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Spring Meeting
9-12 April 1996
Regional Advisory Process (RAP) of the Maritimes Region
Gulf of Maine Subcommittee Assessment Review Meeting

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Abstract

The proceedings of the spring 1996 meeting of the Gulf of Maine Subcommittee are summarized here, along with the results of client consultations for certain fish stocks. The agenda for the spring meeting included both marine fish and invertebrates. The main points of discussion, questions and research recommendations are summarized. Stock Status Reports for the species considered were produced, submitted to DFO Ottawa for approval and are publicly available.

Résumé

On résume ici les délibérations ayant eu lieu à la réunion du Sous-comité du golfe du Maine au printemps de 1996, ainsi que les résultats de consultations avec les clients à propos de certains stocks de poisson. Tant les poissons de mer que les invertébrés figuraient à l'ordre du jour de la réunion du printemps. On trouvera ci-après un aperçu des principaux sujets de discussions, questions et recommandations de recherche. Des rapports sur l'état des stocks de poisson considérés ont été produits, soumis à l'approbation du MPO à Ottawa et sont disponible au public.

Introduction

This document describes questions, concerns and research recommendations resulting from the peer review of the stock assessments of several invertebrate and fish resources and some associated research papers (see Appendix One for the agenda). The Gulf of Maine Subcommittee conducted some of its peer review in two stages in the spring of 1996. The first stage (called the Input Data Review Meeting) occurred only for certain fish stocks, and was intended to cover the input data for the stock assessments, including research vessel indices, commercial fishery catch rates, the catch at age/size, and other indicators of stock status. This early part of review process was completed in Yarmouth, and the minutes and participants are included in Appendix Two. Finally, participants in the April 9-12 Assessment Review meeting are noted in Appendix Three.

The proceedings noted below are intended to highlight the discussion of the presentation, questions, and research recommendations. Those interested in the presentations are encouraged to contact the authors to obtain copies of the appropriate documents.

General Recommendations

Some general observations were made during the meeting that apply to the assessments in the coming year:

- Retrospective analyses should be conducted for all analytical assessments.
- For each assessment include a section on management issues for the current year, and if possible as evaluation of the degree to which the management measures had achieved their objective.
- Develop the biological rationale for the rebuilding of collapsed resources.

Tuesday, 9/4/96

1. Ocean Environment Overview (F. Page)

Questions

Has there been further documentation on the 1994 temperature anomaly on Lurcher since last year? No.

Further to this and a question on the temperatures off Cape Breton on the 1960's, an explanation for the cause of the cold water anomalies was provided. In the 1960's, the cold water extended along the Scotian Shelf all the way to Georges and was caused by an arm of the Labrador Current, while the 1994 cold water was more localized and was due to Gulf Stream rings.

Is there coordination between the four groups (Environmental, Plankton Trends, Community Structure, Ecosystem Dynamics). No, at present groups have concentrated in getting their own 'house in order'.

It was postulated that the outbreak of sea urchin disease on the outside coast of Nova Scotia was due to a warm water anomaly--the data shown do not support this? The speaker indicated that more specifics on area and time would be required in order to do a proper analysis. The data shown are aggregate trends.

What are the predictions for next year in the Gulf of Maine? Eastern Scotian Shelf will continue to be cold and below normal; Emerald Basin will continue to be warm; 4X deep water will probably be above to near normal; Lurcher and Bay of Fundy will be below normal; and coastal temperatures will be variable.

Are fish larvae identified to species? No. Could they be? Not likely. Questions were raised about the value of an aggregate fish index and if there is a better way to present the data.

Action Items--to be completed during meeting--None

Action Items--research recommendations

Concerns expressed last year about the general usefulness of the fish larvae and CPR data were reiterated. What is the general usefulness of the data in terms of linking it to fish abundance given the low numbers of fish larvae in the samples? Can these data be provided in a non-aggregated form (by season, and by species for fish larvae)? Action: Plankton trends Working Group

2. Community Analyses (R. O'Boyle)

Questions

There was considerable discussion on the use of aggregated trends across species. For some species there have been serious analyses and meaningful abundance trends validated. However for some species surveys cannot be related to biomass or population estimates.

Concerns were also expressed on vessel conversion factors, and this also relates to validation of the trends.

Is this a long-term trend or a natural cycle? Are there data from the 40's and 50's?

Comments were made on the skate trends and these trends should be considered in the fall RAP.

Action Items--to be completed during meeting--None.

Action Items--research recommendations

Concerns were expressed about using aggregated data across species. Given the different catchabilities between gadoids and non-gadoids, it should be made clear in the SSR that this represents the proportion in the trawl not in the ocean. There needs to be a mechanism to review this problem and an attempt to validate the results for species-specific trends. Action: Steering Committee or some higher power?

