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**Proceedings of the Newfoundland and
Labrador Regional Advisory Process for
2J3KL Cod, 2007**

**Compte rendu de la réunion du Processus
de consultation scientifique régional de
Terre-Neuve et du Labrador concernant la
morue de 2J3KL en 2007**

**March 27-30, 2007
Clovelly Golf Club, Stavanger Drive, St.
John's, NL**

**Du 27 au 30 mars 2007
The Gazebo, Club de golfe Clovelly,
Stavanger Drive, St. John's, T.-N.L.**

and

et

**April 2-5 and 10th, 2007
EPS Boardroom, Northwest Atlantic
Fisheries Centre
80 White Hills Road East, St. John's, NL**

**Du 2 au 5 avril et le 10 avril 2007
Salle de conférence EPS, Centre des
pêches de l'Atlantique Nord-Ouest
80 White Hills Road East, St. John's (T.-N.-
L.)**

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Don Power**

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August 2008

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Foreword

The purpose of these proceedings is to document the activities and key discussions of the meeting. The Proceedings include research recommendations, uncertainties, and the rationale for decisions made by the meeting. Proceedings also document when data, analyses or interpretations were reviewed and rejected on scientific grounds, including the reason(s) for rejection. As such, interpretations and opinions presented in this report individually may be factually incorrect or misleading, but are included to record as faithfully as possible what was considered at the meeting. No statements are to be taken as reflecting the conclusions of the meeting unless they are clearly identified as such. Moreover, further review may result in a change of conclusions where additional information was identified as relevant to the topics being considered, but not available in the time frame of the meeting. In the rare case when there are formal dissenting views, these are also archived as Annexes to the Proceedings.

Avant-propos

Le présent compte rendu a pour but de documenter les principales activités et discussions qui ont eu lieu au cours de la réunion. Il contient des recommandations sur les recherches à effectuer, traite des incertitudes et expose les motifs ayant mené à la prise de décisions pendant la réunion. En outre, il fait état de données, d'analyses ou d'interprétations passées en revue et rejetées pour des raisons scientifiques, en donnant la raison du rejet. Bien que les interprétations et les opinions contenus dans le présent rapport puissent être inexacts ou propres à induire en erreur, ils sont quand même reproduits aussi fidèlement que possible afin de refléter les échanges tenus au cours de la réunion. Ainsi, aucune partie de ce rapport ne doit être considéré en tant que reflet des conclusions de la réunion, à moins d'indication précise en ce sens. De plus, un examen ultérieur de la question pourrait entraîner des changements aux conclusions, notamment si l'information supplémentaire pertinente, non disponible au moment de la réunion, est fournie par la suite. Finalement, dans les rares cas où des opinions divergentes sont exprimées officiellement, celles-ci sont également consignées dans les annexes du compte rendu.

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SUMMARY

A Meeting of the Newfoundland and Labrador Regional Advisory Process (RAP) on Groundfish was held 27-30 March and 2-5 and 10th April 2007 in St. John's, Newfoundland. A full assessment of the stock status of Northern (2J3KL) cod was carried out based on questions posed in the Terms of Reference (ToR) provided by Fisheries and Aquaculture Management. As part of the process, an overview of environmental conditions on the Newfoundland and Labrador shelf during 2006 was presented. Participants included DFO staff from Science and fisheries and Aquaculture Management branches, representatives of the fishing industry (harvesters and the FFAW) and scientists from Memorial University. The meeting rapporteur was D.B. Atkinson.

These proceedings contain a summary of working papers/PowerPoint presentations/EXCEL spreadsheet presentations as well as summaries of the related discussions. Also included as appendices are the ToR, a list of participants, a list of all working papers/PowerPoint presentations/EXCEL spreadsheet presentations available during the meeting, and the research recommendations. The Proceedings do not necessarily follow the chronological order of discussions but instead are organized to match the flow of the draft agenda.

Additional information on the 2007 assessment of 2J3KL cod is available in the CSAS research document series and Science Advisory Report.

SOMMAIRE

Une réunion du Processus consultatif régional (PCR) de Terre-Neuve-et-Labrador sur le poisson de fond a eu lieu du 27 au 30 mars, du 2 au 5 avril et le 10 avril 2007 à St. John's. On a procédé à une évaluation complète de l'état du stock de morue du Nord (2J3KL) en fonction des questions posées dans le cadre de référence fourni par le secteur de la Gestion des pêches et de l'aquaculture. Dans le cadre du processus, on a présenté un survol des conditions environnementales observées sur le plateau continental de Terre-Neuve et du Labrador en 2006. Au nombre des participants figuraient des représentants des secteurs des Sciences et de la Gestion des pêches et de l'aquaculture du MPO, des représentants de l'industrie des pêches (pêcheurs et FFAW) et des scientifiques de l'université Memorial. Le rapporteur de la réunion était D.B. Atkinson.

Le présent compte rendu contient un résumé de documents de travail et de présentations PowerPoint et Excel ainsi que des sommaires des discussions tenues à cet égard. Sont également joints en annexe le cadre de référence, une liste des participants, une liste des documents de travail et des présentations PowerPoint et Excel données au cours de la réunion ainsi que les recommandations pour la recherche. Le compte rendu ne suit pas nécessairement l'ordre chronologique des discussions, mais est plutôt organisé en fonction de l'ordre du jour provisoire.

Pour de plus amples renseignements sur l'évaluation de la morue de 2J3KL en 2007, voir la série des documents de recherche et l'avis scientifique du SCCS.

INTRODUCTION

A Meeting of the Newfoundland and Labrador Regional Advisory Process (RAP) on Groundfish was held 27-30 March at Clovelly Golf Course, Stavanger Drive, St. John's, NL and 2-5 April 2007 in the EPS Boardroom of the Northwest Atlantic Fisheries Centre, 80 White Hills Road East, St. John's, Newfoundland and Labrador to carry out a full assessment of the status of 2J3KL cod.

The meeting began at 0930 on March 27, 2007. Participants were welcomed by the Chairperson (Don Power, Section Head, Groundfish Section, Aquatic Resources Division, Science Branch) who gave a brief overview of the assessment process. It was indicated that the context of the meeting would be based upon the Terms of Reference (ToR) (Appendix I) that contain the specific requests for information as prepared by Fisheries and Aquaculture Management. Also, the Stock Advisory Report (SAR) will be documented as requested in the ToR. The Chair invited all participants to participate fully in all discussions but also requested that all participants respect the confidentiality of discussions until such time as the SAR is released to the public.

The Chair then presented a draft agenda (Appendix II). He noted that although the draft agenda covered all topics that would be considered, the actual ordering and timelines would be dependent upon discussion durations and material availability. He invited comments on the agenda but there were none.

Introductions were then made around the table followed by an invitation from the Chair to participants to provide any opening remarks or comments. There were none. The list of participants is provided in Appendix III. Not all listed participants attended all meeting sessions.

MEETING PROCEEDINGS

SUMMARY OF 2006 ASSESSMENT

Presenter – John Bratley (DFO – Science)

Presentation Title: Review of previous assessment of northern (2J+3KL) cod based on the Science Advisory Report from the March 2006 assessment (does not include 2006 fishery data) by John Bratley

SUMMARY:

The lead scientist for the assessment presented a brief summary of the 2006 assessment of 2J3KL cod based on information from the 2006 SAR. This included information on data sources, both inshore and offshore, the 2005 situation in an historical context, how the various sources of data were handled and a summary of the conclusions arising from the 2006 assessment including the projections that were carried out from the SPA of the Central Inshore Area.

DISCUSSION:

There was no discussion of this presentation.

WHAT'S NEW FOR 2007?

Presenter – John Bratley (DFO – Science)

Presentation Title: Northern Cod Science and Stewardship Initiative (NCSSI) New Science projects by John Bratley

SUMMARY:

The new Northern Cod Science and Stewardship Initiative (NCSSI) scientific programs were briefly described. The projects include studies on migration and total mortality and offshore winter distribution and migrations, a mobile gear inshore survey using chartered longliners, seal predation work, eelgrass habitat research, research into the possibility of Smith Sound providing eggs and larvae to other areas, and overall comparisons of the dynamics of northern cod to other North Atlantic cod stocks.

DISCUSSION:

Following the presentation, the Chair summarized the current situation indicating that because some projects are ongoing, it may be a while before results are available. Some data will be presented during the current meeting but these will only be preliminary (e.g., the offshore acoustics survey has just finished). Since the presentation was only for information, no additional discussion took place.

OCEANOGRAPHIC CONDITIONS IN 2006

Presenter – Joe Craig (DFO – Science)

WP Title: An assessment of the physical oceanographic environment on the Newfoundland and Labrador Shelf during 2006 by E. Colbourne, J. Craig, C. Fitzpatrick, D. Senciall, P. Stead and W. Bailey

ABSTRACT:

Oceanographic observations on the Newfoundland and Labrador Shelf during 2006 were presented in relation to their long-term (1971-2000) means. At Station 27 off St. John's, the depth-averaged annual water temperature increased over 2005 setting a new record high of nearly 1°C above normal. Annual surface temperatures at Station 27 were also the highest in 61-years at 1.7°C above normal. Bottom temperatures were also above normal by 0.8°C, the 3rd highest in the 61-year record. Annual surface temperatures on Hamilton Bank were 1°C above normal, the 10th highest on record, on the Flemish Cap they were 2.5°C above normal, the 3rd highest in 57 years. Upper-layer salinities at Station 27 were above normal for the 5th consecutive year. The area of the cold-immediate-layer (CIL) water mass on the eastern Newfoundland Shelf during 2006 was below normal for the 12th consecutive year and the 3rd lowest since 1948. The near-bottom thermal habitat on the Newfoundland and Labrador Shelf continued warmer than normal in 2006, with bottom temperatures remaining >2°C, about 0.5°C above normal on Hamilton Bank off southern Labrador during the fall. Bottom temperatures during the fall however decreased substantially from 2005, particularly in northern areas. The area of bottom habitat on the Grand Banks covered by sub-zero water has decreased from >50% during the first half of the 1990s to near 15% during the past 2 years, ranking the 3rd lowest in 2006. In general, except for late fall values, water temperatures on the Newfoundland and Labrador Shelf increased from 2005 values, continuing the warm trend experienced since the mid to late 1990s. Newfoundland and Labrador Shelf water salinities, which were lower than normal throughout most of the 1990s,

increased to the highest observed in over a decade during 2002 and have remained above normal in most areas during 2006.

