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Proceedings of the Maritime Provinces Regional Advisory Process on Assessment of 4VWX Herring

8-9 May 2007
St. Andrews, New Brunswick

Robert O'Boyle
Meeting Chair

Bedford Institute of Oceanography
1 Challenger Drive, P.O. Box 1006
Dartmouth, Nova Scotia
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July 2007

Compte rendu de la réunion d'évaluation du hareng de 4VWX tenue dans le cadre du Processus consultatif régional des provinces Maritimes

Les 8 et 9 mai 2007
St. Andrews (Nouveau-Brunswick)

Robert O'Boyle
Président de réunion

Institut océanographique de Bedford
1, promenade Challenger, C.P. 1006
Dartmouth (Nouvelle-Écosse)
B2Y 4A2

juillet 2007

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 timeframe 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 was held in St. Andrews, New Brunswick, on 8-9 May 2007, to review analyses pertinent to the scientific advice on fisheries management of the 4VWX herring resource in the 2006/07 season. These proceedings document the presentations, record discussion and recommendations, and include written reports from the scientific referees, the Agenda, and the participants.

SOMMAIRE

Une réunion a eu lieu à St. Andrews (Nouveau-Brunswick) les 8 et 9 mai 2007 pour examiner les analyses devant servir à formuler un avis scientifique sur la gestion de la pêche du hareng de 4VWX pour la saison 2006-2007. Le présent compte rendu relate les exposés, les discussions et les recommandations auxquels cette réunion a donné lieu et il inclut les rapports écrits des arbitres scientifiques, l'ordre du jour et la liste des participants.

INTRODUCTION

The Chair, Robert O'Boyle, opened proceedings by welcoming the participants (Appendix 3) and in particular, the reviewers, Dr. Kent Smedbol, Claude LeBlanc, and Mr. Heath Stone. The Terms of Reference (Appendix 1) were then presented and briefly discussed. Particular note was made of the requirement to review analyses of the impact of ageing errors on the assessment of the southwest Nova Scotia / Bay of Fundy (SWNS/BoF) spawning component. Following this, the Agenda (Appendix 2) was discussed. The Industry requested that efforts be made to conclude the meeting on Wednesday evening so as to facilitate their travel back to Nova Scotia early on Thursday morning. It was agreed that the group would work to achieve the objectives of the meeting in that time. With this modification, the Agenda was approved.

The Chair noted that copies of the working papers were available at the back of the meeting room.

These proceedings provide brief summaries of presentations, rapporteur notes, and comments from participants and external referees. The work of the authors has been reproduced with little or no editing. After thanking Paul Boudreau, the meeting rapporteur, the presentation of the working papers commenced.

SUMMARY OF PRESENTATIONS

Southwest Nova Scotia / Bay of Fundy Spawning Component

Presentation Highlights

Power, M.J., K.J. Clark, F.J. Fife, D. Knox, G.D. Melvin, and R.L. Stephenson. 2007. 2007 Evaluation of 4VWX Herring. RAP Working Paper 2007/20.

Landings in the southwest Nova Scotia / Bay of Fundy spawning component in 2006 of 49,160t were about the same as the previous year due to the reduced quota. There continues to be signs of deterioration in the state of the stock. Size distribution in the catch remained contracted, with little improvement in the proportion of older and larger fish in the fishery. The benefits of the reduced quota in 2005 and 2006 have not been in place for a sufficient time to be reflected in the biological characteristics of the population. The acoustic survey index from the spawning grounds in 2006 indicates a slight increase in spawning stock biomass (SSB) from 2005. There has also been little progress towards defined conservation objectives in recent years, and few are being met.

Power, M.J., G.D. Melvin, and L.M. Gosse. 2007. Summary of the 2006 Herring Acoustic Surveys in NAFO Divisions 4VWX. RAP Working Paper 2007/19.

Automated acoustic recording systems deployed on commercial fishing vessels have been used since 1997 to document the distribution and relative abundance of Atlantic herring in NAFO Division 4VWX, from industry vessel surveys and fishing excursions. In 2006, regularly scheduled surveys, at approximately two-week intervals, were again conducted on the main spawning components and the spawning stock biomass for each component was estimated by summing these results. Three structured surveys were conducted in Scots Bay, five on Trinity Ledge, and four on German Bank, with most following the established protocol. Except for the Trinity Ledge area, these surveys provided good coverage of the spawning areas consistent with previous years. Additional data from fishing or survey nights in Scots Bay, German Bank, Browns Bank, Seal Island, and Spectacle Buoy areas were examined. Biomass estimates for

Scots Bay, Trinity Ledge, and German Bank were approximately 27,600t, 8,500t, and 245,500t, respectively, for an estimated total SSB of 281,600t in the traditional survey areas, which is a small increase from 2005 but still a substantial decrease from previous years.