It was recommended that the time series be presented as 3-5 year running means, so that long-term trends can be separated from annual variation. Action: Community Structure Working Group.

Length frequency analyses should be conducted (e.g., legal vs. undersized).

Kees should give a more detailed presentation at SABS including information on changes in distribution. Action: K. Zwanenburg.

3. Browns Bank Scallops (G. Robert)

Questions from the floor

Question on the definition of landings vs. catch. This point requires clarification in the document.

Much discussion on the interpretation of catch rates. Meeting concluded that the catch rate information have little value as an index of abundance prior to 1994 because of area and seasonal effects. However, observation that catch rates declined from 1994 to 1995 appear supported.

Considerable discussion on the utility of the survey indices. It was noted on several occasions that year classes do not track well in the age disaggregated indices. Questions were raised concerning the reliability of the age determinations, which were based on a "slicing" approach. Age information is available for 1995. It was also noted that the area of the survey index increased every year, and is therefore not useful as an index of abundance.

Considerable discussion of the fishery area expansion and the possibility that there are no further areas on the bank which can support high catch rates.

Action Items--to be completed during meeting

Comparison of catch rates in 1994 and 1995 including; figure of the commercial catch rates by month; and for both commercial data and survey data, catch at length divided by effort for 1994 and 1995 to see if modes can be tracked.

The figure which shows catch rates in the fishery is to be moved from Resource Status to the Description of the Fishery, so that the catch rate is not taken as an indication of abundance over the time series.

A number of recommendations were made to improve the SSR wording and the inferences that can be drawn from the data. Comments pertaining to meat counts to be removed from Resource Status Section. The revised analyses for 1994 and 1995 are required before making more comments.

Action Items--research recommendations

Catch rate series to be explored further to document possible spatial and seasonal effects on the catch rate series.

The research survey design should be reviewed with emphasis on having a survey independent of the fishery and one that covers the entire stock area in each year. The density of sampling can be prorated according to the commercial catch rates and still follow a stratified random design.

4. Georges Bank Scallops (G. Robert)

Questions

Ginette was asked to contrast catch rates in the Georges Bank fishery to the Browns Bank fishery. She noted that the catch rates from the Georges Bank fishery should be viewed as more reliable.

The VPA was challenged in several areas. One, the assumption of a dome-shaped PR was not accepted. Two, there appeared to be questions concerning age determinations for this stock, as was the case for Browns Bank. Three, a large non-zero intercept was noted for the tuning plots. Ginette's observation that an age-disaggregated VPA did not work well was also viewed as an indication of possible problems with the age-structured information.

There was discussion on the merits of conducting further VPA analyses at the meeting. In lieu of using the quarterly-based model, analyses were conducted using the catch and survey catch rate data aggregated annually.

Action Items--to be completed during meeting

Stock Status Report to be written to include the major caveats on the VPA.

Further VPA analyses (see above)

Result: The VPA sensitivity runs were conducted as requested and it was concluded that the original Robert & Butler VPA can be used to formulate the advice (see Res. Doc. appendix).

Action Items--research recommendations

Explore the use of a truncated range of ages in the VPA (include ages 3 to 7)

Investigate whether there is convincing evidence for the domed PR.

The absence of larger scallops in the survey was possibly attributed to the lighter gear used compared with industry and this warrants further investigation.

The possibility of using direct aging in the survey should be explored.

5. Bay of Fundy Whelks (E. Kenchington)

Questions from referees (Two Internal Reviews Provided for This Document (Don Clark and Peter Lawton - Both to provide comments to Ellen)

The questions from the floor largely dwelled on the list of biological information which Ellen identified as being required in the fishery. Many noted that the list seemed somewhat ambitious, given the unknown value of the resource. It was suggested that to obtain useful distribution information, a condition of license be that fishers be asked to complete a survey designed by biologists to optimize information on distribution, rather than fishers keying in on areas with highest catch rates. It was further suggested we need an operational model for what is expected from developing fisheries. Could manage in an adaptive fashion, leaving some coastal populations as control sites, while studying population responses to exploitation at other sites.

Discussion halted due to time constraints.

Action Items--to be completed during meeting

Stock status report to reflect concerns of referees, and to note potential for lobster bycatch under Management Concerns. This was done and incorporated into the text.

Action Items--research recommendations -none

Wednesday, 10/4/96

6. 5Z Herring (G. Melvin)

Questions

There were concerns raised as to the exact definition of the Georges Bank management unit. It was agreed that the old ICNAF definition, which included all 5Z and 6, would be used.

