' The excellent portrayal of spatial patterns of *S. mentella* fishery catches illustrates that the redfish line is ineffective for discriminating pelagic from demersal catches (NWWG Figures 10.1.5 and 10.1.6; simplified by the RG in Figure 8). The portrayal plots locations of 'oceanic,' 'deep-sea' and demersal fisheries in a cross-sectional plane extending from south of Greenland northeast to the Icelandic slope, with the relevant Icelandic EEZ boundary as well as the NAFO-ICES boundary. The 2004 fishery had the more typical pattern of separate deep-sea and demersal fisheries. However, the deep-sea fishery occasionally moves further northeast, as shown for the 2003 fisheries. Some 'demersal' *S. mentella* caught with pelagic trawls, because it is N of the redfish line. Although ACFM decided that stock structure information was inadequate to revise the approach to *S. mentella* management (2 management units: pelagic and demersal), catches (as well as effort and CPUE) from pelagic trawls should be included in the pelagic assessment.

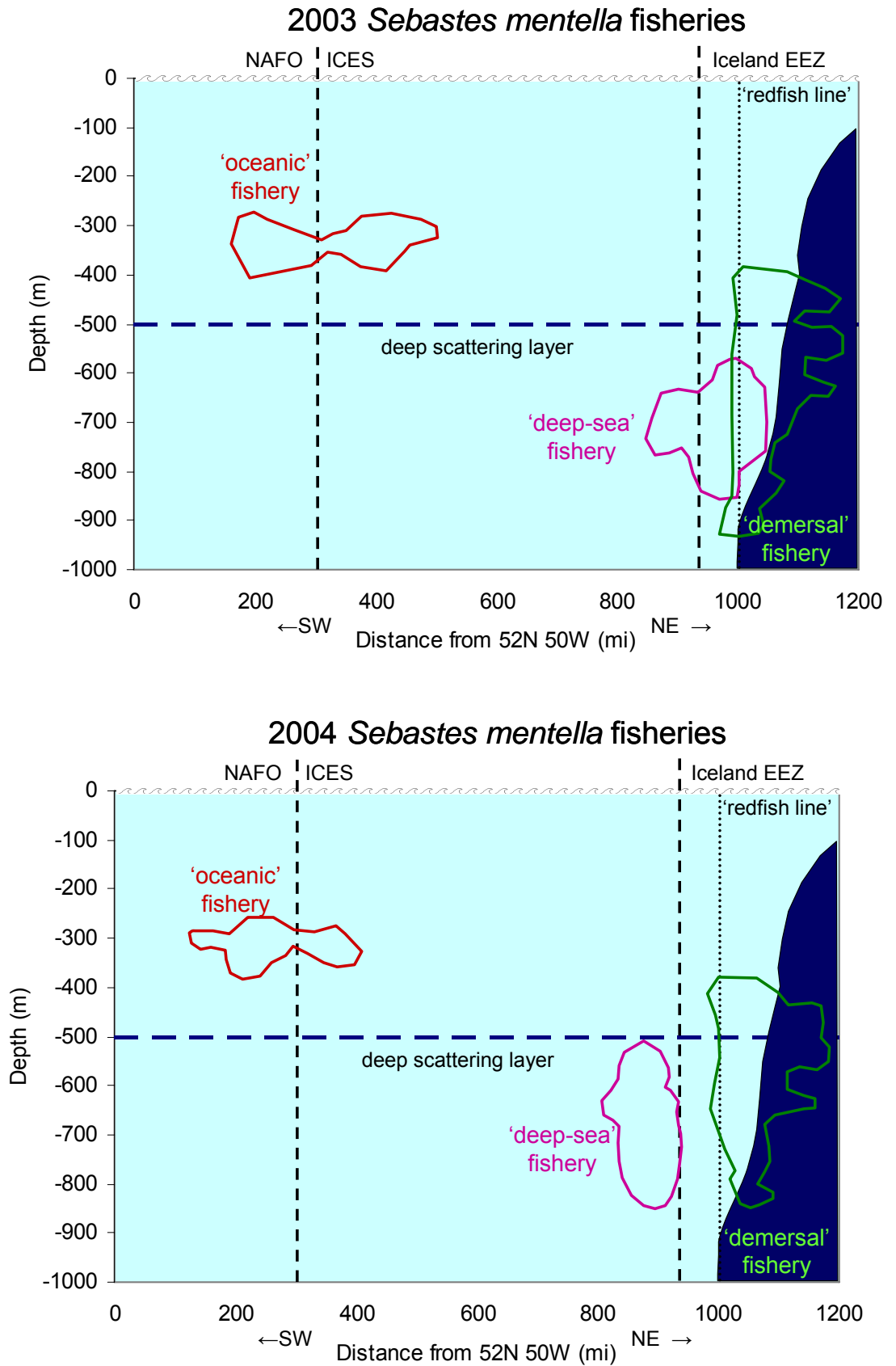
The WG chair felt that the issue is more complex and after the RG meeting provided further elaboration:

Figure 8 illustrates how the fisheries of the two management units have been coming closer in recent years. The overlap was more pronounced in 2003 than ever before, where the pelagic fishery, made up entirely of Icelandic boats completely overlapped the demersal fishery. In response to the 2003 fishery, the Icelandic authorities moved the redfish line eastward in that year, effectively making sure that the pelagic catches would be reported as pelagic, not as demersal. In that year 2000 t of pelagic catch was reported in the demersal management unit. The increase in the demersal catch in 2003 (10 000 thousand tonnes) is thus largely due to demersal gear, and not primarily from including some pelagic catch. If the redfish line would not have been moved eastward that year, the catches attributed to each component would be different.

The Icelandic expert on *S.mentella* fisheries reports that the pattern observed in 2003 is atypical, and pelagic catches attributed to the demersal management unit are usually distinct from the proper pelagic fisheries. The redfish line is only to the west of Iceland, the demersal fisheries also occur along the south and the southeast continental slope of Iceland. Some of the pelagic catch that is reported in the demersal management unit occurred in south and the southeastern areas, nowhere near the conventional pelagic fisheries in the Irminger sea. The

pelagic gear catch that is reported in the demersal management unit occurs more or less above the conventional demersal fisheries. Fishermen predominantly deploy the pelagic gear at night, but during daytime they use demersal gear in similar areas. There is a strong diurnal behaviour in *S. marinus*, where higher catches are reported at night than in daytime in the bottom trawl deployed in the spring survey. Similar analyses should be applied to *S. mentella*. Fishermen claim that they are following diurnal behaviour. Furthermore, this pelagic fishery that is reported as catch in the demersal management unit occurred predominantly in the fall, i.e. in a different fishing season from the pelagic *S. mentella* fishery. Therefore, the WG chair concludes that it would be very premature to attribute all pelagic catches in the pelagic management unit.

- 1) The RG encourages the portrayal of *S. mentella* catches as in (NWWG Figures 10.1.5 and 10.1.6; simplified by the RG in Figure 8) and request that historical catches and survey catches be similarly plotted to investigate changes in spatial patterns of the fishery and possible relationships between oceanic and deep-sea fisheries.
- 2) The section on IUU catches in the redfish overview is specifically for pelagic redfish – not redfish in general, and should be moved to the pelagic redfish chapter.
- 3) The RG suggests that the reason redfish species cannot be discriminated for small fish (<17cm) should be explained.
- 4) The RG requests more information on *S. viviparous*, particularly to explain the huge decrease in landings.
- 5) The RG felt that multispecies catch tables are not relevant to management of redfish resources and should be removed from the redfish introduction.
- 6) The WG chair recommended that a NWWG sub chair or co-chair is needed to coordinate redfish tasks in the WG.



**Figure 8.** Cross-sectional portrayal of *Sebastes mentella* fisheries in 2003 and 2004 (polygons represent locations of fishery catches; data from NWWG 2005 Report).

### Sebastes marinus

1. The catch at age indicates only two strong year classes (1985 and 1990), but the BORMICOM model indicates three strong cohorts (1985, 1990 and 1991). The RG discussed the possibility that this results from the length-based process misinterpreting much catch at length as from the 1991 year class rather than the 1990 year class (possibly resulting from slower growth of that abundant year class). The RG recommends a more conventional age-based assessment of catch at age directly calibrated with both surveys.
2. The RG also had several recommendations to modify the BORMICOM model:
  - a. allow for multiple surveys.
  - b. including all catch (not just Icelandic catch)
  - c. calculate SSB
3. The combined Icelandic TAC for *Sebastes marinus* and *S. mentella* was discussed as an unnecessary impediment to effective management. Managing redfish species separately is clearly more important than managing fishery components separately.