Melvin, G.D., and M.J. Power. 2007. Ageing Inconsistencies and Sensitivity Analysis for 4WX Herring. RAP Working Paper 2007/21.

Over the past couple of years, concern has been expressed about the consistency and inter-reader comparability of herring otolith ages. Following a number of otolith exchanges, there was poor performance for both the inter- and intra-reader tests. This paper provided a sensitivity analysis of the impact on the ageing divergences on the virtual population analysis (VPA) output. The observed inconsistencies began sometime between 1999 and 2000 for younger ages, and perhaps between 1994 and 1995 for ages 6 and older. To investigate the possible impact, a number of model scenarios were run to investigate the effect of different age length keys (ALK) on the catch at age matrix (CAA). Eleven scenarios were run and the outputs compared.

In summary, none of the above analytical procedures are likely to truly reflect the state of the 4WX herring stock. Evident from the analysis is that our perception of stock status using an age based assessment model is highly dependent upon correct ageing. Slight changes such as that which was observed between readers, or the use of a different ALK, can have a profound impact on the final output. Depending upon the approach taken, estimates of F and biomass from a VPA analysis could be off by a factor of 2 or 3, highlighting the need for consistency within, and between, reader ageing. It is also evident, regardless of the scenario, that the stock is at a historically low level with little signs of improvement. Fishing mortality is still well above F0.1, even with a substantial decrease in catches over the past two years; and the acoustic index of abundance shows only a slight upward trend in 2006. The biomass estimates also remain at a very low level. Unfortunately, a proper evaluation of stock status using an age based assessment model can not be undertaken until the ageing problem is resolved.

Discussion

It was pointed out by fishing industry participants that the trends in southwest Nova Scotia / Bay of Fundy (SWNS/BoF) herring landings and total allowable catch (TAC) seem to be similar to the trends that are seen in groundfish. Has there been a general lowering of the ecosystem productivity in the area? Georges Bank appears to be the only ecosystem that has recovered with a reduction of fishing effort. There were calls for an evaluation of the upper limit of harvesting for a healthy herring fishery in relation to what the ecosystem can support. In response, it was noted that the Department of Fisheries and Oceans (DFO) Science Branch has been undertaking a number of studies on recent ecosystem changes. For instance, some of these studies have indicated that the eastern Scotian Shelf ecosystem system has switched from being groundfish- to pelagic-dominated, which may be linked to a switch from a bottom-up (prey-controlled) to top-down (predator-controlled) food chain. U.S. scientists have similarly undertaken a number of studies on the processes underway in the Georges Bank ecosystem. When the herring catch was 93,000t, it was thought that the ecosystem could support this, but in recent years the science recommendation has been only 30,000t, so there is a question about what level is sustainable. In the past, good herring recruitment has been observed about every two or three years. Some of these year classes can be quite large. For instance, the 1983 year class supported the fishery for about a decade. In recent years, however, there has been no indication of a good year class. What has changed? Is it possible that there are environmental influences that are restricting recruitment? Also noted were the large scale decreases in growth rates being observed on the western North Atlantic, such as in Georges Bank haddock.

Haddock recruitment is good at the moment, but the growth rate is low and the individuals are small. These issues will need attention during the 2008 framework review.

Following this general discussion, a number of points were raised on industry observations made during the 2006 fishery. There were observations of a lot of small fish off the Long Island shore in January to May, 2006. The fish appeared to stay off of Long Island and did not make it up to Scots Bay. Some of the catch in Sandy Cove showed a full range of maturity classes. It was stated that there were a lot of fish on Northeast Bank and on German Bank in 2006 so fisherman did not have to go all the way up to Scots Bay to fish. The fish there were a bit better for use in the plants so the boats kept going back.

There was a question as to why the herring are being seen in deeper water close to bottom so that the purse seiners cannot catch them. This observation has been confirmed by the acoustic surveys. The possible reasons for this include distribution of prey, predator avoidance, environmental preferences, and so on. It is not possible with the information available to say which factor(s) is most likely the cause.