Are the biomass estimates comparable pre- and post-crash? See action item below.

There was considerable discussion about what areas were included in the indices and in the USA VPA (see action item below). The concern is that not only should the comparisons use data from comparable areas, but also data from all of Georges Banks should be used.

The value of the USA VPA was questioned, given the problems with under-reporting and that Strata 19 and 20 were not included in the survey. It cannot necessarily be considered a minimum estimate, because it is not known if there was consistent under-reporting.

There were several points of clarification about the distribution figures.

There was considerable discussion about the length frequency plots and the comparison between the USA and Canada (see action items below). The survey design differs considerably and there may be differences in aging methodologies.

Problems with the USA bottom trawl survey, generally, were discussed including the inability to follow cohorts through the years and that pre- and post-crash years cannot be compared.

There was discussion about the difference in the USA and Canadian larval indices. Concern was expressed about the sensitivity of the result to the timing of the survey. It is easy to miss the peak period. Because the USA index is a composite and because it covers a broader area, it is a more representative index. There were then considerable discussions as to what conclusions could be reached regarding SSB and the consensus is reflected in the SSR.

Action Items--to be completed during the meeting

Provide actual biomass calculation for USA bottom trawl survey--calculate from STRAP. Are the biomass estimates comparable for pre- and post-crash?

Include a map to show survey strata used in USA and Canada, and document the actual sources of data used in the Res Doc.

Produce an index from the USA bottom trawl survey data using data from all strata (including 19 and 20) to compare pre- and post-crash. The concern is that we need an appropriate comparison that includes data for the whole of Georges Bank.

In the prognosis section, rephrase to include qualifiers about the timing of the survey.

Clarify the areas used in the old VPA's: Strata 19 and 20 were excluded from the survey indices used in the VPA, and Area 6 catches were included. **Result:** The index was recalculated from the USA survey data and included data from the whole of Georges Bank. When compared to the index used to tune the USA VPA (missing Strata 19, 20), the conclusion remained the same.

Action Items--research recommendations

Investigate the cause for the differences in the age frequencies in the Canadian and USA surveys. Is it because they sample different areas or is there a problem with agreement between readers/aging. Use comparable areas for length frequency comparisons.

Produce length frequencies for historical survey series.

Use historic Russian information to investigate timing of spawning. (with D. Iles)

7. 4WX Herring (R. Stephenson)

Questions
The signals from the fishery were reviewed, including the shift to younger fish in the fishery and the lack of fish greater than age 5.

There was considerable discussion of the larval index and the bumpy pattern over time.

The details of the ADAPT (tuned VPA) and scenario S (untuned) runs were reviewed. The ADAPT run was felt not to provide a useful result and various alternate analyses were proposed (see below). Scenario S is one alternate approach, but may be optimistic as the large fish show up in the result.

RAP doc 4WX Herring # 2 was tabled and a small working group set up to fully review the herring stock structure in relation to assessment and management (M. Sinclair, R. Claytor, D. Stevenson, R. Stephenson).

Action Items--to be completed during the meeting.

Alternate VPA runs requested with the following changes: use the F95 = average F's for 90-93 and reduce by 25%, 50%, and by the change in effort based on purse seine log records (# trips), modify the PR to increase for age 3 and/or calculate PR from 90-93 F's.

Result: Additional analyses were conducted:
-The increased number of trips in 1995 was documented and confirms that the restrictions in 1995 resulted in less effort.
-The mean age in the catch is at about what you would expect if fishing at $F_{0.1}$.
-CPUE at age for purse seine fleet are not considered reliable.
-Alternate VPA runs were conducted as requested showing SSB trends at various scenarios. For illustration, it was decided that the projections be run using a terminal F of 0.3.

Show a range of VPA options and run projections using a terminal F of 0.3. This was done and the SSR was completed.

Action Items--research recommendations

Recalculate F0.1 for a greater age range (currently use ages 1-10, suggestion is 1-13).

Request for age distribution of fish by spawning areas.

Investigate the proportion of age 3 that would not mature in the current year as a possible indication of recruitment next year.

Considerable discussion on the larval index, including a request for a better explanation of the bumpy pattern over time.

Look at condition factors over time.

Re-examine the purse seine log book effort data.

Small working group to meet to review herring stock structure in relation to assessment and management of 4WX herring.

Thursday, 11/4/96

8. Effort Trends Overview (S. Gavaris)

Questions

Why are the number of trips was used as the measure of effort rather than the number of days? The number of trips is more likely to be recorded in the statistical system.