The North Atlantic Oscillation winter index for 2006 was slightly below normal at 0.4 SD, while the sea-level pressure difference between Greenland and Newfoundland was significantly below normal. As a result, arctic outflow to the Northwest Atlantic was weaker-than-normal resulting in record high annual air temperatures in some locations and above normal values throughout the Northwest Atlantic from West Greenland to Baffin Island to Labrador and Newfoundland. Sea-ice extent and duration on the Newfoundland and Labrador Shelf remained below average for the 12th consecutive year. Consequently, water temperatures on the Newfoundland and Labrador Shelf remained well above normal in 2006, continuing the warm trend experienced since the mid-to-late 1990s. The annual values for 2006 increased over 2005 values even surpassing the record highs of 2004. However, data from late fall surveys show a decreased in sub-surface temperatures as slightly colder water moved southward over the area. Salinities on the NL Shelf, which were lower than normal throughout most of the 1990s, increased to the highest observed in over a decade during 2002 and have remained above normal during the past 4 years.

Presentation Title: Northwest Atlantic Climate Update for 2006 by E. Colbourne, J. Craig, C. Fitzpatrick, D. Senciall, P. Stead and W. Bailey

SUMMARY:

- The Station 27 depth-averaged annual water temp. increased ~1°C above normal, the highest on record.
- Surface temperatures at Station 27 were the highest in 61 years, bottom temp. were the 3rd highest.
- Salinities at Station 27 were above normal for the 5th consecutive year.
- The area of CIL water on the eastern NL Shelf was below normal for the 12th consecutive year the 3rd lowest since 1948.
- Bottom temps. During the fall on the NL Shelf were above normal in most areas but decreased substantially from 2005, particularly off Southern Labrador.

DISCUSSION:

There were a few questions requesting clarification of some of the presented material. Discussion, however, was mainly focussed on information from the inshore. There are strong seasonal trends in the inshore that the data as analysed do not capture. Overall there appeared to be some cooling in 2006 compared to 2005 but the scale of data collection during the oceanographic surveys is such that it is not possible to monitor finer scale changes. It was pointed out that there is considerable information collected from the inshore; CTD data going back to 1995 from the Sentinel fishery, inshore thermograph data from other work, possibly considerable data from Smith Sound, and earlier thermograph data from lobster studies that could be useful for comparisons if thermographs were reinstalled at the same locations. Also, data were collected during the inshore mobile gear survey in 2006 and another survey will be conducted in 2007.

It was suggested that these inshore data should be examined and included in future analyses.

INSHORE DATA

Overview of the 2006 Commercial Fishery

Presenter – Derek Tobin (DFO – FAM)

Presentation Title: Northern Cod: 2006 Science and Stewardship Fishery (Commercial Fishery) by D. Tobin

SUMMARY:

The 2006 Science and Stewardship fishery was briefly described. The fishery was announced by the Minister on June 8, 2006. It was restricted to within 12 nautical miles of the coastline, with each fish harvester allowed an IQ of 3000 lb (round weight) including bycatch in other fisheries. It was a fishery conducted on a bay-by-bay basis with harvesters restricted to a vessel <45' length overall. It was believed that the total catch would be about 2300 t. The fishing season was limited to 3 weeks but the specific 3-week period could be selected by harvesters in their own area. The seasons varied between areas beginning as early as August 7 and as late as October 2; not all harvesters were happy with the seasons.

A Conservation Harvesting Plan was developed by DFO in cooperation with the FFAW. Harvesters were limited to a maximum of 6 nets (5 1/2" - 6 1/2") or 2000 hooks. Small fish protocols were in place whereby an area would be closed if there was a high percentage of small fish.

The total estimated catch was 2016 t, with an overall participation rate of about 70%. The participation varied from a high of 87% in Trinity Bay to a low of 34% in Labrador. The average number of days fished was 5.

Consultation workshops to discuss the 2006 fishery were held during January 2007. Harvesters were positive about the fishery and their catches.

DISCUSSION:

Discussion of the presentation was wide ranging. Fish harvesters agreed with the comments that there was limited interest by processors such that harvesters only caught what they could sell or use themselves. The low purchase rate by processors also resulted in harvesters spreading their catches out over time. Also, because bycatch was included as part of the Individual Quota (IQ) total, some harvesters left fish in the water to allow for bycatch in other fisheries such as that for blackback flounder.

The participation in Labrador was low overall and it was felt that this was due to a combination of factors; low fish densities and the fishery was 'something new' such that people were only just getting started again. It was felt that participation would increase in the future.

The method used to calculate participation rates was clarified. Fisheries and Aquaculture Management used all sources of information including Dockside Monitoring Program data, number of licences for the Individual Quota (IQ) and the number of licensed harvesters in each area. The participation rate was then a straight percentage determined by comparison of the total number of participants in the 2006 fishery to the total number of licences existing. Fish harvesters provided information on how the fishery progressed in their areas. Issues related to the times selected and the weather that occurred, and the impacts of these on the fishery, were highlighted.

There was some discussion of bycatch in other fisheries during 2006. It was pointed out that the bycatch in the Greenland halibut fishery was about 3%. Overall, the bycatch in 2006 was estimated to be only about 40 t.

Overview of Conservation and Protection Measures and estimation procedure for Commercial and Recreational Cod Fisheries in 2J3KL in 2006

Presenter – Tilman Bieger (DFO – C&P)

Presentation Title: Monitoring And Compliance: 2006 2J3KL Northern Cod Fisheries by T. Beiger

SUMMARY:

The presentation documented how monitoring was carried out during the 2006 commercial/stewardship and recreational fisheries, and described compliance levels in both fisheries. Monitoring was done via at-sea observers, a Dockside Monitoring Program (DMP) and land, sea, and air patrols by Fishery Officers.

There were 104 sea-days by observers, with 188 fishing trips in the commercial/stewardship cod fishery being observed. Of the 162 ports in 2J3KL, 38 had 100% dockside monitoring for commercial/stewardship landings, while 124 had random dockside monitoring. The 50 Fishery Officers in 2J3KL stationed in 2J3KL spent ~5000 hours monitoring the commercial /stewardship fishery.

Fishery Officers spent ~5000 hours monitoring the recreational fishery. Based on daily estimates of daily activity and catches recorded by Officers, there were approximately 77,000 person-days of activity in the recreational fishery in 2J3KL, accounting for about 380 t of catch. The fish caught averaged between 1.0-1.5 kg in weight.

There were 11 charges laid in the commercial/stewardship fishery, and 19 in the recreational fishery. Compliance with management measures in both fisheries overall was rated as good.

DISCUSSION:

There was no discussion of the information provided regarding the commercial fishery. Instead, all discussion focussed on the recreational fishery. An important point of clarification was made during the discussions. Although Slide 10 indicated that the number of participants was 76,792, this number actually represents the number of person-days of activity and the actual number of participants is unknown. This same situation applies to the 99,000 estimate for all of Newfoundland and Labrador; this is the number of person-days of activity and not the number of actual participants. In response to questions of clarification on how the estimates were derived, the presenter informed meeting participants of the process in a step-by-step manner.

Industry representatives expressed considerable scepticism about the total estimated recreational catch (380 t). They pointed out that anecdotal information from a variety of sources would lead to a conclusion that the overall catch was higher. Harvesters suggested that at least in some areas the recreational catch was as high as the commercial catch and requested that this be examined. It was argued that although prior to licensing there was an estimate of only 500 t, in 2001, when licences were first introduced, there were 93,000 licences and the total catch was estimated to be about 1800 t. Applying the same ratio would

suggest a much higher recreational catch in 2006. Some suggested that the issue was one of enforcement.

The Chair reminded participants that there are other avenues available for expressing dissatisfaction with how the fishery was carried out and monitored. The focus of the current meeting was to do the assessment including evaluation of the merits of input data. As such, he requested those with doubts concerning the catch estimates to be more specific with regard to their comments and indicate which specific aspects of the estimation process didn't seem realistic and they had problems with.

It was described that in 2001 there was a lot of interest in a recreational fishery whereas in 2006 overall interest levels were lower resulting in lower catches. Also, since fish could be purchased cheaply on the wharf from commercial harvesters, there was less interest in actual participation.

Examination of commercial versus recreational returns of tags indicated a return ratio between commercial and recreational for the Central Inshore Area was about 4:1; this is similar to the catch ratio between the commercial and recreational fisheries suggesting that the estimated catch from the recreational fishery is reasonable. Some questions were raised as to the confidence in the source of returns. In response it was clarified that all persons returning tags were contacted by phone to obtain, amongst other things, information as to whether the tagged fish was taken in the recreational or commercial fishery.

After considerable discussion and debate, the Chair summarized that there were no obvious deficiencies discovered in the estimation process, and in light of that, there was no choice but to move forward with the information as presented. The only independent source of information (tagging) did not point to any discrepancies. He reminded participants that any issues regarding management of the recreational fishery could be raised with the appropriate authorities who would take the perspectives into consideration for the future.

Catch and Catch-at-Age **Presenter – Eugene Murphy (DFO – Science)**

Presentation Title: Cod catch in 2J3KL during 2006 by Eugene Murphy

SUMMARY:

The 2006 catch information was presented indicating a total estimated catch of 2679 t divided between commercial (2140 t), Sentinel (159 t) and recreational (380 t). Gillnets accounted for the largest proportion of the commercial catch at 1885 t. Catches in the areas north of 3Kh were low relative to those from further south. Age 6 dominated the catches overall, but age 5 dominated in the catches by handlines and ages 4 and 5 in those by linetrawls.

DISCUSSION:

Discussion was primarily focussed on points of clarification. The presenter described the sources of the length frequency data and otoliths that are used to estimate the numbers caught-at-age. He pointed out the considerable importance of the data from the Sentinel fishery in this process.

The 1990-92 year-classes are only showing up weakly. They were never very strong in the population but are still present although they are not showing up in the gillnet catches. The possible reasons for this are unknown.

It was noted that cod are more noticeable in the shrimp fishery based on the number of samples coming in from observers. It is not believed that their sampling instructions have changed so this may indicate a better sign of cod offshore. At present though there are no estimates of this offshore bycatch so they are not accounted for in the catch statistics.