In 2006, the Margaretsville line was meant to achieve fisheries management objectives and the limited fishery above the line restricted the ability to sample in Scots Bay. One could only fish above the line with a scientific permit. Sampling was constrained by the line and this may have impacted the amount and quality of the samples in the area; the 2006 data may not be consistent with previous information.

The situation with the poor condition and lack of access to the Digby wharf has impacted fishing, and thus sampling, in Scots Bay, as this increases the distance between the fishing area and the ports. In 2006, there were very few boats operating that far up the Bay of Fundy. The Scots Bay trends are decreasing. There were lower numbers of samples in Scots Bay. Scots Bay trips were earlier in the year but the fish were small and went out through the mesh. In the last few years there have been small fish there, which has been confirmed by the acoustic survey in Scots Bay.

There then was discussion on the 2006 acoustic surveys with a short review of the conclusions of the acoustic survey framework review. In the 2006 Scots Bay survey, no herring were sonified on the survey transects. However, one school was observed just to the east of a transect. The fact that herring were there was highlighted by an industry catch off Halls Harbour after the completion of the survey.

The 2006 fishery was targeted more on filet and roe, and less on bait. For economic reasons, the larger fish were targeted in areas close to Yarmouth to keep fuel costs down. There was no need to search for fish in contrast to previous years when the industry had to search far and wide. During June and July, herring catches were good.

It was noted that the 2006 German Bank survey was considered very well executed.

A number of issues were raised about the acoustic survey itself, which were also discussed during the framework review. It was mentioned that editing of the acoustic data has been carried out consistently throughout the time series. The editing and analysis is double checked for any portions of the survey that are judged to be exceptional. The framework meeting suggested that a reference set of data be established for use in ensuring consistency in editing and analysis over time. It was pointed out that the editing of the acoustic information has improved now that there is access to the raw data.

There is still a question about the ability of the acoustic gear to estimate fish biomass in the first metre and a half from bottom. This is an important problem, as herring are being seen to be concentrated closer to bottom in recent years. This might be a downwards biasing of the acoustic results if fish are being missed by the acoustic sampling. There were a number of recommendations from the framework assessment on how to estimate the number of fish in the dead zone, but it has not been possible to carry out the analysis in time for this meeting.

In the past, herring appeared to be more widely distributed. Now they are more concentrated. There was a question about any evidence that the fish in the schools were less dense than in previous surveys. There have been no studies carried out by DFO on the density of fish within schools.

The discussion on the impact of the ageing discrepancies then followed. It was noted that the confidence intervals around the annual age estimates appeared to decrease over time. What are the possible reasons for this? This may result from better quality control in recent years, as well as the removal of outliers. If recorded length for the sampled fish had an impact on the estimate of age, this would also result in lower confidence intervals. Whatever the cause, there is more concern for the age 3 plus individuals.

The VPA results of the ageing scenarios presented in the working paper are more or less the same in terms of the present status of the stock. The different scenarios provide different estimates of spawning stock biomass (SSB), but all analyses suggest that the stock is currently at a low level. One major difference from the analyses presented in the 2006 Expert Opinion (DFO 2006) was the continuance of high rates of exploitation on the age 5–8 herring since about 2000 under all growth scenarios examined. Interpretation of the biomass trends is complicated in that no adjustment to the historical weights at age had been possible in the time available.

In the discussion on the overall status of the stock, a question was asked about the percentage of small fish caught in recent years by the industry. It was pointed out that although the percentage of fish greater than 30 cm has not changed appreciably in recent years, there is evidence that the abundance of fish less than 30 cm may be increasing, which is a positive sign for the future.

The most notable trend in the 2006 data was the decrease in the acoustic estimates of Scots Bay biomass. The SSB is now the second lowest in the time series. Industry felt that there were a number of possible reasons for this. There are fewer vessels now involved in the survey so that the spacing between survey transects has increased up to 4 to 5 kms. Overall sampling intensity has been reduced. No big schools of herring were observed in Scots Bay, which raises the question about whether the survey in 2006 is comparable to those in previous years. The industry feels that there are more fish in Scots Bay than what has been observed in the last two years.