### Demersal S. mentella

#### Data:

- 1) The RG disagrees with the practice on including catches of *S. mentella* by pelagic gear in the demersal *S. mentella* assessment merely because the catch was taken inside the 'redfish line.' Although ACFM decided that stock structure information was inadequate to revise the approach to *S. mentella* management (2 management units: pelagic and demersal), catches (as well as effort and CPUE) from pelagic trawls should be included in the pelagic assessment. A more detailed description of the discussion is in the redfish overview section, above.
- 2) The RG requested more information on age structure, maturation and growth.
- 3) The RG noted that the Faroese survey does not sample deep enough to offer a reliable perspective on stock biomass.

#### Assessment:

- 1) The RG commented that  $U_{lim}$  and  $U_{pa}$  should be deleted from CPUE figures, because their basis was rejected by ACFM in 2004.
- 2) The RG confirmed that commercial CPUE should not be used as an index of abundance, and a survey-based assessment is better than CPUE-based assessment.
- 3) The combined Icelandic TAC for *Sebastes marinus* and *S. mentella* was discussed as an unnecessary impediment to effective management. Managing redfish species separately is clearly more important than managing fishery components separately.

### Pelagic S. mentella

#### Data:

- 1) The RG disagrees with the practice on including catches of *S. mentella* by pelagic gear in the demersal *S. mentella* assessment merely because the catch was taken inside the 'redfish line.' Although ACFM decided that stock structure information was inadequate to revise the approach to *S. mentella* management (2 management units: pelagic and demersal), catches (as well as effort and CPUE) from pelagic trawls should be included in the pelagic assessment. A more detailed description of the discussion is in the redfish overview section, above.
- 2) The RG encourages the portrayal of *S. mentella* catches as in (NWWG Figures 10.1.5 and 10.1.6; simplified by the RG in Figure 8) and request that historical catches and survey catches be similarly plotted to investigate changes in spatial patterns of the fishery and possible relationships between oceanic and deep-sea fisheries.

- 3) The RG noted that the relationship between acoustic and trawl is poor, and requests that more information on the relationship is needed to help interpret biomass estimates for the deep component.
- 4) The RG also requests more details on the GLM used to standardize CPUE (e.g., is size of gear standardized?). The RG feels that misallocated catches because of different TACs for oceanic and deep-sea may affect the CPUE.
- 5) The basis of discard estimates should be described.
- 6) The size structure shown in the WG report is remarkably stable, but size structure by depth may be more revealing.
- 7) The section on IUU catches in the redfish overview is specifically for pelagic redfish – not redfish in general, and should be moved to the pelagic redfish chapter.
- 8) On a related note, the observation that effort could be 25% greater than reported, based on satellite imaging, should be evaluated, particularly in interpretations of CPUE.

*Assessment:*

- 1) The RG agreed that the actual decrease in stock biomass may have been greater than indicated from the survey, because of the increasing area covered over the survey time series (NWWG Table 10.2.1)
- 2) The RG agreed that the assessment will most likely be based on the 2005 acoustic-trawl survey, and agreed to meet by correspondence in August to review results of the survey, conclude on stock status and draft advice for 2006. The SG for the redfish survey will meet in late July.
- 3) The RG requests that NWWG Table 10.2.1 be updated. The RG agreed that unless 2005 survey biomass increases substantially (e.g., 1000kt of biomass in <500m waters), draft advice will be the same as last year: “there should be no directed trawl fishery on this stock and the area closures and low by-catch limits should be retained, until a significant increase in the spawning stock biomass (and a subsequent increase in the number of juveniles) has been detected in surveys.”

*Special Request on providing information on stock structure and spatial allocation of catches*

- 1) The RG concluded that information from the three WDs on stock structure referenced in the NWWG report should be reviewed as a part of a comprehensive, multidisciplinary evaluation. The RG noted that the NWWG and associated RGs cannot effectively perform such a comprehensive evaluation.
- 2) The RG agreed that we do not have the required information to provide advice on spatial allocations to avoid disproportionate exploitation and local depletion. In order to be able to do this, ACFM would need information on seasonal distribution of the resource and movements among areas.

## Annex 5: TECHNICAL MINUTES

---

### Review of Report of North Western Working Group

#### Review Group II - NWWG

Copenhagen, ICES, 19-20 May, 2005

#### *Participants*

Review-group Chair: Fátima Cardador (Portugal)

Working Group Chair: Einar Hjörleifsson

Evgeny Shamray (Russia)

Bengt Sjostrand (Sweden)

#### **General Remarks**

This Review group was in charge of revising the following stocks:

##### **Faroe stocks:**

Faroe Plateau Cod	Observation
Faroe Bank Cod	Experimental
Faroe Haddock	Update
Faroe Saithe	Benchmark

##### **Iceland stocks:**

Herring	Benchmark
Capelin	Update

The Review Group spent some time in updating the summary sheets because the Working Group had no time to do it.