It was agreed that overall there were no serious problems with the estimation of catch-at-age although there were some sampling difficulties related to the handline catches in 2J.

Sentinel Surveys – Overview and Standardization

Unstandardized Overview

Presenter – Dawn Maddock-Parsons (DFO – Science)

WP Title: Sentinel Surveys 1995-2006: Catch per Unit Effort in NAFO Divisions 2J3KL by Dawn Maddock-Parsons and Rick Stead

Presentation Title: Sentinel Surveys 1995-2006: Catch per Unit Effort in NAFO Divisions 2J3KL by Dawn Maddock-Parsons and Rick Stead

ABSTRACT:

Data from the Sentinel program in NAFO divisions 2J3KL were summarized and updated for 2006. They were presented as weekly average catch rates and annual length frequencies scaled to effort and grouped by NAFO division. In 2006 gillnet catch rates (5 ½") were similar to 2005 values in 2J and 3L but up slightly in 3K. Small mesh gillnet catch rates increased from 2005 in both 2J and 3K while 3L values were close to the series low. Linetrawl in both 3K and 3L had lower catch rates than in 2005.

DISCUSSION:

The continued higher catch rates in 2J were highlighted and discussed. It was noted that in both years the rates increased with time, starting lower then increasing as the season progressed.

For the 3¼" gillnets, the length frequencies for 2006 were bimodal as in the past but they also indicated that the gear caught mid-sized fish in 3K and 3L. This pattern was different than in the past but there was no explanation available as to possible reasons.

It was suggested that for the future, sites that have not been active for many years should be removed from the presentations in order to make viewing and interpretation easier.

Standardization

Presenter – Dawn Maddock-Parsons (DFO – Science)

Presentation Title: 2J3KL Cod: Sentinel Index by Dawn-Maddock-Parsons and Brian Healey

SUMMARY:

Sentinel data were standardized and modeled to produce indices for gillnet, linetrawl and small mesh gillnet. Most of the data were 5 ½" gillnet data (80%) and the other two gear types (small mesh gillnet and linetrawl) each provided about 10% of the data to the indices. Indices were examined for all of 2J3KL data, and for three inshore areas (Northern 2Jm 3Kad, Central 3Khi 3Lab, and Southern 3Lfq). For the complete area and the central area, the 5 ½" gillnet indices increased in 2006, linetrawl indices decreased and small mesh gillnet were similar to 2005. Indices by age were examined and recruitment at younger ages (ages 3 and 4) appears relatively stronger in recent years. Older ages are still poorly represented in the indices. Residuals were examined and patterns observed were not different from those presented for previous assessments. Results of the standardization were similar to the unstandardized sentinel results.

DISCUSSION:

It was suggested that the linetrawl index is not very good at tracking year-classes, and there are year effects so perhaps not a lot of faith should be put in these data. Discussion then focussed on these data and how they might be handled in the SPA; self-weighting or *a priori* weighting of $1/10^{\text{th}}$ since there are about 10-fold more gillnet data.

It was pointed out that for the Central Inshore Area, the limitation of data to a 12-hour soak time or less resulted in elimination of considerable data. Discussion then focussed on the reasons behind the 12-hour cut-off and more information was requested related to this issue (see following presentation on Selection Criteria).

A tentative conclusion was reached to include the linetrawl data in an initial run of SPA for comparison with the 2006 assessment but to do the final run with this index excluded.

Industry indicated that at an upcoming meeting of Sentinel participants there will be a discussion of the linetrawl part of the program so any conclusions arising from the RAP will be helpful.

Selection Criteria

Presenter – Dawn-Maddock-Parsons (DFO – Science)

Presentation Title: Sentinel Index Criteria – Review of soak times and months surveyed by Dawn-Maddock-Parsons

SUMMARY:

Sentinel data are standardized prior to modeling using soak time and month criteria. At a zonal assessment meeting in Rimouski in 1999 a working group looked at all the sentinel data and it was proposed to set limits on soak times and months used to standardize the sentinel data. For gillnets, it was proposed that sets with soak times between 18 and 24 hours in the months of July to November should be included in the analysis. For linetrawl sets less than or equal to 12 hours in the months of August to November were to be included. At the time it was thought these criteria were reasonable to describe most of the

sets of sentinel gear. In the current assessment, for gillnet, the soak time criteria (now 12-32 hours, a change made in the 2001 assessment) excluded only about 20% of the data. Further analyses of the gillnet index data indicated that inclusion of June made almost no difference in the trends. The conclusion was to use data from June to Nov for all gears and keep the soak time criteria as previously used to calculate the indices from Sentinel until a further review can be undertaken.

DISCUSSION:

It was noted that the minutes of the Rimouski meeting were not sufficiently clear to understand why June should be excluded or why the cut-off for soak time should be 12 hours. It was considered probable that the decisions regarding both soak time and exclusion of June data could have been influenced by fishing practises in the Gulf of St. Lawrence.

In regard to the month criteria considered, there was a discussion on why June was excluded from the index, and there was no good reason provided for the exclusion of the data put forth, other than those were the months the working group had agreed to. The RAP requested additional analysis of Sentinel gillnet catch and effort data with June excluded and included (see below: Further analysis of Sentinel data). It was tentatively agreed to include the June Sentinel gillnet data in the index for calibration of SPA since there was no clear reason for excluding them, but plots of the index with and without June will be reviewed before making a final decision.

It was noted for linetrawl, however, the soak time criteria excluded about 40% of the data. Some of the participants using linetrawl in 2J3KL were setting the gear for up to 24 hours (a difference from participants in other areas who only set the gear for a few hours). Because of this, data from some locations are never included in the index. It was also suggested that after 2-4 hours the bait will be gone so there shouldn't be much difference between a soak time of 12 and 24 hours although there could be a loss of some fish with longer soak times. It was felt that the soak time for linetrawl would have to be considered more carefully in a review of this gear type by the participants. It was noted that an upcoming Sentinel meeting will be an opportunity to obtain the views of harvesters on this issue. It was therefore agreed that soak time criteria would remain until after the upcoming meeting of Sentinel harvesters after which the issue would be revisited drawing on their views.

The overall conclusion of the RAP was to use data from June to Nov for all gears and keep the soak time criteria as previously used to calculate the indices from Sentinel until a further review can be undertaken.

The issue of inclusion of the linetrawl data in SPA calibration was revisited and it was again tentatively agreed to downweight the index.

Further analyses of Sentinel data
Presenter – Dawn Maddock Parsons

Presentation Title: 2J3KL Cod: Sentinel Index by Dawn Maddock-Parsons and Brian Healey (last 2 slides only comparing analysis of Sentinel gillnet data with June included and excluded)

SUMMARY:

Summary plots of the analysis of Sentinel gillnet catch and effort data with June excluded and included were presented. They clearly indicated that inclusion of June made almost no difference in the trends.

DISCUSSION:

It was agreed that the comparisons of the Sentinel gillnet series with June included and excluded showed very little difference and therefore the index with June included would be used in the SPA calibration.

Recruitment

WP Title: Relative strength of the 2005 and 2006 year-classes, from nearshore surveys of demersal age 0 & 1 Atlantic cod in Newman Sound, Bonavista Bay by Robert S. Gregory, Corey Morris, Mary Ryan, and Brianna Newton

Presentation Title: Relative strength of the 2005-06 year-classes, from nearshore surveys of demersal age 0-1 Atlantic cod in Newman Sound, Bonavista Bay by Robert S. Gregory, Corey Morris, Mary Ryan, and Brianna Newton

ABSTRACT:

We surveyed demersal age 0 Atlantic cod (*Gadus morhua*) in the nearshore (<10 m deep) using a seine net to conduct a qualitative assessment of the strength of the 1996-2006 year-classes of Atlantic cod early in their life. Our assessment was based on abundance of demersal age 0 and age 1 Atlantic cod sampled at 6 – 13 nearshore sites in Newman Sound, Bonavista Bay in 10 summer-autumn periods during 1996-2006. Compared with the benchmark historical low in 1996 observed in several pre-recruit studies in the waters off the northeast Newfoundland coast, age 0 abundance was 30 times higher in 1999. The 1998, 1999, and 2002 year classes were strong in the Newman Sound time series, compared with adjacent years. The 2006 age 0 abundances were the worst in the time series. Analysis of length frequency data collected from July to November in Newman Sound indicated that age 0 Atlantic cod settled in the nearshore in two or more distinct recruitment pulses in “good years” – e.g., 1998 and 1999 – the first pulse arriving in early August, the second in late September. In “bad years” – e.g., 1996 and 2004 – the first pulse was generally weak and late to recruit to the nearshore. In several years (2004 & 2006), the first pulse appears to have been eliminated by the early autumn. The length frequency data in years following strong age 0 recruitment also suggest that the pulse structure may remain intact through the first winter and appears to be detectable in age 1 cod the subsequent year. Other than the 2002 year class, others in the current decade have been poor or weak, comparable to 1996, the poorest year class recorded in all three independent surveys of age 0 abundance off northeastern Newfoundland. Newman Sound age 1 abundance correlated positively and significantly with age 3 estimates available from last year's inshore SPA ($p=0.0171$). However, within Newman Sound itself, age 0 abundance appears to be a poor predictor of

that of age 1 cod. We suggest that in years of very high abundance (compared to the decadal average 1996-2006), age 0 mortality is higher than in other years, leading to lower abundances of age 1s the following year – dampening out the strongest recruiting cohorts.

DISCUSSION:

Questions were posed regarding the importance of Newman Sound as a nursery area and the possibility of other important areas existing. While Newman Sound is clearly quite important, there are no doubt other sites as important or more so but their numbers and locations are not known. Newman Sound may not be the ideal location but with Terra Nova Park in the vicinity, logistics are good for working there. The Fleming surveys covered a much wider area (St. Mary's Bay to Notre Dame Bay) and Newman Sound is in the middle geographically. Limited comparisons have suggested an overlap in trends between Newman Sound and the larger area although the actual numbers didn't match. Therefore the authors believe that Newman Sound is a good indicator although broader coverage would be helpful. There was some discussion of the observation that a significant predator of juvenile cod is white hake. There is no information regarding where the hake eggs may come from or where the hake go when they have grown larger. It was noted that the only significant amount of white hake in the Newfoundland and Labrador area is in 3NO.

A recommendation from the 2006 RAP was that the data be standardized. It was clarified that this had been done as recommended and the correlation between the index and SPA still holds.