The table of objectives versus observations for 2006 was reviewed, and a number of suggestions for changes made. These are reflected in Science Advisory Report (SAR) noted below. In addition, it was mentioned by industry participants that there is a large population of grey seals presently living on Seal Island, which may be influencing the behavior of the herring and the success of recruitment. Most seals in this area in the summer would come from Sable Island breeding population, but there is anecdotal evidence of an expansion of rookeries into this area during the winter. In the Gulf of Maine, the harbour seal population is also increasing.

It was further mentioned that in 2006, both purse seiners and weir operators observed lots of small age 1 herring. There is mostly anecdotal information of an increase in the abundance and distribution of small herring in areas where they have not been seen since 1970, including areas near Pubnico and other areas along the shore. The only hard evidence for this is from the New Brunswick weir fishery.

Offshore Scotian Shelf Spawning Component and Coastal Nova Scotia Spawning Component

Presentation Highlights

Power, M.J., K.J. Clark, F.J. Fife, D. Knox, G.D. Melvin, and R.L. Stephenson. 2007. 2007 Evaluation of 4VWX Herring. RAP Working Paper 2007/20.

Landings of 9,800t from the offshore Scotian Shelf banks by purse seine, midwater and bottom trawl increased in 2006. The bottom trawl research survey catches, while reduced in 2005 and 2006, remain high and herring were widely distributed on banks west of Sable Island.

There was an increase in surveyed acoustic biomass in the Halifax / Eastern Shore areas while the Little Hope area saw a large decline. A survey with an acoustic recorder was completed for the first time in the Glace Bay area in 2005 but there was no survey effort in 2006. Recorded landings were stable for the Little Hope and Halifax areas but there were decreases in the other main areas. The Bras d'Or Lakes fishery was again closed and there was no sampling from this area.

Power, M.J., G.D. Melvin, and L.M. Gosse. 2007. Summary of the 2006 Herring Acoustic Surveys in NAFO Divisions 4VWX. RAP Working Paper 2007/19.

Biomass estimates from surveys of the coastal Nova Scotia spawning components for the Little Hope / Port Mouton and Eastern Shore areas were also examined. There was a relatively large decrease in the Little Hope area while the Eastern Shore area saw a substantial increase from the previous year. A survey with an acoustic recorder had been completed for the first time in 2005 for the Glace Bay area but was not repeated in 2006. There was again no acoustic survey effort in the Bras d'Or Lakes. There were some large aggregations of herring observed and reported but no acoustic surveys were completed for the offshore Scotian Shelf.

Discussion

Some spawning herring were observed on the Scotian Shelf south of Sable Island in the groundfish research vessel (RV) survey in 2006. The 10 fish sampled were found to include a few spring and fall spawners. There were many recovering fish on the offshore bank in the July RV survey that might be indicative of spring spawning on the offshore banks. Researchers at Dalhousie University believe that they are spawning on Emerald Bank but no further information was presented at this meeting on this.

A question was asked about DFO efforts to distinguish between the fish from the Bay of Fundy and the offshore banks. Is it possible that fish might be moving from German Bank to the offshore banks in a matter of days? There are presently few observations of the populations on the offshore banks and there are no efforts underway to establish affinities among the populations. However, this was discussed during the first framework meeting and it was agreed that the current stock component structure was appropriate.

Changes in the RV catches over time do not appear to be well correlated with abundance. There was a suggestion that herring predators, or the lack thereof, on the banks may be causing herring to stay on the bottom and be more catchable in the bottom trawl. Herring is now the highest catch in the RV survey. It may also be a response to environmental factors. This is consistent with purse seine observations made in the Bay of Fundy. Consequently, the catch of herring in the bottom trawl survey should not be used as an index of abundance for tuning the assessment.

The RV survey also catches small herring inshore but not in the offshore areas. This is believed to be a valid reflection of the distribution of the small herring which stay inshore. There was also a question about the highly variable catch of small juveniles. This may be a result of the bottom trawl encountering mid water schools of small herring as it is being set. This situation would have a low probability of occurrence, but if a school was encountered it is reasonable to expect that the catch would be high.

The guideline to fisheries management in the coastal N.S. spawning component is to take 10% of the acoustic survey estimate of SSB averaged over five years as an annual harvest. The fleet observed good catch rates and the survey was good in 2006 as well. Thus, there was no sentiment that the guideline needed to be changed. There is, however, an issue with target strength and the use of acoustic surveys as absolute estimates of biomass.

