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Comité d'évaluation des ressources transfrontalières

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TRAC

Transboundary Resources Assessment Committee

Proceedings 2008/01

TRANSBOUNDARY RESOURCES ASSESSMENT COMMITTEE (TRAC)

Report of Meetings held
23-26 June 2008
and
12-13 August 2008

Stephen H. Clark Conference Room
Woods Hole Laboratory
Northeast Fisheries Science Center
Woods Hole, Massachusetts, United States

Meeting Chairpersons

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http://www.mar.dfo-mpo.gc.ca/science/TRAC/trac.html

Canada

FOREWARD

The purpose of these proceedings is to archive the activities and discussions of the meeting, including research recommendations, uncertainties, and to provide a place to formally archive official minority opinions. As such, interpretations and opinions presented in this report may be factually incorrect or misleading, but are included to record as faithfully as possible what transpired at the meeting. No statements are to be taken as reflecting the consensus of the meeting unless they are clearly identified as such. Moreover, additional information and further review may result in a change of decision where tentative agreement had been reached.

AVANT-PROPOS

Le présent compte rendu fait état des activités et des discussions qui ont eu lieu à la réunion, notamment en ce qui concerne les recommandations de recherche et les incertitudes; il sert aussi à consigner en bonne et due forme les opinions minoritaires officielles. Les interprétations et opinions qui y sont présentées peuvent être incorrectes sur le plan des faits ou trompeuses, mais elles sont intégrées au document pour que celui-ci reflète le plus fidèlement possible ce qui s’est dit à la réunion. Aucune déclaration ne doit être considérée comme une expression du consensus des participants, sauf s’il est clairement indiqué qu’elle l’est effectivement. En outre, des renseignements supplémentaires et un plus ample examen peuvent avoir pour effet de modifier une décision qui avait fait l'objet d'un accord préliminaire.

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ABSTRACT

The Transboundary Resources Assessment Committee (TRAC) met during 23-26 June 2008 in Woods Hole, Massachusetts, United States, to review stock assessments of Eastern Georges Bank cod and Eastern Georges Bank haddock, and to consider a number of related scientific issues. During 12-13 August 2008, TRAC met again, via teleconference, to review the Georges Bank yellowtail flounder stock assessment. Results of both meetings will be used by the Transboundary Management Guidance Committee (TMGC) in developing management guidance for the 2009 fishing year for these transboundary resources.

RÉSUMÉ

Le Comité d'évaluation des ressources transfrontalières (CERT) s'est réuni du 23 au 26 juin 2008 à Woods Hole, dans l'État du Massachusetts, aux États-Unis, pour examiner les évaluations des stocks de morue et d'aiglefin de l'est du banc Georges et pour étudier diverses questions scientifiques connexes. Le CERT s'est réuni de nouveau, par téléconférence, du 12 au 13 août 2008 afin d'examiner l'évaluation du stock de limande à queue jaune du banc Georges. Les résultats de ces réunions serviront au Comité d'orientation de la gestion des stocks transfrontaliers (COGST) à établir des orientations de gestion applicables à ces ressources transfrontalières pour l'année de pêche 2009.

INTRODUCTION

The Transboundary Resources Assessment Committee (TRAC) co-chairs, Loretta O'Brien and Tana Worcester, welcomed participants (Appendix 1). The TRAC receives its terms of reference from the Transboundary Management Guidance Committee (TMGC). The TRAC review process is two tiered (a change introduced in 2002), with annual assessment reviews undertaken between more intensive, periodic benchmark reviews. The benchmark for Eastern Georges Bank cod was established in February 2002, while that for Eastern Georges Bank haddock was established in 1998. Yellowtail benchmark discussions were conducted during 25–26 January (data inputs) and 26–29 April 2005 (model formulations). This meeting applies these benchmarks to the most recent data on these resources to produce assessments that will guide fisheries management in 2009/10.

The TRAC is a forum for scientific review where management issues are not considered but can provide context. TRAC deliberations and conclusions are not considered final until the Transboundary Status Reports (TSRs) have been made public.

The Terms of Reference and Agenda for the meeting are provided in appendices 2 and 3, respectively. During the meeting, each working paper was presented by one of the authors, followed by a plenary discussion of that paper. Rapporteurs documented these discussions for the Proceedings.