Action Items--to be completed during the meeting. None

It was noted that the $F_{0.1}$ strategy adopted by Canada in 1977 should have generated a constant level of 'effective' fishing effort. The analyses presented indicate that quota management between 1977 and about 1992 allowed substantial increases in annual fishing effort. Recent measures (1993-1995) have resulted in large reductions in effort. This point should be made in the overview of the final report.

Action Items--research recommendations. None.

9. 5Z Yellowtail (S. Gavaris)

Questions

There were questions about the reliability of the stock structure definition used. It is considered reliable and this should be expanded upon in the Res Doc.

Clarification was requested on the unspecified flounder in the early years, and also the documentation and estimation of discards.

Clarification was requested on the differences in the USA and Canadian survey gear. Jean-Guy feels there are more fish on the Canadian side, in addition to any differences in survey gear.

Commercial catch rates were discussed, and it was noted that during the discussions in Yarmouth that catch rates are worth considering as a longer time series becomes available.

There were discussions about the age of maturity (two) and spawning seasons (March/April).

The reason for the lack of older ages in the catch was discussed--is it behavioral or gear selectivity, or a lack of older fish. Other species, once mature, usually have the same spatial distribution.

The residual patterns were discussed and concern was expressed about the USA research vessel conversion factors (see below).

Clarification of the 1995 and 1996 survey analyses was provided.

Given the poor precision of the ADAPT run, it was indicated that these results are only used as a rough guide. These caveats are clear in the SSR and Res. Doc.

Action Items--to be completed during the meeting.

The reliability of the definition of stock structure should be expanded upon in the Res. Doc.

Document unspecified yellowtail in the early years.

Show discards on table in Res Doc. Clearly state that discards have been accounted for USA but not for Canada.

Action Items--research recommendations

Calculate the mean size at capture over time. The observation was made that there has been tremendous exploitation and this may have resulted in stress to the population.

Investigate sources of maturity information and document (samples from the fishery, ictheoplankton survey information, etc.).

Investigate the impact of not doing a sex-specific analysis. Sample by sex and consider calculating sex-specific indices in the future.

Investigate the data from the USA survey vessel/gear conversion studies.

Over its brief history, the Canadian Georges Bank yellowtail fishery distribution has changed considerably from year to year. The same situation was seen in the Browns Bank scallop fishery. It is recommended that models and techniques be developed for both commercial and survey data to take into account geographic distributions. The resultant indices should be assessed as tuning indices.
Given the poor CV's in the ADAPT runs, it was recommended that a risk analysis be conducted.

Investigate use of USA scallop survey for use as a recruitment index.

10. 5Z Cod (J. Hunt)

Questions

Clarifications of the stock and assessment boundaries were made.

Fishermen noted that there have been pronounced catches of large fish in deep water. Comparisons of length distribution in the hook and line survey vs. the fishery showed no unusual trends.

In order to evaluate the reliability of reported landings, the size distributions and species compositions should be compared between observed and unobserved trips. The size compositions were compared last year and there was no obvious evidence of discarding of smaller fish. Resource Management may have conducted in-season monitoring of species composition in 1995 (see below). It was also noted that until 1994, the quotas were not very restrictive and in recent years monitoring has been fairly strict.

There was considerable discussion about the similarities and differences in the 3 RV indices. A number of recommendations were generated regarding the variability associated with each index, and the conversion factors used in the USA surveys. Fishermen noted that its hard to catch cod on Georges in the fall and this may be part of the reason for the lower USA fall survey values.

It was noted that the results of the 1996 assessment was less pessimistic that last year's. The trends were similar, but the absolute estimates differ considerably. This should be carefully explained in the SSR.

Action Items--to be completed during the meeting.

Request from Resource Management any in-season monitoring of the species composition comparisons between observed and unobserved trips.

Document the use of evasive fishing strategies used in 1995 and include in SSR.

Document effects of current regulations, including monitoring coverage in the description of fisheries.

Calculate the mean square residuals for each index to evaluate the influence of the 3 survey indices.

In the SSR indicate why the 1995 assessment was more pessimistic than the 1996 assessment. Note the overall trend is not different (and the present level is close to the lowest on record), but the magnitude of the estimate is.

Remove 'longterm' from 'longterm average' in Fig. 3.

In Figure 16, show the 3+ biomass, instead of the total and indicate on the axes the 1996 3+ biomass and F_{1995}.

If possible, to provide a view of long-term trends in abundance, calculate the 1963-present abundance and biomass indices for the USA fall survey time series. This should be included in the Res. Doc. and SSR.

Action Items--research recommendations

Compare species and size composition among dock side monitoring program (DMP) trips, observer trips, and test fishery trips.

In 1997 Res. Doc., include CV's on the 3 indices.