Southwest New Brunswick Migrant Juvenile Fishery Component

Presentation Highlights

Power, M.J., K.J. Clark, F.J. Fife, D. Knox, G.D. Melvin, and R.L. Stephenson. 2007. 2007 Evaluation of 4VWX Herring. RAP Working Paper 2007/20.

The landings in the traditional New Brunswick weir and shutoff fishery for juvenile herring remained low at 12,900t and there is a trend of decreasing landings over the past ten years. There was a large proportion of small recruiting herring in the weir catches during the 2006 season.

Mike Power then presented the information on the N.B. coastal weir and shutoff fishery.

Discussion

There was a question about why there has been a decline in this fishery in recent years. Industry did not feel that this was due to declines in recent market. This year, the fish were late coming and did not arrive until July. The fish were small and stayed small throughout the area, including Grand Manan, and throughout the year. The small fish were too small to be used in the production of sardines and so they were used for bait. This provides further support of the anecdotal observations that there were a large number of small fish in the area in 2006.

According to industry, there does not appear to be any long-term trend in abundance. The herring weir industry's long-term average catch is 20,000t and in 2006, 14,000t was caught (including the N.S. catch). This is in spite of the fact that there are only 80 operating weirs now, compared to about 200 weirs that operated in the past. It is believed that if the fish caught were larger, then there would have been a better market and more catch would have been taken. In regards to effort, it was also pointed out that fishing practices have changed in recent years because of the lack of ability to move due to aquaculture sites, fewer shutoff areas, and so on.

There was discussion on whether the change in the percentage of small fish from 2005 to 2006 would provide any indication of recruitment. It was noted that this has not been the case in the past. In addition, weir catches are a mixture of fish from different spawning components. Thus, large weir catches do not necessarily translate to large stock catches later on.

DISCUSSION ON DRAFT SCIENCE ADVISORY REPORT

The draft Science Advisory Report (SAR) was reviewed in detail, and represents the consensus of the meeting on stock status and advice for 2006/07. The following additional points were made at the meeting:

- While there is a lack of older fish in the catch in 2006, the increase in the proportion of 23-30 cm size fish was considered a positive sign for the future.
- Acoustic estimates for Scots Bay and German Banks can be added, but those for Trinity cannot. In 2001, Spectacle Buoy was included even though it was outside of the survey area. This appeared to be contrary to the recommendations of the framework meeting. The addition in 2006 is negligible, but there is a question of whether Browns is the only non-traditional area. When there are schools in Scots Bay outside of the survey box, they should be included.
- It was recognized that there are inconsistencies between the biomass estimated from the virtual population analysis (VPA) and the acoustic survey. It was agreed that neither can necessarily be considered absolute estimates of abundance, as there are uncertainties in both.
- It was agreed that in recent years there has been a contraction in size distribution with a higher proportion of the catch being made up of smaller fish.

Regarding sources of uncertainty, the following was agreed to:

- It was agreed that herring are being seen closer to bottom and this would result in relatively lower acoustic abundance estimates in recent years.
- There are uncertainties related to residency time on the spawning grounds that may affect the acoustic survey estimates.
- There is uncertainty in using an age length key from one year to other years in the population analysis.

Overall, stock status is similar to that determined last year – no improvement but also no further decline. In relation to the alternatives of decreasing, maintaining the status quo, or increasing the total allowable catch (TAC), faster rebuilding can be expected, along with a reasonable expectation for the continuing improvement in size distribution if the TAC is kept low. There is a high risk of no rebuilding if the TAC is increased. Although there are a few small positive signs in the assessment this year, there remain questions about whether the small sized fish observed this year will make it through into the fishery and support future increases in the population. The 50,000 TAC for 2005 was a compromise that was higher than what was thought to be appropriate to allow the stock to rebuild. If the TAC had been lower, it is reasonable to expect that the SSB would have increased by more than what has been observed in this 2006 assessment.

CONCLUDING REMARKS

The Chair reviewed the process to be followed for the remainder of the assessment review. The Science Advisory Report (SAR) will be revised by the authors and sent to the editorial board for finalization. Once finalized, it will be posted on the Canadian Science Advisory Secretariat (CSAS) website. The proceedings will be circulated to all participants for comment.