It was agreed that the index is interesting since there is good correlation between the Newman sound index age 1 and the SPA age 3. This was followed by discussion surrounding the possible use of the index in SPA. Questions as to criteria for determining inclusion or not were raised but could not be answered. Comparisons were made with the previous decisions to include linetrawl data. It was questioned whether the correlations between SPA and Newman Sound data hold with the linetrawl data excluded from the SPA. No firm conclusions were reached except that the Newman Sound index would not be included in the SPA for now but this would be considered again when initial SPA runs become available.

It was argued that if the Newman Sound data are a good indicator of recruitment then there are serious implications for the future because the index indicates very poor recruitment.

Prey (notably Capelin) (biological update) Presenter – Fran Mowbray (DFO – Science)

Presentation Title: Capelin in SA2+Div. 3KL by Fran Mowbray

SUMMARY:

There are 4 stocks of capelin in the NL area – 4RST, 3Ps, 3NO and 2+3KL. Information on past research versus current activity was presented. There have been significant reductions in the offshore acoustics survey coverage as well as a reduction in the number of beaches studied in detail.

While the offshore acoustic data suggest dramatic declines in capelin abundance beginning in the early 1990s, this is not reflected in the beach spawning data. Information from the offshore bottom trawl surveys suggests a more southerly distribution of capelin through the

1990s to 2006. Also, data suggest that the capelin were closer to the bottom during the 1990s than during the 1980s.

Overall, fish sizes were smaller and a higher proportion of 2-year old females have been sexually mature since about 1994 although this proportion, while still relatively high, declined after 2003. Also, spawning was later in most areas than the historic norm.

In 2005, spawning was widespread and somewhat earlier than in the recent past. Also, the overall distribution was more northerly. Better growth was also seen but the spring 3L acoustic density remained low.

DISCUSSION:

There were a number of observations of harvesters described. In 2006, capelin seemed to appear earlier in many areas and were also in greater abundance. They also are appearing again in some places where they hadn't been seen for many years. There were many whales and gannets around in April in 2006 and large schools were seen on sounders. It was pointed out in response that in April large schools were also found during research but these were very small age 1 fish that would not be spawning later. There is some spawning as early as April but the survival rates are not believed to be very high due to a mismatch with prey sizes available at that time.

The longer term trends of information available seem to indicate that capelin are expanding their distribution northward again.

Traditional Tagging

Presenter – John Bratley (DFO – Science)

WP Title: Exploitation and movements of Atlantic cod (Gadus morhua) in NAFO Divs. 3KL: tagging results from the reopened fishery in 2006 by J. Bratley and B. P. Healey

Presentation Title: Exploitation rates and movements of Atlantic cod (Gadus morhua) in NAFO Divs. 3KL: tagging results from the reopened fishery in 2006 by John Bratley and Brian Healey

ABSTRACT:

The directed fishery for cod in the inshore of NAFO Divs. 2J+3KL was reopened during 2006, resulting in reported landings totalling 2400 t from commercial, recreational, Sentinel and by-catch fisheries combined. Approximately 5000 cod were tagged and released in the inshore prior to the re-opening of the fishery. Tag returns were used to estimate exploitation rates in three inshore areas that accounted for most of the landings (3Ki, 3La, 3Lb). The tagging study incorporated estimates of tagging mortality, tag loss, and reporting rates using methods we have described previously. Single tag reporting rates estimated from a high-reward tagging study were approximately 50%, much lower than the rate estimated for the period 1997-2002 (76%). Based on recaptures of tagged cod >50 cm fork length released in 2006, exploitation rates (% harvested) were high (25-36%) for cod released in 3Ki in the Twillingate area compared to those tagged about 50 km away southeast of Fogo (10%). Cod tagged further south in 3La and 3Lb were much larger (mostly > 65 cm) and exploited less heavily (i.e., 5% for cod tagged in Bonavista Bay and 10% for those tagged in Smith Sound). The distribution of recaptures was similar to that from our previous (1997-2002) experiments. Recaptures indicate that within a few weeks to months after release there is movement of

cod between eastern and central Notre Dame Bay (3Ki), Bonavista Bay (3La) and Trinity Bay (3Lb). Overall, the results are consistent with our previous conclusion indicating a resident inshore component of northern cod that remains within an area bounded by the 3Kd/3Ki border in the north and the 3Lb/3Lf border to the south.

DISCUSSION:

Questions of clarification were posed regarding the use of double tags and high reward tags in the determination of tag loss and return rates respectively. Clarifications were provided emphasizing that double tag information was used only to estimate tag loss rate while high reward tag information was only used to estimate return rates. There were no double tagged fish during the 2006 program but many high reward tags were applied.

It was suggested that analyses might be redone excluding returns from the year of tagging since there may be biases introduced due to lack of adequate dispersal of the tagged fish. It was agreed that this may be an issue but it was noted that for many areas, the 2nd and 3rd year returns were from the same areas where the fish were tagged indicating that the fish were returning to the same areas in summer although it is not known what the fish might be doing during winter. As such, dispersal may not be an issue generally although it may have been an issue in 3Ki in 2006.

Discussion also focused on reporting rates which seemed lower in 2006 than previously. There was no explanation for this although there could have been lower return rates in the recreational fishery. Also, there may have been less interest in returning tags by commercial harvesters, similar to the 3Ps situation. It is still assumed that there is 100% reporting of the high reward tags and no reason to doubt that this is reality. It was agreed that a question could be added to the FFAW questionnaire regarding tag returns similar to what was done in 3Ps. It was also agreed that reporting rates could be a problem that may increase in the future. It was also clarified that the size range of fish with high reward tags was the same as that for fish with regular tags so there wouldn't seem to be a size difference issue with reporting rates.

It was questioned whether the estimated exploitation rates for 3La and 3Lb could be underestimated due to tagging of very large fish (>85 cm). It was indicated that it was a possibility. However, although reanalysis excluding fish >85 cm, did result in some increase, it was not very much.

Some discussion regarding the sizes of fish tagged compared to those available to the commercial fishery also took place. There was agreement that some reanalysis should be done for this meeting that would allow examination of length distributions of tagged fish compared to sizes in the catch. This will include percentage returned by 5-cm groups by area, as well as analysis of the tagging data with a cut-off of 85 cm.

Revised Tagging Results Presenter – John Bratney

Presentation Title: Revised Tagging Results by John Bratney and Brian Healey

SUMMARY:

In response to concerns regarding the sizes of fish caught and tagged in the different areas inshore compared to the sizes taken in the commercial fishery, a number of reanalyses were

carried out to examine estimates based on using all 50+cm data versus only data for fish from 50-85 cm.

It was not possible to extract the length frequencies of the commercial catch; only the catch-at-age table and numbers-at-age data were available so these were put together. It was also not possible to split the age/size distribution of the commercial catch by Area. The approximate calculations gave a peak at ~62 cm (age 6) then showed a decline beyond that. Less than 1% were >90 cm. For the reanalysis, the percent >50 cm in commercial catch versus tagged fish data was examined.

The lengths of tagged cod recaptured were binned into 5 cm length groups and the raw return rates (i.e., not adjusted for reporting rates) examined. In 3Ki, the percent recaptured is close to '0' in the smallest tagged fish but goes up dramatically above that 55-60 cm especially. It was about the same up to ~80 cm. In 3Ki there was very few large fish sampled. The data indicate that if fish >85 cm were excluded from the analyses, it would have virtually no impact since there were so few fish.

There was a different picture in 3La in that very few below 60 cm were caught. The percent captured seems flat through a wide range of lengths to about 80 cm. Above 85 cm is some information due to good sample sizes but drops off. Fish >85 cm don't seem to be caught as well in the commercial fishery.

The Smith Sound data are noisy but averages around 3-4% but goes up to about 100 cm fish.

Overall there was not much change in the estimated exploitation rates although there is some drop in most areas. The conclusion was that if the complete analysis was redone with a cut-off at 85 cm, it would have little impact in 3Ki due to very few fish, and little impact in 3La/b because selectivity extended beyond 85 cm although only a small proportion of all sizes were caught in commercial fisheries in this area.

DISCUSSION:

Discussion focussed on the observation that the revised analysis did not result in very much change in exploitation rate estimates. The differences in the estimates between regions did not seem to be related to the size issue although it does confirm that fish <50 cm should not be included in the analyses.

Discussion took place concerning the implied selectivity curve that was noisy but quite flat for 3Lb compared to what might be expected for a gillnet fishery. It was pointed out that the mesh sizes ranged from 5½" to 6½" so that might account for an apparent flatness.

It was agreed that there are still issues related to size differences of fish seen during tagging, in the Sentinel fishery and in the commercial fishery but they could not be sorted out during this meeting. Since the size ranges used to determine exploitation based on tagging are the same as those available to the commercial fishery, then, assuming other aspects of the model are correct, the exploitation rates should not be overestimated.

There was some discussion as to whether the length frequencies of tagged fish could be converted to age and a partial recruitment curve derived that would be independent of SPA. It was concluded that there would probably be too many problems with the application of available age-length (A/L) keys due to differences in growth and mean length-at-age for this

to be reasonable. Otoliths are collected during tagging work to determine the age distribution of tagged fish but there is generally poor sampling in 3Lb. There could be a push for more work in the future.

It was agreed that for the SAR, exploitation rates as determined from tagging would be described as in the past but results of these new analyses should also be included.

Preliminary Results from Telemetry Tagging
Presenter - John Bratney (DFO – Science)

WP Title: Survival and movements of coastal northern cod: preliminary results from acoustic telemetry by John Bratney and Brian Healey

Presentation Title: Survival and movements of coastal northern cod: preliminary results from acoustic telemetry by John Bratney and Brian Healey

SUMMARY:

The preliminary results of telemetry tagging of cod in 2J3KL in 2005 and 2006 were reported. In May 2005 a pilot study was carried out whereby 10 fish were tagged (internal transmitter as well as double external tags) and three receivers placed in Smith Sound. All 10 fish left Smith Sound in late spring. Less than 1000 t of cod were caught inshore 3KL in 2005. Nonetheless, 1 fish with a transmitter was caught by a harvester. All 9 remaining fish returned to Smith Sound during October-November 2005. All 9 survived winter and remained in Smith Sound until spring 2006. They all left Smith Sound spring 2006; batteries expired in July 2006.