The Working Group had used variable approaches when choosing exploitation pattern and the mean weights for the Yield, SSB/recruit calculations.

The WG chair pointed out that he could not give the group any guidelines since the objectives for these calculations have not been clarified by ACFM. If ACFM would specify the objectives of long term yield estimates it would facilitate the choice of proper input values.

The value of natural mortality should be mentioned also in the text and not only in the input data tables for predictions;

The sampling intensity should be provided in quantitative terms, and tabulated by year including the amount sampled per 1000 tonnes landed.

The Overview for Demersal Stocks in Faroe Area, section 2.1.6 (Medium term projections and reference points) is difficult to read because the stocks are grouped, it would be desirable to have subsections by stock.

### **Faroe Cod Plateau – stock in observation**

The WG should present the effects of changing the XSA option from power model to no power model in the present assessment.

The maturity data is obtained from spring surveys since 1983, but the abundance indices start in 1993, why?

When constructing the ALK for the surveys, fish of length 15-34 cm has been regarded as 1 year olds. An evaluation of the overlap in length distribution between 1 and 2 year olds would be beneficial.

Evaluate the likelihood of high grading and the degree of the fishers ability to target different species in connection with the price differences between species.

Mean weight – since the quality handbook is not available yet it would be valuable to have information available of the fit with the model referred to in the report.

The reference fishing mortality is based on a simple average of age group 3 to 7. In some years the fishing mortality of a particular age group may be unduly high and may more reflect sampling error rather than fishing mortality rates. Using a different basis for calculating reference F gives a different indication of the exploitation of this stock. However, this would require a re-evaluation of the F reference points.

The WG is encouraged to continue their analyses of the influence of environmental factors on stock parameters. It may help to explain some of the cyclical variations in recruitment.

### **Faroe Bank Cod – experimental assessment**

The WG provides information about lengths, modes and correlates it with age groups: validation with age readings are required

The WG should clarify what regulative measures that are in force for this stock.

The WG should clarify what is the basis for the assumption that British catches reported as to be taken on the Faroe Bank are assumed to be taken in the Faroe Plateau;

The estimates of the landings should be explained in a more detailed way;

Description of the basis for stock definition of Faroe Bank should be provided in the report (or in the Quality Handbook);

An overview of the sampling intensity through time from commercial and survey data should be presented.

Improvement in the sampling is recommended in order to provide improved assessment.

### **Faroe Haddock – updated assessment**

The WG is asked to critically evaluate what plus group would be most appropriate for this highly variable stock.

In the page 73, section 2.4.7.3.1 is referred a new management system but this refers to 1996 system which is not new.

Figure 2.4.5.B – It is not clear what were the objectives of these results, the WG are invited to explain it;

In Page 104, Figure 2.4.6. are not shown the labels of the corresponding ages;

The Figures 2.4.13 to 2.4.15 with the relationship between survey indices at age and the indices of the same Year Class (YC) one year later, are very helpful and the RG recommends that such figures be include in all the stocks.

The cohort method to predict the mean weight at age should be shown in the report until the annex for this stock is not available;

Recruitment in the predictions: the reason for the choice of the time span for the GM (1980-2005) is not mentioned;

The contributions of the recruitment in the catch in 2006 and SSB in 2007 are important to be shown as it was done for saithe.

The WG should explore the sensitivity to fishing mortality estimates, average, weighted, excluding year classes, etc in the predictions.

The Figure of the residual  $q$  plots 2.4.9, page 106, is wrong. In spring survey the age range is 0-6 but the plots indicate ages 2-8.

The value of  $F_{med}$  shown in Table 2.4.17 (0.3091) is different of the value in Table 2.4.18 (0.299), why?

The RG recommend presenting a map with the fishery distribution.

### **Faroe Saithe – benchmark assessment**

The standardization of the CPUE for the Pair trawlers was carried out using a GLM method, and taking into account the factors season, trawler type, statistical square and year.