In preparation for this meeting, Canadian scientists met with fishermen in Yarmouth, N.S., Canada, on 4 June 2008. A summary of this meeting is provided in Appendix 4.

ASSESSMENT INPUTS

Discards from the 2007 Canadian Scallop Fishery

Jonsen, I., A. Glass, and S. Gavaris. 2008. Discards of Atlantic Cod, Haddock and Yellowtail from the 2007 Canadian Scallop Fishery on Georges Bank. TRAC Working Paper 2008/03.

Rapporteur: Loretta O'Brien

Presentation Highlights

Discards of Atlantic cod, haddock and yellowtail flounder from the 2007 Canadian scallop fishery on Georges Bank were estimated from 14 observed trips. A conversion factor of 1.0 freezer trawler hour equivalent to 1.2 wet fish trawler hours was used to standardize effort. Data were insufficient to determine spatial differences in discard rates per hour but temporal trends were accounted for using a 3-month moving window calculation. Discards were estimated by applying the monthly discard rate per hour obtained by the 3-month moving window calculation to the total monthly effort in hours of the scallop fleet. Total annual estimated discards in 2007 were highest for Atlantic cod, at 124 mt, intermediate for yellowtail flounder, at 105 mt, while those for haddock were lowest, at 61 mt.

Discussion

It is common for marine fish to aggregate for spawning. Higher discard rates observed for cod in winter and yellowtail flounder in summer correspond with the general timing of spawning for these species.

In 2006, one scallop fishing vessel used a 3 dredge gear configuration during an observed trip. That vessel also had a higher yellowtail flounder discard rate. The scallop fleet generally does not use a 3 dredge gear configuration, but it could not be confirmed if this configuration occurred in 2007. Further, it could not be concluded from the information collected on the 2006 observed trip that the 3 dredge gear configuration had contributed to the higher yellowtail flounder discard rate. The higher discard rate appeared to be related to a spatial/temporal effect. Both regulatory area/time closures and voluntary avoidance by the fleet are strategies employed to reduce by-catch.

As noted in the analysis conducted in 2007, the conversion factor of 1.2 wet fish trawler hours to 1.0 freezer trawler hour appears to be related to gear and generally corresponds to the ratio between the sizes of dredge used by these vessels. Observers are deployed on both wet fish trawlers and freezer trawlers. It was suggested that the spatial distribution of observed and unobserved fishing could be compared separately for wet fish trawlers and freezer trawlers, to evaluate if sampling is representative.

Observed and unobserved information from logbooks could be compared to investigate if there is an effect due to the presence of an observer. Similarity in catch rate, for example, could be used to verify that observed fishing is representative of unobserved fishing. While this suggestion could be considered, the requirement to discard groundfish may limit the extent of examination possible.

ASSESSMENTS

5Zjm Cod

Clark, K., L. O'Brien, Y. Wang, S. Gavaris, and B. Hatt. 2008. Assessment of Eastern Georges Bank Atlantic Cod for 2008. TRAC Working Paper 2008/01.

Rapporteur: Chris Legault

Presentation Highlights

Combined Canada/USA catches, which averaged 17,500 mt between 1978 and 1992, peaked at 26,460 mt in 1982, declined to 1,804 mt in 1995, fluctuated around 3,000 mt until 2003 and subsequently declined again. Catches in 2007 were 1,796 mt, including 472 mt of discards.

There are concerns regarding the currently accepted benchmark model formulation. A flat pattern for survey catchability at older ages was considered a desirable feature of the benchmark formulation. This formulation now shows a domed catchability for older ages in the DFO and NMFS spring surveys. In combination with the domed fishery partial recruitment (PR) for older ages, this generates 'cryptic' biomass that cannot be observed by either the fishery or the surveys. This may have led to an overestimation of fish at older ages. A preliminary examination was made of a number of other model formulations. There were also issues with these alternative formulations that were not fully resolved, but it was notable that all gave lower

biomass and projected catches than the current benchmark formulation. Some of the alternative formulation results were similar, but the most pessimistic (splitting the survey indices in 1994) were about half the 3+ biomass and projected catch of the benchmark formulation results. The benchmark formulation was used as the basis for management advice.