During winter 2005 and spring 2006 a larger study was carried out. Another 142 cod were tagged with implanted transmitters and external tags (~100 in Smith Sound), and hydrophone arrays were placed in a number of locations from Notre Dame Bay to Conception Bay. Most (>80%) left Smith Sound during spring (March-June) 2006. About 30% were detected by hydrophones off Cape Bonavista during May-June 2006, and about 40 % have been detected off Melrose. Data from other receivers has not been retrieved yet.

Most fish were detected close to shore and about 10% were captured in the fisheries in Trinity Bay and Bonavista Bay. By 19 January 2007 most (~75%) had returned to Smith Sound (plus 6 of 13 tagged in Bonavista Bay).

DISCUSSION:

Questions were posed related to such things as tagging survival rates, success of offshore tagging and returns of transmitters. Overall, participants were very pleased with this new approach, agreeing that considerably more information is potentially available than from traditional tagging approaches.

It was interesting that the return rate from 3Ki was quite high; 5 of 25 tags were returned. The exploitation rate suggested by this was the same as that implied from conventional tagging.

It was questioned whether the survival estimate available could be useful for the assessment. After discussion it was agreed that it would be premature to consider it as it was only for an 8-month period and it is unknown if there are seasonal differences. By 2008 it should be possible to partition mortality between different times of year. It was also cautioned that any

information on mortality would only apply to the period under study and it might not be realistic to extrapolate to the past. It was not considered possible to obtain age-by-age mortality estimates because due to tag size, they are only applied to fish >58 cm. As technology improves this situation could change and it may be possible to tag fish of all commercial sizes.

Fish Harvesters' Observations

Presenter – Harvey Jarvis (FFAW)

Presentation Title: 2J3KL Fish Harvester Questionnaire by H. Jarvis, J. Pennell, D. Power, A. Tucker

SUMMARY:

The industry surveys have been going on for a number of years. Telephone surveys were begun a few years ago. Until 2006, the objective was to target 15-20% license holders in each area. Work has been ongoing to make the surveys more statistically sound; this began in 3Ps and was extended to 2J3KL in 2006. Previously, the surveys were done by statistical area but this would have meant ~800 samples which would have been too large to handle. Therefore, the 2006 survey was conducted by division, resulting in a sample size of ~300 which was manageable.

Most felt that there were less cod in 2J during 2006 than there was during the late 1980's. Most in 3K and 3L felt abundance was better during 2006 than the late 1980's. Most in 2J and 3K felt that cod were more abundant during 2006 than during 2005. In 3L, fish harvesters' opinion was evenly split between abundance being about the same and abundance being better than it was during 2005. While there was a wide range of opinion about the distribution of cod in 2J, in 3K and 3L most felt that cod were widely distributed or distributed throughout the area. Most fish harvesters in 2J, 3K and 3L felt that cod were in good condition during 2006.

DISCUSSION:

Points of clarification were addressed during the discussion. The presenter agreed that there are some difficulties in interpretation of some of the response information but noted that as a follow-on to a recommendation made in 2006, the FFAW will be working with researchers at MUN to refine the questionnaire and hopefully things will improve in the future.

It was questioned how, if people don't fish, they are able to respond reasonably. It was pointed out that harvesters do see cod in other fisheries and gear and so may base their reports on these observations. They may also base responses on what they hear from others.

It was agreed that the harvester observations should be updated and included in the SAR as in the past. It will also be noted that there was no representation from the offshore at the RAP and therefore there will be nothing to report from offshore harvesters.

Science Logbooks – Standardization
Presenter – Eugene Murphy (DFO – Science)

Presentation Title: <35 Fixed Groundfish Logbook by Eugene Murphy and Brian Healey

SUMMARY:

Science logbook data collections from inshore harvesters in 2J3KL began with the reopened fishery in 1998. From 1998 to 2002, return rates decreased from about 83% to about 70%. The return rate to date from the 2006 fishery is about 63%. For gillnets, the standardized 2006 catch rates generally fell between the high and low values observed during the 1998-2002 fisheries. In contrast, standardized linetrawl catch rates were higher than during 1998-2002 although the confidence intervals in 2006 were quite wide.

DISCUSSION:

It was noted that the data from 2006 were very sparse compared to earlier years. Also, given the fact that the timing of the fishing seasons was variable from location to location, it is difficult to interpret the results with regard to indicators of stock status. Also, the return 2006 rate was only about 63% to date compared to 70% in the 1998-2002 period.

The observation was made that the 2006 Sentinel gillnet catch rate was quite similar to that determined from the logbooks for the same gear.

It was concluded that the data would not be used in the SPA but that there is comfort in the similarity between the logbook and Sentinel gillnet catch rates.

Sequential Population Analysis (SPA)
Exploratory data analysis prior to SPA (FLEDA)
Presenter – Brian Healey (DFO – Science)

Presentation Title: 2J3KL Cod: Exploratory Data Analysis (FEDA) by Brian Healey

SUMMARY:

FLEDA is a software package developed by scientists in the EU to carry out exploratory analysis of assessment data sets, including prior to their input to an SPA. Analyses of the catch data as well as the indices did not reveal any problems that would preclude their inclusion in the SPA for the Central inshore region. The analysis did reveal that the linetrawl sentinel data track yearclasses as well as the Sentinel gillnet series so a perceived inability to do so should not be used as a criterion to exclude these data from the SPA. The index correlations presented were not part of FLEDA and did not include the June data from Sentinel.

DISCUSSION:

It was agreed that the previous conclusion that the linetrawl data should be excluded from SPA calibration because they don't track year-classes very well needs to be revisited because the analyses indicate that these data do a reasonable job of tracking year-classes. The issue then becomes one of sample size; the soak time cut-off of 12 hours results in a lot of the data being removed (reduces 9 sites total to only 4 sites). It was concluded that there was no good reason to exclude the linetrawl data from the SPA analysis although more sites would be helpful. It was pointed out that if site numbers was an issue, the numbers could be improved for the future and this will be discussed during the upcoming Sentinel meeting.

The index correlations require further analysis as some of them did not look very good at some ages although it was believed that the problem may have come from a single point.

**Sequential Population Model (SPA) on Central Inshore Area
Presenter – Brian Healey (DFO – Science)**

Presentation Title: 2J3KL Cod: Inshore VPAs by Brian Healey

SUMMARY:

In 2006, the catch for the Central Inshore Area was 1992 t. There was an additional year of sentinel sampling available for inclusion in the SPA. The linetrawl and 3¼" gillnet indices have declined, whereas there was an increase in the 5½" gillnet index.

The inputs to the SPA were as follows: catch-at-age, ages 2-10+, 1995-2006; Sentinel 5½" GN (fixed sites), ages 3-9, 1995-2006; Sentinel linetrawl (fixed sites), ages 3-7, 1995-2006; and Sentinel 3¼" gillnet (experimental sites), ages 3-9, 1996-2006. All indices were equally weighted. Natural mortality (M) was assumed to be 0.4. The model estimated survivors for ages 4 to 10+ at the beginning of 2007. The SPA results and diagnostics were presented. In addition, sensitivity and retrospective analyses were also conducted, and the comparisons between the SPA recruitment and the Newman Sound beach seine index were updated.

DISCUSSION:

It was agreed that the runs using the Sentinel indices with and without June showed very little difference so June would be left in. Due to the changes estimated in maturities at age, there may be a retrospective problem next year with regard to spawning stock biomass but it was agreed to defer further discussion of this until maturity data are tabled.

Concerns were expressed regarding the lack of convergence of the SPA. Different opinions were expressed as to the possible reasons. Also, it was questioned whether the lack of convergence would invalidate the SPA all together. It was pointed out that this was discussed during the 2006 assessment and there were no serious problems identified then.

There were also concerns expressed regarding whether bias-corrected or uncorrected estimates should be used for projections. It was also pointed out that opinions differ regarding the handling of plus-groups. The Chair noted these issues and suggested that they would be better discussed during a Framework Meeting. It was therefore **recommended** that a Framework Meeting take place to examine the issue of bias correction, the handling of plus-groups and the lack of convergence of SPA.

Further discussion took place regarding the Newman Sound recruitment index. It was agreed that for now it would not be included in the SPA. Instead, the information would be used to qualify the projections indicating that if the correlation holds, projections with the lower estimates of recruitment would be the best reflectors of what might be anticipated. It was agreed that more information is required regarding the Newman Sound work to allow for better evaluation of the representativeness of these data to overall recruitment, and that a request for as much information as possible related to this should be made.

Exploitation Rate Analyses
Presenter – Noel Cadigan (DFO – Science)

Presentation Title: ADAPT Exploitation Rates by Noel Cadigan and Joanne Morgan

SUMMARY:

The analysis compared the SPA 5+ exploitation rates to rates from tagging experiments. The overall rate for 2006 was 10% based on the tagging compared to the SPA estimate of about 7.5%. For 1999-2002, the tagging rate (average) was also computed to be about 10% for the exploitable biomass (approximately 4+) according to the 2005 SAR but the SPA estimates were all 15% or higher. The authors expressed concerns regarding the differences between the tagging estimate and the SPA estimates for the earlier period.

DISCUSSION:

The source of the 10% estimate for 1999-2002 was unclear. There were also questions as to what differences might exist using 4+ versus 5+.

It was agreed that since the details of the analysis of the 1999-2002 data as well as the 10% estimate are unclear, the comparisons should be restricted to 2006 only unless more analyses were done. More detailed analyses of the data were requested (see below).

Exploitation Rate Comparisons from Tagging and SPA
Presenter – John Bratney (DFO – Science)

*Presentation Title: Average Annual Exploitation Rates from Tagging by John Bratney
(EXCEL Spreadsheet)*

SUMMARY:

Based on earlier discussions, the exploitation rates from tagging were further compared to the results from SPA. Exploitation rates for 2006 from the SPA were 4.4% and 6.9% for ages 4+ and 5+ respectively compared to 9.3% estimated from tagging for the central area. The rates estimated from tagging were also broken out by statistical area based on an assumption of 20% of the catch was from 3Ki and the remainder from 3Lab. This analysis suggested exploitation of 17% in 3Ki, 5.0% in 3La and 9.6% in 3Lb.