Investigate weighting procedures of indices in Canadian stocks generally. Action SSSC.

Investigate the conversion factors used in the USA survey indices.

Calibration suggests large differences in catches between surveys that could be due to differences in gear and/or vessels, the availability of fish in the survey area, and the depth distribution. Additional research to investigate these differences is warranted.

Look at tag returns by month.

Update retrospective analyses each year to help evaluate changes in the estimates from year to year.

11. 5Z Haddock (S. Gavaris)

Questions

It was clarified that 3+ biomass is shown, not SSB.

There was discussion about the relative error on the catchability and clarifications were made. The values in the table are ln's and not transformed. The relative error on the catchability was about 0.3 for the Canadian and 0.2 for the USA series. The USA series may have smaller CV's because it is a longer time series (see below).

There was discussion on the new partial recruitment and the use of the revised $F_{0.1}$. It was agreed that it is appropriate to use the revised selectivity pattern.

The merits of using $F_{0.1}$ were discussed. The Industry indicated they would not want to see anything less strict, given the good results seen from management measures in recent years.

Action Items--to be completed during the meeting.

To indicate the potential of the resource, show the 5Zj&m survey series from 1963 onwards in the SSR.

Action Items--research recommendations

Investigate the influence of the length of the time series on the CV's (try an assessment with the same length series).

In future Res. Docs., show the retrospective analyses in the traditional spaghetti plot.

Calculate long-term yield from the 1930's to the 1960's from 5Zjm and include in the SSR (background).

Investigate the use of Canadian ogives in the estimation of SSB.

Develop the biological rationale for the rebuilding of this and other collapsed resources.

Friday, 12/4/96

12. Digby Scallops (E. Kenchington)

Questions

There was a number of clarifications on the catch rates. There are clear distinctions between the inshore and offshore.

The sampling goal for 1996 was described.

There was extensive discussion on the utility of the of the VPA as presented. Clarification was provided on the sessile nature of scallops (2+), as well as the causes of natural mortality and patterns of recruitment. It was concluded that because of the sessile nature of the animals, a VPA on an scale smaller than the genetic area would be appropriate and meet the assumption of being a self-contained unit. The utility of the age-slicing technique was questioned and should be further explored.

It was proposed that the survey data alone be used as a measure of abundance and to estimate total mortality. Preliminary mortality calculations do not seem to be compatible with those of the VPA.

Action Items--to be completed during the meeting.

Include clapper numbers in Table 13.

Include longer time series comparisons in the text (not just 94-95).

Show full historic record of catches and survey data. Each document should be self-contained.

Use the survey data in an age aggregated form to estimate total mortality.

The above items were completed outside the meeting.

Action Items--research recommendations.

Examine catch rates for a standard number of vessels.

Continued development of the VPA, in particular investigate the utility of the current approach for age slicing.

13. Bluefin tuna catch rates (H. Stone).

Questions.

Stock structure was clarified.

Will the vessel density effect be standardized for? It is a more complex analysis and the plan is to standardize for certain obvious effects first, then consider such factors as vessel density, tides, etc. if sufficient variability is not explained.

It was suggested that the problem of zero catch trips might be overcome by selecting a certain time window. In addition, the interviews with selected fishermen will ensure that all trips are included.

Action Items--to be completed soon.

Include the percentage of the catch represented by the log records in Table 1.

Action Items--research recommendations.

Now that many of the technical problems associated with developing an index (or indices) have been overcome, there is a need to re-examine if a reasonable index (one that actually reflects the abundance of bluefin tuna in the West Atlantic stock) can be developed. Tuna have a very patchy distribution and although tuna return to certain distinct areas each year, these areas may change after a decade or so. This should be discussed during the ICCAT Bluefin Methods Meeting next week.

14. Pollock Age Determination (J.Neilson).

Questions.

There were very favorable comments about conducting such studies.

Discussion centered on internal reader consistency and validation of the actual ages. What can be done to validate the otolith aging? It was noted that the small otolith work has partly dealt with this, but there are no plans to validate beyond. Tagging data should be examined.

There was agreement that readers are ready to start production aging.

Action Items--to be completed during the meeting. None.

Action Items--research recommendations.

Examine the extent of internal consistency among readers. Is there consistency between the two new readers?

Investigate tagging data as a way to validate this aging technique.

Compare Canadian and USA pollock aging standards.