Adult population biomass (ages 3+) declined substantially from 43,800 mt in 1990 to 8,500 mt in 1995, the lowest observed. The biomass subsequently increased to 19,400 mt in 2001, declined to 13,200 mt in 2005 but increased again to 19,300 mt at the beginning of 2008 (80% Confidence Interval: 16,281 mt – 23,618 mt). Much of the increase in the late 1990s and early 2000s was the result of growth and survival to ages 5+ of the 1992, 1995 and 1996 year classes. The increase in 2006 was due largely to recruitment of the 2003 year class, and the increases in 2007 and 2008 were due to growth of the 2003 year class. For all subsequent year classes recruitment has been well below the 1978 to 2007 average. Lower weights at age in the population in recent years and the generally poor recruitment have contributed to the lack of sustained rebuilding.

Recruitment at age 1 of the 2003 year class, at 7.1 million, is the only above average (6.0 million for 1978-2007) cohort since the 1990 year class. The 2002, 2004 and 2006 year classes, at less than 1 million each, are the lowest on record. Whilst the 2005 year class, at 2.6 million, is stronger than these, it is also below average.

Fishing mortality for ages 4-6 increased sharply between 1989 and 1993 from 0.5 to 1.0. Due to restrictive management measures, fishing mortality fluctuated between 0.19 and 0.5 from 1995 to 2004. In 2005, F declined to 0.12. Fishing mortality was at the F_{ref} level of 0.18 in 2006 and declined in 2007 to 0.13 (80% Confidence Interval: 0.10 – 0.18).

Assuming a 2008 catch equal to the 2,300 mt total quota, a combined Canada/USA catch of about 2,100 mt in 2009 will result in a neutral risk (50%) that the fishing mortality rate in 2008 will exceed F_{ref}, whereas a catch of 1,300 mt will result in a neutral risk (50%) that the 2010 adult biomass will be lower than the 2009 adult biomass. A 10% biomass increase is unlikely even with no catch.

Discussion

Most of the discussion centered around two related issues: 1) which VPA formulation to use for providing management advice and 2) the relationship between the Eastern Georges Bank cod assessment conducted in TRAC and the full Georges Bank cod assessment conducted in the USA Groundfish Assessment Review Meetings (GARM). All the VPA formulations presented had problems. The “around the corner” formulation exhibited domed PR in the fishery and in all the surveys. This created the problem of “cryptic biomass,” meaning there are old fish in the sea that are not detected by either the fishery or the surveys. While the domed PR in the fishery had been seen previously and could be partly explained by the gear used in the fishery, the domed PR in the surveys was new and caused concern for this formulation. Of all the formulations examined, this one estimated the largest population abundances and lowest fishing mortality rates in recent years and so could be considered the most “optimistic” formulation.

All the other formulations also had issues (such as retrospective patterns, domed PR, and unexplained changes in survey catchability) and all estimated lower abundance and higher fishing mortality rates in recent years. The most “pessimistic” formulation was the “split survey series,” which separated the tuning indices into pre-1994 and post-1995 series. The “split survey series” approach was used in the GARM Reference Points meeting for the full Georges Bank stock. Applying this formulation to the Eastern Georges Bank stock component generated

only a small decline in fishing mortality rates since 1994. This was thought to be unrealistic given the large reductions in catch arising from the strong management measures implemented beginning in 1994. However, it was noted that this situation is similar to that of the Georges Bank yellowtail flounder stock which also had strong management measures implemented in 1994, but the stock assessment uses the split survey series approach and estimated relatively small decreases in fishing mortality rates. As well, both stocks have not had a large increase in older fish observed in more than a decade. The yellowtail assessment explains this absence by a high F while the cod assessment explains this absence by "cryptic biomass", i.e., old fish exist but do not appear in either the fishery or the surveys. However, the recruitment patterns for cod and yellowtail flounder differ. After much discussion, it was decided to continue with the benchmark formulation because there was not an alternative presented that could be accepted by the entire group as all the alternative formulations have problems.