Dr. Rob Stephenson thanked the team for putting the work together. He thanked the Chair and all of the participants who contributed to the success of the meeting. He congratulated all on the positive tone of the meeting.

The Chair then thanked all the participants and closed the meeting.

REFERENCES

DFO, 2006. Science Expert Opinion on the Impact of Age Reading Inconsistencies on the 2006 TAC Advice for Southwest Nova Scotia / Bay of Fundy (SWNS/BoF) Herring. DFO Maritimes Region Expert Opinion 2006/06.

Fife, F.J. 2007. Water Temperature Summary from Station Prince 5 and Lurcher Shoal. RAP Working Paper 2007/22.

Melvin, G.D., and M.J. Power. 2007. Ageing Inconsistencies and Sensitivity Analysis for 4WX Herring. RAP Working Paper 2007/21.

Power, M.J., G.D. Melvin, and L.M. Gosse. 2007. Summary of the 2006 Herring Acoustic Surveys in NAFO Divisions 4VWX. RAP Working Paper 2007/19.

Power, M.J., K.J. Clark, F.J. Fife, D. Knox, G.D. Melvin, and R.L. Stephenson. 2007. 2007 Evaluation of 4VWX Herring. RAP Working Paper 2007/20.

APPENDICES

Appendix 1. Terms of Reference

Maritime Provinces Regional Advisory Process on Assessment of 4VWX Herring

8–9 May 2007

Hachey Conference Centre
St. Andrews, N.B.

TERMS OF REFERENCE

Context

Every winter, DFO Maritimes, Fisheries and Aquaculture Management (FAM) Branch requests Science Branch to undertake an assessment of the 4VWX herring management unit in support of the upcoming fishery. In 2006, the review was split into two parts: 1) data inputs and 2) scientific peer review and interpretation of the information for drafting of the Science Advisory Report (SAR). This year, because herring assessment framework meetings were held to review data inputs (31 October – 1 November 2006) and abundance indices (9–11 January 2007), only one meeting (8–9 May 2007) on the scientific peer review and SAR drafting will be conducted. The goal of the meeting is to develop stock status conclusions and advice, and complete the Science Advisory Report.

The last meeting of the herring assessment framework on model formulations was to be conducted during 27 February – 2 March 2007 but has been postponed until winter 2008/09 to allow time to address ageing issues uncovered in 2006. This necessitates the in-depth examination of the implications of these ageing errors on the science advice for 2006/07.

Objectives

Review and evaluate biological and fishery information on 4VWX herring stock status for establishing the final quota for 2006/2007 fisheries, as required in the Integrated Fisheries Management Plan, including:

- An evaluation of the southwest Nova Scotia / Bay of Fundy spawning component, including an evaluation of the implications of the ageing errors uncovered in 2006 on the current VPA-based assessment formulation.
- A compilation and review of information regarding the offshore Scotian Shelf spawning component and the coastal Nova Scotia spawning component.
- Update on southwest New Brunswick migrant juvenile fishery component.

Outputs

- CSAS Science Advisory Report
- CSAS Proceedings on the discussion
- CSAS Research Documents summarizing the working papers

Participation

- DFO Maritimes Science
- DFO Gulf Science
- DFO Maritimes FAM
- Herring fishing industry

Appendix 2. Agenda

Maritime Provinces Regional Advisory Process on Assessment of 4VWX Herring

8–10 May 2007*

Hachey Conference Centre
St. Andrews, N.B.

AGENDA

8 May 2007 – Tuesday

0900 – 0915 Welcome, Introduction, and review of Agenda

0915 – 1200 Nova Scotia / Bay of Fundy spawning component

1200 – 1300 Lunch

1300 – 1700 Nova Scotia / Bay of Fundy spawning component

9 May 2007 – Wednesday

0900 – 1200 Offshore Scotian Shelf spawning component, coastal Nova Scotia spawning component and update on southwest New Brunswick migrant juvenile fishery component

1200 – 1300 Lunch

1300 – 1700 Review of 4VWX Science Advisory Report

10 May 2007 – Thursday

0900 – 1200 Review of 4VWX Science Advisory Report (if required)

1200 Adjournment

*Meeting adjourned evening of Wednesday, 9 May 2007, as approved by participants.

Appendix 3. List of Participants

Maritime Provinces Regional Advisory Process on Assessment of 4VWX Herring

8–9 May 2007

Hachey Conference Centre
St. Andrews, N.B.

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