15. Adjournment. The meeting adjourned at 1600 h.

APPENDIX ONE

Meeting Agenda

	Tuesday	Wednesday	Thursday	Friday
0800-0830	Welcome & Introduction	Rapporteurs Summary	Rapporteurs Summary	Rapporteurs Summary
0830-0900	Ocean Environment Overview	5Z Herring	5Z Yellowtail	Briar/Lurcher Scallops[1]
0900-0930	Effort Trends Overview	5Z Herring	5Z Yellowtail	Briar/Lurcher (SSR)
0930-1000	Community Analyses	5Z Herring (SSR)	5Z Yellowtail	Digby Scallops
1000-1030	Coffee	Coffee	Coffee	Digby Scallops
1030-1100	Browns Bank Scallops	4WX Herring	5Z Yellowtail (SSR)	Coffee
1100-1130	Browns Bank Scallops	4WX Herring	5Z Cod	Digby Scallops
1130-1200	Browns Bank Scallops	4WX Herring	5Z Cod	Digby Scallops (SSR)
1200-1300	Lunch Break	Lunch Break	Lunch Break	Lunch Break
1300-1330	B B Scallops (SSR)	4WX Herring	5Z Cod	Soft Shell Clams[1]
1330-1400	5Z Scallops	4WX Herring (SSR)	5Z Cod	Soft Shell Clams (SSR)
1400-1430	5Z Scallops	German Bank Scallops[1]	5Z Cod (SSR)	Pollock Age Determine
1430-1500	5Z Scallops	German Bank (SSR)	5Z Haddock	BF Tuna Catch Rates
1500-1530	Coffee	Coffee	5Z Haddock	Coffee
1530-1600	5Z Scallops	Eastern Shelf Scallops[1]	Coffee	SSR Revisions
1600-1630	5Z Scallops (SSR)	Eastern Shelf (SSR)	5Z Haddock	SSR Revisions
1630-1700	Bay of Fundy Whelks	SFA29 Scallops[1]	5Z Haddock	SSR Revisions
1700-1730	Whelks (SSR)	SFA 29 (SSR)	5Z Haddock (SSR)	SSR Revisions
1730		Re-Runs, as required	Re-Runs, as required	SSR Revisions
1800	Dinner Break	Dinner Break	Dinner Break	Meeting Conclusion
1900-??	Informal Talk on Recent US Fisheries Management Initiatives			

[1] Deferred to a later meeting

APPENDIX TWO

Minutes of Input Data Review Meeting
March 26, 1996.
Yarmouth, N.S.

5Z HERRING: Presented by Gary Melvin

Information was presented on American bottom trawl survey, American larval survey, and Canadian larval survey, outlining changes in distribution, catch per tow and age structure of herring on George's Bank from the 1970's to present. Herring disappeared in the early '70's, began to reappear on the bank in the early 1980's, and had spread to cover the bank, including the Canadian portion, by the early 90's. Spawning now seems to occur over much of the bank, perhaps divided into two main areas in the east and west. Larval abundance is now in the same range seen before the collapse of the stock in the early 70's.

Questions
Paul Blades Where were the foreign fleets catching herring in the early 70's if there was no herring there as suggested by the American groundfish survey? Perhaps herring would have moved out of the area by the time of year the bottom trawl survey was conducted. The herring fleet fished earlier in the year. (larval abundance was still high in those years wasn't it? D.C)

Q. Dick Stewart Regarding "unusual" distribution to the south; Russian fleet in late 60's fished the southern edge of George's.

A. We do not survey down in that area, and it could be that they are also there now.

Q. Stratis We need to decide if the bottom trawl survey is a reliable indicator, and can be used to follow year classes. Is a fall survey (bottom trawl) the correct timing (why is the spring survey not used)?

A. We can look at age data to see if they can be tracked adequately. We seem to be able to follow shifting modes in lengths.

ACTION ITEM- Determine if the age-classes can be followed.

Q. How do you explain the "sudden" appearance of larvae in the 87 survey?

A. It was not really that sudden, just the scale on the figure gives that appearance.

Q2. Are there older fish there now?

A. They are there. The figure is relative abundance, but ages 5-8 are present.

Q. Stratis Is the bottom trawl survey proportional to abundance?.

A. Only partially. The catch is frequently dominated by single catches.

The fall survey is likely representative of the spawning stock, but the catch in the summer may not be. They could be a separate stock.

Q. Evan Walters. Could there be additional fish to the south of our larval survey which could be contributing to the recovery?

A. Perhaps, but it would not likely be contributing to a great extent. This is based on the distribution of 0 catches around the 1 big catch.

Q. Don Aldous. Canadian and American larval surveys do not seem entirely consistent. Why?

A. Much of it could be timing relative to when spawning occurred. With the later survey date which has been used for the last 4 years, the trend may be more reliable. Spawning seems to be occurring later than was seen in the late 70's. The later of the 4 American surveys may be more reliable than the amalgamated index, but the numbers have not been available.