The TRAC strongly recommends a benchmark assessment for the Eastern Georges Bank cod stock and further recommends that it also be conducted for the full Georges Bank cod stock. This is because the Eastern Georges Bank cod stock is a subset of the full Georges Bank cod stock. The assessment of eastern GB is conducted on the assumption that the eastern part is a component of a complex. This approach of assessing both a subset and the whole is not common in fishery science and management. However, due to a long historical development of these assessments, this is the current situation. In the past, this approach has worked because the subset and the whole were in agreement in terms of estimated abundance trends and both assessments provided similar advice. Now, however, there may be a divergence in assessment advice (depending on the outcome of the August GARM) due to the different formulations used for the eastern component and for the whole stock. For example, the Eastern Georges Bank assessment has a larger proportion of older fish than the whole Georges Bank assessment due to the use of the "around the corner" formulation which estimates older fish that are not available to the fishery or survey, while the "split survey series" formulation in the whole Georges Bank assessment estimates more young fish due to higher fishing mortality rates. It would be preferable to have either a single whole Bank assessment with a sharing agreement based on the whole Bank, or else conduct separate eastern and western Bank assessments and sum the stock size and recruitment results to create the whole. This decision should be based on biology as well as stock assessment diagnostics. An examination of these alternatives should be part of the benchmark TORs. It was noted that DFO will be reviewing assessments for all Canadian cod stocks next year, including the Eastern Georges Bank stock, and this could be used as an impetus for the benchmark as well. [Ed. note: Eastern Georges Bank cod will not be considered in the review of Canadian cod stock assessments.]

A number of other issues were also discussed relative to the presentation.

It was noted that while the general trends in weight-at-age were similar in the catch and the DFO survey, a recent increase in young ages in the survey was not seen in the catch. However, this was found to be a perception issue as the surveys have one more year of data than the catch time series. Similar trends were also found when the NMFS Spring survey weights at age were examined, although these data were noisier due to lower sample sizes.

The 1995 and 1996 catches appear low. Discarding of cod is not permitted in Canadian groundfish fisheries. Comparison of species composition between observed and unobserved fishing trips resulted in estimates of cod discards from Canadian groundfish fisheries during 1997-1999. There is insufficient observer coverage to investigate if discarding occurred during 1995 and 1996.

F_{ref} was computed assuming a flat-topped PR, but the exploitation pattern in the accepted assessment indicates a strong dome. This difference needs to be explored in the next benchmark assessment. If fishery selectivity remains domed in the future, then the reference point calculation should use the domed PR pattern. However, if the doming is due to the bycatch nature of the current fishery and a flat-topped PR is expected as the stock rebuilds, then a flat-topped selectivity pattern should be used in the reference point calculation.

A general suggestion was made to be more quantitative when making comparisons between US and Canadian data instead of using qualitative descriptions such as "similar." As a follow-up, a comparison was conducted between countries of the average lengths of fish landed and discarded.

During the Canadian meeting between scientists and industry representatives, a question was raised of why US discards are so high. In reply, it was noted that trip limits and minimum size regulations were causing the discards, combined with the difficulty of catching haddock without also catching cod.

Although US spring 2008 survey data were used in the assessment, these have not been fully audited and could change. However, appreciable revisions are not expected.

A question was raised regarding the ages used in each survey for tuning the assessment. The 2002 benchmark assessment evaluation examined all ages for all surveys and identified those age group indices which were considered representative of population changes, and eliminated a number of ages having lot of zero observations. This selection process should be re-examined as part of the upcoming benchmark assessment.

It was noted that the terminology used in describing retrospective patterns was somewhat imprecise. Instead of simply stating that a formulation either underestimated/overestimated a quantity, it would be better to state that the current estimate is different than previous estimates because the truth is not known.

A suggestion was made to depict retrospective patterns as relative differences instead of absolute trends. This exercise was accomplished and it was concluded that a retrospective pattern was NOT evident because the updated estimates of fishing mortality and stock size exhibited both increases and decreases (i.e., not unidirectional). It was further noted that the relative changes were small, less than 20%.

The strong dependence of catch in the next few years on the 2003 year-class was noted, even though the 2003 year-class is only of average strength relative to the assessment time series. For example, over half the 2009 quota comes from this single year-class. The 2005 year-class is average relative to the recent ten years, but low relative to the entire assessment time period. The low recruitment year-classes of 2002, 2004, and 2006 cause concern for this stock. One way to emphasize this problem to managers may be to estimate the catch at age (CAA) in weight expected when fishing at F_{ref} and compare it to the proportions at age expected in 2009, as has been done in the past for yellowtail flounder. Preliminary examination of this approach did not appear useful though. Once the 2003 year-class passes through the fishery, there will not be much left to support the fishery.