DISCUSSION:

It was pointed out that overall there was a good fit in earlier years but there were some differences in 2001, perhaps due to the large recreational fishery. It was agreed that although there are some discrepancies, there is reasonable agreement overall. This will be noted in the SAR. It will also be noted that the tagging estimates of exploitation are more pessimistic (i.e., higher) than those from SPA.

Projections from SPA

INITIAL DISCUSSION:

Prior to presentation of the projection results, there was some discussion regarding the projections. There was further discussion on whether projections should be done as 'bias-corrected' or not. It was noted that in the 2006 deterministic projections, the bias-corrected abundance was projected and that is the approach usually followed in Canada and at NAFO

although the ICES Methods Working Group and the United States don't use bias-corrected data. It was agreed that for this assessment, the procedure followed in 2006 would again be applied. It was noted that this would also be part of the agenda for the previously recommended Framework Workshop.

For recruitment, it was agreed that the same approach that was used for the 2006 assessment (i.e., LOW, MED (geometric mean) and HIGH) would be used. For the risk analysis (stochastic projections) the same approach for recruitment would be used as in 2006.

From these it was considered that the information requested in the ToR would be addressed for the Central Inshore Area.

Deterministic Projections

Presenter – Brian Healey (DFO – Science)

Presentation Title: 2J3KL Cod Inshore VPA Projections by Brian Healey

SUMMARY:

Deterministic projections for 1 year (to beginning of 2008) based on the results of the inshore SPA were presented. The inputs were as follows: catch weights and stock weights were set at the geometric mean of the most recent 3 years; the maturity was set based on the modelled results; natural mortality was set at 0.4; the partial recruitment was the rescaled average of 2001, 2002 and 2006; recruitment was set to LOW (minimum estimated age 2 abundance from the SPA series), MED (geometric mean of the most recent 3 years) and HIGH (highest in the SPA series at age 2); projections were carried out with catches of 0 t, 1250 t and 2500 t. At all 3 levels of recruitment, the spawning biomass was projected to increase by about 12% with a catch of 0 t. With a catch of 2500 t, the spawning biomass would only increase by about 1-2% under all 3 recruitment scenarios.

For 3-year projections, results are more sensitive to the assumed recruitment values. It was estimated that the spawning biomass would decrease with catch options of 1250 t and 2500 t with the low recruitment scenario, and with a catch of 2500 t with the medium recruitment scenario. It was projected to increase on average by 7% per year with a catch of 2500 t if recruitment was the high estimate.

DISCUSSION:

It was noted that the ToR requested information for 3+ but the analyses are for 4+. The Chair reminded participants that an explanation was provided in the 2006 SAR as to why 4+ was more appropriate (better represented exploitable biomass), and indicated that Fisheries and Aquaculture Management had been reminded of this when the ToR were being drafted. It may be an oversight that they still refer to 3+. It was agreed that 4+ will again be used and the reason will again be explained in the SAR.

There was further discussion of the Newman Sound recruitment information. Since the Newman Sound age-1 index and the SPA age-3 estimates are highly correlated, and most importantly, that the Newman Sound data suggest extremely weak year-classes entering the population, it was suggested that doing LOW, MED and HIGH projections is unrealistic and it would be better to do something else such as projections under headings such as 'realistic' and 'optimistic'. After considerable additional discussion, it was agreed that based on the

Newman Sound information, the SAR should only contain deterministic projections using the LOW estimate of recruitment as that is most realistic.

Discussion then turned to the stochastic projections (risk analysis). It was agreed that this analysis should be done in a manner consistent with that for the deterministic projections reflecting the Newman Sound information suggesting very poor recruitment. It was agreed to set age-2 in the risk analysis equivalent to the LOW value of the deterministic projections (61% of the geometric mean).

Risk Analysis

Presenter – Brian Healey (DFO – Science)

Presentation Title: 2J3KL Cod Risk Analysis for the Central Inshore Area by Brian Healey

SUMMARY:

The bootstrapped projections were carried out using the same input parameters as were used for the deterministic projections. The age 4-6 bootstrapped survivors were back-calculated to age 2 to generate different values of the age 2 and 3 survivors for each bootstrap replicate. Earlier discussion regarding the recruitment picture from the Newman Sound research resulted in agreement to use only a recruitment value for projections that was consistent with the results for the most recent year-classes as indicated by this pre-recruit index. In the deterministic projections, the lowest recruitment value was 61% of the recent geometric mean so for the risk analysis, age 2 recruitment was set at 61% of the geometric mean of the back-calculated values. Growth targets of 0%, 5% and 10% were examined over time periods 1 and 3 years. In most instances there were high risks of not meeting the targets.

DISCUSSION:

During discussion it was realized that the medium term projections were not 0%, 5% and 10% annually but were for the 3-year period overall. It was not clear which approach was followed for the 2006 assessment. It was concluded that since the ToR referred to 'annually for 2007 to 2009', it appears that annualized information is being requested. As such, the analyses (risk and deterministic) needed to be redone with the percentages annualized. It was emphasized that with the low recruitment anticipated, the stock will not show any growth if it is fished.

The Chair emphasized that the exact procedures used for both the deterministic projections as well as the risk analysis will have to be carefully explained in the SAR.

It was also noted that DFO Science (Ottawa) prefers risk plots as opposed to summary tables to allow closer examination of trends.

Additional Risk Analysis Work
Presenter – Brian Healey (DFO – Science)

Presentation Title: Risk Results-Annualized Percentage by Brian Healey (EXCEL Spreadsheet) and Table of TAC Options-SSB Response Annualized by Brian Healey (EXCEL Spreadsheet)

SUMMARY:

Based on discussion results where it was agreed to keep the risk analysis consistent with the deterministic projections, an annualized average growth rate was computed to demonstrate the risk of spawning biomass in 2010 not meeting annual growth targets of 0%, 5% and 10%.

DISCUSSION:

There was no further discussion of the information as it had been agreed previously to include the results of this approach in the SAR.

OFFSHORE DATA

Autumn Multispecies Surveys
Overview of Surveys and their Problems
Presenter – Bill Brodie (DFO – Science)

WP title: A Brief Description of Canadian Fall Multispecies Surveys in SA2+ Divisions 3KLMNO from 1995-2006 by Bill Brodie and Don Stansbury

Presentation Title: A Brief Description of Canadian Fall Multispecies Surveys in SA2+ Divisions 3KLMNO from 1995-2006 by Bill Brodie and Don Stansbury

ABSTRACT:

Stratified random multispecies trawl surveys have been conducted during autumn by the Department of Fisheries and Oceans in the Newfoundland and Labrador Region annually since 1977. Since 1990 these surveys have covered the offshore areas of NAFO Divisions 2J, 3K, 3L, 3N, and 3O. During 1995, the Campelen 1800 shrimp trawl was adopted as the standard survey gear, and coverage was extended to include the inshore areas of Div. 3K and 3L, parts of Div. 3M, Div. 2GH, and areas deeper than 1000 m.

Some changes, planned and unplanned, have occurred to the survey series since 1995. Many of these unplanned changes have occurred because vessel breakdowns have not allowed full or timely completion of the entire survey area. The main problems with the 2004-06 surveys were the complete absence of survey sets deeper than 731 m in Div. 3LMNO, the lack of coverage in several other strata in Div. 3L, the reduction in coverage in some strata in Div. 3K, and the extension of the timing into January in 2005 and 2006. The approximately 650 sets completed in 2004 and 2005 surveys were the lowest numbers since the 1995 survey, although the number of sets in 2006 improved to 704.

There are at least three sources of uncertainty resulting from the problems encountered during the fall surveys of recent years: gaps in coverage (missed strata, reduced numbers of sets); changes in timing (survey coverage extended later, coverage of some strata/Divisions often spread out over a much longer period than planned); and vessel effects (few direct comparisons of the 3 vessels used, using vessels in areas where they have little or no coverage in previous years).

Careful attention to survey gear and fishing protocols, along with set-by-set monitoring with trawl sensors ensures minimal variability during tows. However, the problems with survey coverage and timing have introduced a further degree of uncertainty into the survey estimates for many species.

DISCUSSION:

There was no discussion of the presentation.

Abundance/Biomass

Presenter – Eugene Murphy (DFO – Science)

Presentation Title: 2J3KL Multispecies Surveys by Eugene Murphy

SUMMARY:

The results of the 2006 multispecies survey in 2J3KL were presented and compared with results from surveys in previous years. It was noted that 42% of inshore area was not covered in 2006. No age 7 fish were found offshore in 2J and there was not much fish >age 6 in 3K either. It was noted that there were fish above age 7 during the 1980s. The age distribution was truncated in 3L as well but there were some older fish in 2006 for the inshore, there was a difference between 3K and 3L with many more fish found inshore in 3L.

DISCUSSION:

It was noted that in past assessment meetings, considerably more information was presented but since the 'big picture' message remains the same; i.e., that the offshore biomass index is only about 2% of that from the mid-1980s, it was considered unnecessary to include all the additional detail this year.

It was agreed that the information would be reported in the SAR as in the past. It was also agreed that if the increase seen between the 2005 and 2006 offshore survey results continued to 2007 then a closer examination would be warranted during the 2008 assessment.

Distribution

Presenter – Don Power (DFO – Science)

Presentation Title: no title included in presentation

SUMMARY:

Expanding symbol plots of cod catches during the autumn multispecies offshore surveys in 2J3KL were presented. There were some differences in where fish were seen in 2006 compared to the earlier years, but the abundance was still low overall. It was noted that 2006 was 1st year that the survey was completed before Christmas for number of years.

DISCUSSION:

It was noted that in 2006 the main distribution of fish seemed to be in the Bonavista Corridor area and this is where the majority of the offshore tags were applied during the February-March, 2007 offshore acoustic/telemetry survey. There was no further discussion.

Spring Multispecies Surveys

Abundance/Biomass

Presenter – Eugene Murphy (DFO – Science)

Presentation Title: Spring Survey by Eugene Murphy (EXCEL Spreadsheet)

SUMMARY:

The results of the 2006 multispecies survey in 2J3KL were presented and compared with results from surveys in previous years. Overall there have been steady increases in biomass from 2004 to 2006 although the total remains very low compared to that of the 1980s. It was noted that 42% of inshore area was not covered in 2006. No age 7 fish were found offshore in 2J and there was not much fish >age 6 in 3K either. It was noted that there were fish above age 7 during the 1980s. The age distribution was truncated in 3L as well but there were some older fish in 2006 for the inshore, there was a difference between 3K and 3L with many more fish found inshore in 3L.