ACTION ITEM- Effort will be made to obtain and examine these before the assessment.

Q. Stratis. Why no old fish in the survey? Where do they go?

A. The older fish may move out of the survey area. It does seem anomalous. You can follow ages 3-6, but not after that. It does seem that they are not present in the survey.

ACTION ITEM Identify management unit and discuss consistency of statistical unit area for landings and areas surveyed, both for adult and larval herring.

Rob Stephenson. Perhaps using absolute numbers rather than relative would show older fish are still present, but recruitment increasing annually swamps this when a relative number is given.

ACTION ITEM- Present values as actual numbers so we can see if the numbers can be traced.

Q. Stratis Is the old VPA reliable? Are the fish caught in the summer not those surveyed in the fall?

A. The catches should most likely be representative of the spawning stock, so the VPA should be meaningful. Most likely the anomalies were the survey numbers for the early 70's.

Spawning areas do seem to have returned to their historical locations.

ACTION ITEM- Catchability by age/size. Look at 5Zjm abundance in isolation.

Check to see catches were from George's Bank proper, not including Nantucket Shoals, same for larval catch.

ACTION ITEM- Compare results of analysis with the results of the recent U.S. assessment and interpret any potential discrepancies.

4WX Herring. Presented by Rob Stephenson

Q. Brian Blades. Landings from traps does not seem to reflect actual landings from all traps. "our" traps landed more than is included here, and so did those from other traps. If the landings reported in this document are viewed as a negative sign, then perhaps more effort needs to be given to insuring all landings from traps are reported.

Q. Glen D'Eon There was less effort as well as less landings in the summer of '95. Fish were too mixed in size for commercial use, this is the reason markets went unfilled.

Q. D. Aldous. "Temporary(?)" exclusion of offshore banks from 4WX catch; Is it not separate? Has this not been decided?

A. We do not know if there is spawning in that area, and what connection they have to other fish in 4WX. An exploratory fishery on Sable Island Bank would not necessarily be included in the quota fishery, however, non-spawning fish could come from quota if they look like 4WX fish.

Q. Catch in '95 reflects management. This does not necessarily reflect abundance

A. Agreed.

Q. Mike Sinclair. Was '95 more abundant in Chedabucto Bay; How do we know?

ACTION ITEM- This will be documented more thoroughly for April.

Hours searched could be useful, but perhaps not yet.

Q. Fish were abundant off Halifax, but were not fished. Catch/effort would have been higher if they were.

ACTION ITEM- Look at days on grounds for the winter fishery for as long a time span as possible.

--Brian B. prior to '82 we were fishing up into the Gulf and effort for the 4VWX area will not be available separately.

Q. WHERE DO those fish off Halifax come from? Could we tag with acoustic transmitters and follow fish to document origins of overwintering fish?

(This might be feasible on a small scale; transmitters of an appropriate size are available. However, they are not cheap, and the effort of tagging and searching is probably not justified. Furthermore, if they are not relocated then the results are inconclusive. D. Clark)

Q. Stratis The Trinity check list looks entirely positive, yet it remained closed. If abundance is the overriding concern, should we indicate that? How will the checklist be used?

A. The criteria for decision making have not been determined. On Tr. it was abundance that drove the decision.

Q. Stratis Can we describe how the "survey" values are derived since they seem to be used for setting target quotas on individual stocks? How can the survey values be used?

Q. M. Sinclair. Can we use a ranking rather than + - checklist so we can see how things rate over the long term, not just vs. last year.

Point Mike Nowinski- Missed May/June fishery because people were chasing the "phantom" capelin off Canso. Thus effort was down, and the season was restricted. People still held off because they did not want to use up quota before the roe fishery began, so they did not start till quota was settled in July.

Q. Rob S. Why no Seal Island fish? (As a spawning area)

A. (Mike N.) Seal Island was ignored during the usual Sept. time because fish had showed up on German, and they are usually bigger fish. A.2. Is this really a separate stock? should you not look at a larger area in assessing this stock?

General from industry. Small fish are on top of a school. There are lots of large fish but they are at the bottom of the schools, and you can't get them out.

Q. Are the larval indices really a reliable indicator of stock abundance? In the 70's when the index was at levels similar to '95, the landings were over 100,000t, suggesting there is still lots of fish to be caught at these levels.

Q. Ed Trippel. Can we have confidence intervals around means for the surveys?

A. They may not be meaningful.

Q. This years survey point (larval index) is greater than more than half of the years. Does this mean we are at a point where we can sustain a fishery of 120,000t as we did in past years when the index was similar or lower?