It was requested that the US catch in the assessment be compared to the US Regional Office quota monitoring. It was noted that this comparison would be made at the TMGC meeting for all three stocks.

There was some discussion regarding the difficulties that may arise if the Eastern Georges Bank assessment provides different advice relative to that based on the whole Georges Bank assessment. Since the whole Georges Bank assessment will not be completed until August as part of the GARM process, the two assessments cannot now be compared.

5Zjm Haddock

Van Eeckhaute, I., L. Brooks, and M. Traver. 2008. Assessment of Eastern Georges Bank Haddock for 2008. TRAC Working Paper 2008/04.

Rapporteur: Liz Brooks

Presentation Highlights

Fishery

The total catch of eastern Georges Bank (EGB) haddock in 2007 was 12,680 mt under a combined Canada/USA quota of 19,000 mt. The 2007 Canadian catch decreased from 12,051 in 2006 to 11,951 mt while the USA catch increased from 591 mt in 2006 to 729 mt. Estimated discards from the Canadian scallop fishery were 61 mt. USA groundfish fishery discards of 482 mt, accounted for 66% of the total USA catch.

As in 2005 and 2006, a Canadian exploratory winter fishery took place in January and February and ended in 2007 on February 15. The majority of the Canadian catch was made in July and August, then September and June. Most of the Canadian landings were made by otter trawlers, with longliners landing a significant portion of the Canadian total. Catch from gillnet gear was very low. The USA fishery is almost exclusively otter trawlers. The Canadian landings were well sampled and included port and observer sampling. Most USA landings occurred in quarter 2 (Q2), while the highest USA discards (regulatory) occurred in quarter 4 (Q4). USA sampling was low, and lengths were augmented from adjacent areas. Peaks in the length frequency (LF) occurred between 44 cm and 46 cm in the Canadian fishery and at 48 cm for the USA landings. USA discards showed a LF mode at 46 cm.

Catch at Age

Age reading comparisons between labs and intra-reader testing at the Woods Hole lab produced very high agreement. The 2003 and 2000 year classes dominated the landings. Older ages now contribute more to the catches than during the 1990s. The 2007 observed catch-at-age composition (in percent) is very similar to that predicted in 2006.

Indices

The 2008 spring DFO and NMFS surveys showed high, widespread catches of adult fish. High catches were also observed along the northern edge in the 2007 NMFS fall survey. Catches of ages 0, 1 and 2 fish were generally low. As has been observed for other large year classes, the 2003 year class was widely distributed in the spring. The index of the 2003 year class increased in the DFO survey, decreased in the NMFS spring survey, and slightly declined in the fall survey. Adult biomass indices increased in the DFO and NMFS fall surveys, but declined in the NMFS spring survey. Indices of recruitment for the 2007 year class were higher than those for the 2001, 2002 and 2006 year classes.

Size at Age

The 2007 fishery weights at age increased for ages 2, 3 and 4 (2003 year class) but decreased for ages 5, 6, and 7 (2000 year class). DFO survey weights in 2008 increased for younger ages (1, 2, 3, 4) and for age 7, but decreased for older ages (5, 6 and 8). Except for age 1, the increase in survey weights did not offset the recent downward trend in weight-at-age observed since about 2000. Condition (weights at length) decreased during 2007 and a declining trend is evident. Growth rates for the 2003 year class, which is smaller at age than earlier year classes, were similar to growth rates at length for the 2000 year class.

ADAPT Formulation

The ADAPT formulation was the same as that used in the previous assessment with the following changes: 1) an annual catch at age was used instead of a quarterly one; 2) timing of the surveys was revised with the largest change occurring for the fall survey, from 0.69 to 0.79; and 3) the F on the oldest age, age 8, during 2003-2007 was revised from the average age 4-7 value to the average age 5-7. This latter change was made to account for a shift in PR since 2003 from fully recruitment at age 4 to full recruitment at age 5. The first two changes did not produce appreciable differences from the 2007 assessment, and showed similar diagnostics and no persistent retrospective patterns.