DISCUSSION:

There was no discussion of the information provided.

Distribution

Presenter – Don Power (DFO – Science)

Presentation Title: no title included in presentation

SUMMARY:

Expanding symbol plots of cod catches during the spring multispecies offshore surveys in 3LNO were presented. It was noted that in 2006 there was missed coverage along the shelf edge in 3L. In 3L, the largest catches were taken along the northern edge of the Grand Bank.

DISCUSSION:

Discussion was quite limited. There were a few questions of clarification regarding timing of the surveys and coverage. It was indicated during the discussion that the area of greatest concentration in 2006 corresponded generally to where the largest concentrations had been found historically during these spring surveys.

Biology From Multispecies Surveys

Maturity

Presenter – John Bratney (DFO – Science)

Presentation Title: Maturity of female cod 2J+3KL from fall survey by John Bratney

SUMMARY:

The fall survey data were analysed to estimate the proportion mature of female cod. Over time, the age at 50% maturity has shown a general decline with the 2002 cohort being the youngest age in the series. Comparison between the 2006 assessment and the current modelled analysis of the proportion of the 2002 cohort mature at age 5 indicates a dramatic change (increase) from 0.38 estimated during the 2006 assessment to 0.66 now estimated. This will have significant implications to estimates of spawning stock biomass from SPA.

DISCUSSION:

Questions of clarification were posed regarding sampling. It was clarified that all samples are from the autumn offshore surveys. In the late 1990s there were some studies done to compare the inshore and offshore and there was good agreement then but it is unknown if that situation still holds for today.

The key issue noted was the change in the modelled estimate of the proportion mature of the 2002 year-class at age 5 (0.38 in the 2006 assessment but 0.66 now). There was discussion regarding the way the data are treated and the modelling details. It was highlighted that the problem is one of trying to fit a shape when the data are only available for half of that shape. The only way of knowing for sure what is correct is 'after the fact'. It was suggested that this could be examined in more detail, but that rapid changes could also be real.

It was agreed to use the information as presented for this assessment but it was **recommended** to carry out further examination of the maturity data and model, and to carry out comparative analyses for the next assessment.

There was also discussion surrounding the possible impacts of the revised estimates of the 2002 cohort at age 5 on the estimation of spawning stock biomass including retrospective patterns that would occur. It is only in retrospect that it is possible to determine which was more reasonable.

Size-at-Age, Condition

Presenter – George Lilly (DFO – Science)

Presentation Title: Northern (2J+3KL) Cod: Size-at-age and condition by George Lilly

SUMMARY:

Data required for monitoring size-at-age and condition have been collected during bottom-trawl surveys in the offshore since the late 1970s. The trend toward low mean size-at-age in the early 1990s was reversed during the late 1990s. In Division 2J, where the decline was the greatest, recent mean lengths have been at or above the average for the period 1985-2006 but well below the levels of the early 1980s. Size-at-age has varied without consistent trend in the past few years. Much of the high year-to-year variability may be sampling error related to small sample sizes.

Temporal changes in condition at age varied among Divisions. In Division 2J, both gutted condition and liver index declined in the early 1990s. During the second half of the 1990s, gutted condition returned almost to normal, whereas the liver index increased only a little. There has been variability with little trend since the mid-1990s. In Division 3K, gutted condition declined during the early 1990s and improved during the latter half of the 1990s. Liver index changed little during the 1990s. As in Division 2J, there has been variability with little trend since the mid-1990s. In Division 3L, gutted condition has remained relatively unchanged over time. Liver index increased considerably during the early 1990s and has since returned to an intermediate level.

Temporal patterns have differed between gutted condition and liver index, and among Divisions within each of the two indices. It is difficult to explain the different patterns. A study into the relationship between condition and annual variability in stomach contents, for the

period 1978-95, is in progress. Exploratory analyses have also shown that liver index tends to be higher in females than in males. Gutted condition appears not to differ consistently between genders.

Some information on liver index is available from the sampling of USSR commercial catches in Division 2J during many months in the period 1964-66. When the mean values for autumn months are compared with values computed from samples taken during Canadian autumn surveys in the 1980s, it is apparent that the values from the 1960s are considerably higher. It is not known if this reflects a true decline in condition or an unrecognized difference in sampling method, location or some other factor.

DISCUSSION:

The observation was made that when the liver index is split out by sex, there is a dichotomy at about the size of sexual maturity. The first assumption would be that females would put more into gonad development and less into livers but the opposite happens. This is worth exploring further.

It was speculated that the differences in condition seen between divisions could be related to feeding. In the north (2J), feeding is less during winter so fish there may need higher reserves than in for example, 3L where they can feed all year.

Lower productivity now may be related to the lower size at maturity and lower spawning success.

It was agreed that a summary would be included in the SAR.

Recruitment

Presenter – Eugene Murphy (DFO – Science)

Presentation Title: Recruitment by Eugene Murphy (EXCEL Spreadsheet)

SUMMARY:

A plot showing relative year-class strengths at ages 2 and 3 from the fall offshore surveys in 2J3KL was presented. The data clearly demonstrate the dramatic decline in recruitment after the late 1980s. From the early 1990s, recruitment has been variable but at very low levels.

DISCUSSION:

During the brief discussion it was highlighted that recent estimates of recruitment are low but there was some increase in the size of the 2004 year-class compared to that of 2003. It was agreed to include the plot provided in the SAR.

Mortality

Presenter – Brian Healey (DFO – Science)

Presentation Title: Compute Zs by Brian Healey (EXCEL Spreadsheet)

SUMMARY:

Total mortality estimates (Z) from the offshore survey data were presented. Comparison of the 2006 to 2005 data indicated negative Zs since the survey values for the three cohorts

considered all had increased survey abundance in 2006 (despite being one year older) compared to 2005 . This could reflect a possible year effect in the survey results.

DISCUSSION:

It was agreed that due to the negative estimates across many ages from 2005 to 2006, caution must be exercised in interpreting the apparent increase in survey biomass between 2005 and 2006 as there may be a year effect with either the 2005 estimate being low or the 2006 estimate being high. The plot will be included in the SAR as well as a cautionary note regarding interpretation of the apparent change in biomass/abundance between 2005 and 2006.

ACOUSTIC SURVEYS – SMITH SOUND

Presenter – George Rose (MUN)

Presentation Title: Acoustic surveys of overwintering cod in Smith Sound, 2006-07 by George Rose and Susan Fudge

WP Title: Acoustic surveys of overwintering cod in Smith Sound, 2006-07 by George Rose and Susan Fudge

SUMMARY:

Hydroacoustic studies were conducted in Smith Sound in western Trinity Bay (3L) at various times from spring 1995 to the present. Winter (January-February) surveys were conducted in a standard manner by the Fisheries Conservation Group at Memorial University of Newfoundland starting in 1999 (Rose, 2003). Average indices of biomass increased to a peak of about 26,000 t in 2001 and then declined to 23,000 t in 2002, 20,000 t in 2003, and 18,000 t in 2004. These surveys were suspended in 2005 but revised in 2006 employing a chartered vessel using the same acoustic equipment. Average indices of biomass were stable in 2006 at 16,500-18,500 t (using the same methodology as earlier surveys and a new geostatistical approach), but declined in 2007 to 7000-8000 t, the lowest in the time series.

DISCUSSION:

A fish harvester noted that in late January 2007, a large body of cod was seen under the causeway near Clarendville and they ended up in Shoal Harbour. It was questioned whether they may have circled Random Island and didn't return. This would help explain the lower estimate for Smith Sound in 2007.

The difference between the results of the January 2007 and the February 2007 surveys was regarded as being somewhat surprising. It suggests that many fish returned to the Sound after the January survey. It was pointed out however, that this notion is in contrast to the telemetry data which suggested that most fish were back in Smith Sound by early January. The differences in interpretation could be size related but there is no way of determining this. It was questioned whether there may have been any differences in temperatures. It was reported that temperatures were slightly higher in January but by late March they were about 'normal'.

It was reported that up until mid-March there were reports of a body of fish in Northwest Arm. It was questioned whether these could be Smith Sound fish but the response was that there is no way of knowing.

The overall conclusion was that there are some different things going on in 2007 but it is not possible to speculate on possible meanings.

OFFSHORE ACOUSTIC/TELEMETRY SURVEY, PRELIMINARY RESULTS
Presenter – Luiz Mello (MUN)

Presentation Title: Offshore Winter Acoustic/Telemetry Survey in NAFO Areas 2J3KL – Preliminary Results by Luiz Mello

SUMMARY:

This new survey, first conducted in early 2007 has 3 main objectives: to determine the distribution and abundance/biomass of cod during winter (February-March) on the outer shelf and upper slope off southern Labrador, Northeastern Newfoundland and Grand Bank; to assess the extent to which ongoing domestic and non-Canadian fisheries overlap the distribution of cod and might contribute to the high mortality of cod, as monitored during autumn research surveys; and, to determine whether a significant proportion of the cod that over-winter offshore migrate during late spring and early summer to coastal waters, where they would be susceptible to over-exploitation by inshore fisheries.

Preliminary results suggest the greatest biomass of offshore cod were found in the Bonavista Corridor followed closely by Hawke Channel. Relatively few fish were found in Funk Island Deep and on the northern Grand Bank. These findings are consistent with results of previous surveys (1994-2003).

DISCUSSION:

There were questions posed regarding details of tagging in the Hawke Channel area. Although tagging was attempted, the cold temperatures of the CIL and cold air temperatures resulted in the fish being frozen when they came from the water.

It was noted that the length frequency data suggest the possibility of a relatively good year-class (2005). It was also noted however that the data are preliminary and for one year only and so the SAR can only report the results as preliminary. It was agreed that these types of surveys demonstrate the successful combination of acoustics, trawling and tagging.

INSHORE MOBILE GEAR SURVEY
Presenter – Don Power (DFO – Science)

Presentation Title: Inshore Mobile Gear Survey 2006 by Don Power and Rick Stead

SUMMARY:

This inshore survey, conducted for the first time in 2006 was funded under the Northern Cod Science and Fisheries Stewardship Initiative and conducted in cooperation with the FFAW under the Fisheries Science Collaborative Program. The survey was conducted using a stratified-random design with about 150 sets. The intent was to cover the area where the 2006 fishery was to take place – within the 12 mile limit. The survey stratification was described as well as the fishing vessels, gear and fishing protocols. Survey results were presented but it was cautioned that the results represent a point estimate only.