Q. Mike N. Would you plot landings on the same date line as the larval survey for comparison?

5Zjm Haddock — Presented by S. Gavaris

Q. Mike S. Is the low age 2 catch due to YC strength or fishing practice?

A. Looks like the '93 yc is decent, and the low catch of age 2 probably reflects fishing gear changes and shifts in practice.

Q. Mike S. could we also have information on # of trips and days fishing?

A. Effort was down; perhaps 1/2 or less of '94 level.

ACTION ITEM

Landings were adjusted for area misreporting in 1988. Industry noted that DFO told them to report 4X catches from 5Z, perhaps in 1986 or '88.

Q. John Neilson Why do you feel the U.S. fall is anomalously high?

A. The distribution of sets was such that most were in areas of expected high abundance on the Canadian side of jm, and no sets were done in lower abundance areas.

Q. Donald Clark. Does the US fall survey improve the resolution of the assessment, given the variability in this survey?

A. It does indicate trends in year classes on the long term. We can explore the relationship with and without this survey in the assessment. ***ACTION ITEM.***

Q. Bob O'. Weight at age increase since 1989 yc?

A. Will look at survey to see if trend shows up there. ***ACTION ITEM***

Q. Mike O'Connor Are there differences between US and Canadian surveys in indication of distribution patterns; have they shifted towards Canada in recent years?

A. There does seem to have been a shift, and the US closed area has not made any difference yet, although it is possible that it will.

5Z Cod

Presented by J. Hunt

Q. D Clark. There appears to be some bias between primary and secondary agers, and the Canadian and US ager.

A. This is not viewed as large enough to be a problem, and only the primary ager is doing production aging.

Q. Is the decrease in proportion of the catch comprised by the 1990 yc for '95 greater than expected? Is the '92 yc perhaps larger than anticipated?

A. Perhaps. This will come out when the assessment is completed.

Q. D. Clark. Is the US fall survey a reliable indicator of population trends; would the resolution be improved by omitting this survey?

ACTION ITEM- Sensitivity analysis for all 3 surveys to see if 1 is driving the assessment.

Q. M. O'Connor We saw very little fish on George's Bank in the late fall, much like the fall US survey. Why is there this discrepancy between surveys?

A. Variability may be the most important factor in the discrepancy noted. We do not weight one more heavily than the other, unless one looks completely out of line with the other 2, in which case we could omit it.

Q. M. Sinclair. The surveys do not seem to be indicating recruitment. They seem to be suspect in the case of 1 year olds.

A. It is a discrepancy. Age 1 looks poor for early 90's, then we are getting high survey for older ages in '96, which should reflect these year classes.

ACTION ITEM- The age 1 index is suspect and should be examined carefully before it is included.

5Z Yellowtail Flounder

Presented by J. Neilson

Q. Perhaps include unspecified flounder catch by month to indicate where catch comes from in months where no YT catch is indicated.

Q. How do the proportions in the "unspecified" equate to what is seen in the survey?

A. May be a moot point. Survey is not directed but the fishery is. It is probably predominantly YT. Plaice is probably a very small proportion of flats from George's.

Q Could survey catches be used by looking at sets only from the areas where the commercial fishery takes place.

A. Probably not. Industry is using specially rigged gear and may not have similar proportions to our net.

Claude d'Entremont. There was probably some discarding in '93, '94 when the mesh size was smaller. There is still some discarding now, but not as much.

Jean Guy d'E. Scallopers were landing YT, and this does not seem to be reflected in the reported landings. "35 tons were landed in Yarmouth in 1 day"; this is greater than the total landings reported here. They are surprised that this is not reported here since they should be 100% dockside monitoring. ***ACTION ITEM***.

Q. J. Neilson Observers are not seeing the small fish. Why?

A. Jean Guy. The fishery was over a very discrete time period. There were 2 short periods. The first trips had smaller fish, thus if the observer data came from the 2nd set of trips, they would see only large fish.

ACTION ITEM Check dates of observer coverage to confirm if first time period, when small fish were caught, was missed by observers.

Jean Guy The learning curve peaked by '94. In '95 there were only 2 trips made, and these were done the same as in '94. Thus, the increase in catch rate in '95 should be real.
Martin d'E.. The fishery in '94 lasted longer, so they kept moving around to stay with the fish. In '95 the fishery was so short that they did not have to. The fish moved out of the "YT Hole" and they moved to stay with them.

They cannot vouch for the abundance over the rest of the bank because they did not fish anywhere else.

Q. Look at year class in the surveys to see if Canadian and US spring show similar trends. ***ACTION ITEM***.

Is there a diel trend in catches for the survey? Derwyn thinks they catch more at night in standard gear.

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APPENDIX 3

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