Since it is the first time this model is used by the WG, it should be appropriate that the WG provide more explanation about it, model fit and the outcome in the text, specially if the working document was not available to the reviewers; the RG could read the WD during the meeting and it states that the length of the tow is weighted which is not mentioned in the report;

Figure 2.5.3.2 – the weight at age 3 is plotted against the catchability at age 3. There is no explanation of how  $q$  was calculated and the intention of presenting this graph. In the discussion by the RG the issue was raised that  $q$  may change as a results of changes of weight at age given the high variability in the weight at age for the saithe. The WG should comment qualitatively on the effect of this in the assessment;

Maturity input data: the WG should provide the basis for the fixed maturity at age data during 1961-1982;

Mean weight at age predictions: the values 2006 and 2007 are assumed to be equal to 2005 value. In the Faroe haddock the predicted values for 2006-2007 were based on the prediction of 2005. The WG is invited to investigate this procedure in the saithe.

The method applied to predict weight at age is not transparent and the justification to use year class strength and not the average is not obvious.

The GM 1977-2001 as the input of the Recruitment for predictions is not justified.

$F$  2004 is misprinted in page 125, instead of 0.34 should be 0.4351 and in page 126 instead of 0.335 should be 0.4351.

The WG has proposed a  $B_{pa}$  of 60000 t but in the text this is not clear. This question is reflected in section 2.5.6.3, first sentence and in section 2.5.7.

Figure 2.5.5.6, page 166, it is not clear which is the ADAPT run.

The report of this stock must be revised carefully, some figures were not correct, some graphs need to be updated. It is not evident how the revised conversion factor from gutted weight to live weight was applied.

The RG consider very useful that the WG show in the report a map with the fisheries distributions, with the location of the fishery by quarter.

The present estimates of fishing mortality in 2003 is 13% higher than estimated last year. SSB for 2004 is 36% lower than estimated in last year's assessment. This decline in SSB estimates is largely attributed to observation of maturity at age and weight at age being lower than predicted last year.

## **Faroe Stocks**

### **Medium term projections**

For Faroe Plateau Cod, Haddock and Saithe, the RG has considered necessary to evaluate the sensitivity of the results to other stock recruitment relationship like Beverton & Holt, hockey stick function or non-random recruitment. These analyses should focus on different target F in relation to Blim.

### **Biological reference points:**

#### **Plateau Cod:**

Blim is set as 21 000 t, consistent with the segmented regression analysis done by SGPRP 2003. The corresponding Flim would be 1.44. The WG purpose to set Flim at 1.4.

#### **Haddock:**

The WG purpose a new Blim based on the B\* or Bloss segmented regression. The value proposed is 23 000 t.

The RG agreed with the Blim value proposed of 23 000 t.

The WG purpose to set an arbitrary value of 1.4 for Flim.

The Blim ICES value was 40 000 t and Bpa is 55 000 t.

#### **Saithe:**

The WG proposed the value of Blim of 60000 t as the value of Bpa based on the SGPRP 2003. It argues that SSB and recruitment pairs are of the inverse form where recruitment increases as SSB decreases.

The SGPRP2003 states that:

*in the case where the R-SSB relation is inverse, it may therefore be difficult to decide whether  $B_{loss}$  should be  $B_{lim}$  or  $B_{pa}$ . The rationale adopted in each case should therefore be specified individually.*

The RG did not support the argument that Bloss equal to Bpa.

### **Icelandic Herring- benchmark assessment**

During the review group meeting a correction was given on the catch in the last fishing season 2004/05. The analysis in the WG report was based on catches being 125716 t. The correct catch is however 114 237 t. No reassessment was provided to the review group.

The updated catch at age model was not considered to be reliable because of inconsistencies in the catch and survey data. The RG did not accept the analytical assessment.

In general very little is provided on the methodology used to calculate the input data for the assessment. For example, concerning the acoustic surveys no description or references are given. In section 3.5.5.1 no reference is shown for the Shepherd-Nicholson model.

A description on the port sampling and the methodology used to estimate the catch of Norwegian spring spawning herring should be provided.

Section 3.5.2 – quantify the information on the area closures.

Table 3.5.6.3 – Usually the output VPA is without SOP corrections, why SOP correction was used?

The input data in the prediction table 3.5.7.1 are not corrected per instance the maturity at age, the population at age 3 in 2005 did not taken into account natural mortality and the estimates of selection pattern is not in accordance with the description in the text.

A clarification is needed to which part of the calendar year the stock numbers estimates refer to.

The WG has to provide information on the sampling intensity of the commercial fishery

### **Icelandic Capelin - updated assessment**

A map of the fishery distribution will be valuable.

Some minor corrections must be done in the text concerning the years for particular surveys.

For the TACs predictions there is no description on the methodology used.

It is not clear in the text that the actual acoustic estimates are used as absolute biomass estimates. Therefore the information on target strength and its origin should be quoted.