DISCUSSION:

Discussion focused on survey design as well as gear used. Although the planned tow duration was 30 minutes, many tows were shorter than this due to topography in the area surveyed. Concerns were expressed regarding the lack of large fish in the catches (only ~130 caught >60 cm). It was pointed out that the gear used was the same as that in the northern Gulf survey and there are no complaints there regarding ability to catch larger fish. It was suggested that more larger fish might be caught with a faster towing speed or longer tows. The length frequency data could be examined to see if greater proportions of larger fish were caught in the longer tows.

It was noted that at present only one more survey has been approved (to be conducted in 2007). If a decision is made to develop a longer time series, then more time will be required to examine the best possible combination of gear, towing speed and duration in order to best achieve the desired objectives. At present there is only limited time available for such planning.

It was agreed that a key issue is that the survey is a means of obtaining increased spatial coverage in an area closer to where the commercial fishery takes place.

It was reported that for the 2008 assessment, the length frequency data will be broken out by area to look for similarities/differences and to allow for more thorough comparisons with data from other sources.

PREDATORS (NOTABLY SEALS)

There was no information provided during the RAP.

DISCUSSION:

In the absence of any updated information, it was agreed to include text in the SAR as follows: "No new information regarding the impact of seals on the dynamics of cod was presented to the meeting. Previous cod assessments (DFO 2003) have concluded, based on seal feeding behaviour and trends in the abundance of both seals and cod, that predation by seals is a factor contributing to the high total mortality of cod in the offshore and the high natural mortality of adult cod in the inshore.

A two-year programme of enhanced study of seals, initiated in 2003, has included new population surveys, new studies of distribution, and new studies of diet, both inshore and offshore. A pilot study on the efficacy of seal exclusion zones was conducted in Smith Sound (Bowen 2004). The information from these programmes is not yet available for review."

IMPLICATIONS OF BAY-BY-BAY FISHING

DISCUSSION:

The Chair reviewed what had been said in the 2006 SAR on this issue. It was felt that the same statement could be made in the 2007 SAR as there is no additional information available to update the previous response.

ANSWERING QUESTIONS IN THE ToR

DISCUSSION:

It was agreed that all of the questions posed in the ToR had been addressed during the RAP meeting and responses will be provided in the SAR.

BULLETS and SAR

DISCUSSION:

After review of all available material was completed, remaining discussion focused first on the bullets to be included in the SAR and then on the text of the SAR itself.

In the SAR, the Sources of Uncertainty in the report will be ranked according to their importance. The projections, which were discussed in the Conclusions and Advice Section in the 2006 SAR, will be moved to the assessment section under the sub-heading "Stock Projections" and the Conclusions and Advice section will now focus on answering the questions in the ToR, as key conclusions and recommendations (advice).

The FFAW submitted a block of text for inclusion in the SAR as follows: "Fish harvesters throughout 2J3KL felt that the overall catch is a source of uncertainty. Harvesters believe the amount landed in the recreational fishery may be significantly higher than the 380 t suggested. The recreational catch in 2001 was estimated at 1975 t, when cod was less abundant, less time was available to fish and more restrictions were placed on participants. This fact coupled with harvesters' observations of the 2006 recreational fishery suggests the catch was actually much higher. The recreational fishery conducted with minimal regulation, as in 2006, cannot be accurately monitored. Professional fish harvesters must pay licensing fees, IQ fees, observer fees and dockside monitoring fees while completing science logbook information. It is unreasonable for recreational users to operate with minimal restrictions and not contribute information for scientific purposes."

After review of the submission, the Chair concluded that the portion dealing with enforcement, fees and requirements for the provision of information were not relevant to the provision of scientific advice and would therefore not be included in the SAR.

**Meeting of the Newfoundland and Labrador Regional Advisory Process (RAP) on
Northern (2J3KL) Cod**

Clovelly Golf Club, Stavanger Drive, St. John's, NL

March 27-30, 2007

and

EPS Boardroom, Northwest Atlantic Fisheries Centre

80 East White Hills Road, St. John's, NL

April 2-4, 2007

Meeting Chairperson: Don Power, Section Head, Groundfish Section, Aquatic Resources
Division, Science Branch, DFO, Newfoundland and Labrador Region.

TERMS OF REFERENCE

Context

The status of Divisions 2J3KL cod was last assessed in 2006. The current assessment is requested by Fisheries and Aquaculture Management to provide the Minister with detailed advice on the status of the stock and the implications of a possible small scale cod fishery on the inshore portion of this stock in 2007.

Objectives

Full assessment of the stock status of the following resource will be reviewed:

- 2J3KL Cod

Specifically, the following objectives have been set:

- Assess the current status of offshore populations, inshore populations and the stock as a whole. In particular, assess current spawning biomass, total (age 3+) biomass, exploitation rate, natural mortality and biological characteristics (including age composition, size at age, age at maturity, and distribution). Describe these variables in relation to historic observations.
- Highlight major sources of uncertainty in the assessment, and where appropriate, consider alternative analytical formulations of the assessment.
- To the extent possible with available information, provide information on the strengths of year-classes expected to enter the exploitable populations in the next 1-3 years.
- Assess the implications to stock growth of inshore fishery removals varying from zero to 2,500 t in 2007 and annually in the medium term (2007-2009). Implications are to be assessed in terms of a risk analysis, specifically, the risk of the beginning of year SSB not meeting a growth rate of (0%, 5% and 10%) for inshore populations, offshore populations, and the stock as a whole where possible.
- Assess the implications of conducting an inshore fishery on a bay-by-bay basis.
- Assess the impact of the 2006 Inshore Fishery One Year Pilot Project on the stock population and prospects.

In addition, an overview of ocean climate conditions during 2006, in comparison to the historical record, will be presented.

Products

A Science Advisory Report (SAR) and associated research document(s) will be produced. A Proceedings Report will record the meeting discussions.

Participation

The following participants are expected to attend:

- DFO Science, Newfoundland and Labrador and NCR
- DFO Fisheries and Aquaculture Management, Newfoundland and Labrador Region
- Industry Representatives
- Non-Governmental Organizations
- Fish, Food and Allied Workers Representatives
- Provincial Department of Fisheries and Aquaculture
- Memorial University

2J3KL cod assessment

Tentative Agenda v.1

Tentative agenda for the 2J3KL cod assessment meeting. Much of the information to be presented is associated with research effort in the inshore. Therefore, information from the inshore will be presented and discussed first, **if possible**, and information from the offshore (essentially from the Multispecies surveys) has been placed lower in the sequence.

Tuesday, March 27

- | | |
|---|---|
| <p>900 Welcome, Opening remarks, Terms of Reference – Objectives, introductions
 Overview of work to be done
 Brief Review 2006 assessment – data, analyses, conclusions
 What is different or new for 2007 ?</p> | <p>Don Power
 John Bratley</p> |
| <p>0930 Oceanography</p> <p><u>Inshore data</u></p> | <p>Joe Craig</p> |
| <p>1000 Overview of 2006 Commercial Fishery</p> | <p>Derek Tobin (FAM)</p> |
| <p>(709) Overview of Conservation and Protection Measures and estimation procedure for Commercial and Recreational Cod Fisheries in 2J3KL in 2006 (C&P)</p> | <p>Tilman Bieger</p> |
| <p>1100 Catch and catch-at-age</p> | <p>Eugene Murphy</p> |
| <p>1130 Sentinel surveys
 Overview and Standardization
 Parsons</p> | <p>Dawn Maddock</p> |
| <p>0130 Recruitment
 Beach seine</p> | <p>Bob Gregory</p> |
| <p>0230 Prey (notably capelin) (biological update)</p> | <p>Fran Mowbray</p> |
| <p>(709) Tagging
 Distribution and migration
 Exploitation rate (individual experiments)
 Preliminary results from Telemetry tagging</p> | <p>John Bratley
 Bratley and Healey
 John Bratley</p> |

Wednesday, March 28

- | | |
|--|----------------------------|
| <p>0900 Fish harvesters' Observations</p> | <p>Harvey Jarvis</p> |
| <p>0930 Science Logbooks – standardization
 Healey</p> | <p>Eugene Murphy/Brian</p> |

1000 Inshore Mobile Gear Survey
Stead Don Power and Rick

1045 Sequential Population Model (SPA) on Inshore Central Area
Discuss projections / risk analysis Brian Healey

Offshore data

(709) Autumn Multispecies survey
Abundance/biomass Eugene Murphy
Distribution John Bratney

Spring Multispecies survey
Abundance/biomass Eugene Murphy
Distribution John Bratney

Biology from Multispecies surveys
Maturity John Bratney
Size-at-age, condition George Lilly
Recruitment and Mortality from surveys John Bratney

SPA Reruns Brian Healey

Thursday, March 29- Friday March, 30

Offshore Acoustic/Telemetry Survey
Preliminary Results Luiz Mello (MUN)

Acoustic Surveys – Smith Sound George Rose (MUN)

Predators (notably seals) (Draft Text for SAR) Gary Stenson

Answering questions in the remit

Risk Analysis Brian Healey
Implications of fishing bay-by-bay Don Power

Science Advisory Report

Major conclusions (bullets)
Science Advisory Report in full

List of Participants

Northern (2J3KL) Cod Regional Advisory Process Meeting

27-30 March 2007 Clovelly Golf Club, St. John's, NL

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Research Recommendations

1. Concerns were expressed regarding whether bias-corrected or uncorrected estimates from SPA should be used for projections. It was also pointed out that opinions differ regarding the handling of plus-groups. The Chair noted these issues and suggested that they would be better discussed during a Framework Meeting.

It was therefore **recommended** that a Framework Meeting take place to examine the issue of bias correction, the handling of plus-groups and the lack of convergence of SPA.

2. There was discussion on the way maturity data are treated and the modelling details. It was highlighted that the problem is that one is trying to fit a shape when the data are only available for half of that shape. The only way of knowing for sure is 'after the fact'. It was suggested that this could be examined in more detail, but that rapid changes could also be real. It was also agreed to use the information as presented for this assessment.

It was **recommended** to carry out further examination of the maturity data and model, and to carry out comparative analyses for the next assessment.