Results

Improved recruitment in the 1990s and the strong 2000 year class, lower exploitation, and reduced capture of small fish in the fisheries allowed the population biomass (ages 3+) to increase from near an historical low of 9,000 mt in 1993 to 77,100 mt in 2003 (Figure 2). Adult biomass decreased to 54,000 mt in 2005 but subsequently increased to 158,100 mt (80% Confidence Interval: 122,300 mt – 201,100 mt) in 2008, higher than the 1931-1955 maximum biomass of about 90,000 mt. The tripling of the biomass after 2005 was due to the exceptional 2003 year class, estimated at 322.7 million age 1 fish, the largest in the assessment time series (1931-1955 and 1969-2007). In contrast, the 2001, 2002, 2004 and 2006 year classes, at less than 8 million each, are below the 18 million average of the 10 most recent year classes (excluding the 2003 year class). The 2005 year class (26.9 million age 1 fish) is well above the 10 year average. Initial estimates of the 2007 year class (13.8 million age 1 fish) suggest that it is below the 10 year average.

Fishing mortality for ages 4+ fluctuated between 0.25 and 0.47 during the 1980s and showed a marked increase in 1992 and 1993 to about 0.6, the highest observed. The age at full recruitment to the fishery shifted in 2003 from age 4 to age 5 due to the decrease in size at age. Fishing mortality (ages 4+ for pre-2003 and ages 5+ for 2003 and onwards) was below $F_{ref} = 0.26$ during 1995 to 2003, increased to above F_{ref} during 2004 to 2006 but declined in 2007 to 0.14 (80% Confidence Interval: 0.11 – 0.18) (Figure 1). The determination of F_{ref} was based on analyses that assumed full recruitment to the fishery at age 4 and older.

Projection

In the projections, survey and fishery average weights-at-age for the most recent year were used, except for the 2003 year class. The fishery partial recruitment pattern was based on the average of the most recent five years. Inputs for the 2003 year class were derived by accounting for the recent trend in reduced growth rate, using the same approach as in the previous assessment. Assuming a 2008 catch equal to the 23,000 mt total quota, a combined Canada/USA catch of 33,600 mt in 2009 results in a neutral risk (50%) that the 2009 fishing

mortality rate would exceed $F_{ref} = 0.26$, and a projected 1+ biomass of 133,000 mt at the beginning of 2010. The 2003 year class is expected to account for 89% of the 2009 catch in weight. A catch of 28,000 mt in 2009 results in a low risk (25%) that the 2009 fishing mortality rate will exceed F_{ref}. It was not considered appropriate to change the fishing mortality reference point as the decline in size at age may not be persistent, as suggested by the size at age 1 for the 2007 year class is now at the pre-decline level.

Discussion

Data Inputs

It was noted that the US discards were higher than the US landings, which is a similar to the situation with cod. The explanation for the high discards was related to the smaller size at age, and the slower growing 2003 year class. The USA minimum landings size for haddock was reduced to 18 inches on 11 August 2007, and this will be extended through 10 August 2008. During some portion of 2007, US fishermen were allowed to land fish around 48 cm, but before that time, the same size fish were discarded. The highest USA discards, however, occurred in Q4. Were there high regulatory discards prior to size reduction? Upon checking, it was noted that in Q4 the fishery was only open from about October 20 to November 30 in 2007, which would have been after the minimum size was reduced. A high discard rate was noted during the end of October. Most of the discards at this time were from the 2003 year class, but some were also from the 2005 year class.

A question was raised as to how the winter fishery avoids cod. In reply, it was noted that haddock aggregate in winter making it possible to avoid cod. Large landings of haddock from very short trips are therefore possible. Although not much cod is taken in the winter fishery, whatever is caught, is sampled.

Clarification was requested of the PowerPoint slide showing the percent predicted vs. observed CAA as to whether the percentages represented numbers or weight of fish. The data depicted was percent CAA by number, but the patterns would also be similar if expressed in weight (predicted close to observed).

The bubble plots of survey age composition allowed comparison of the 1963 year class to the 2003 year class, and revealed how quickly the 1963 was fished out. This is not happening with the 2003 year class (or the much smaller 2000 year class) and is a positive development.

For haddock, weights-at-age (WAA) generally agree between the survey and fishery. A question was raised as to whether the downward trend in WAA could be explained by seasonal shifts in fishing activities. It was noted that including or excluding the winter fishery did not affect the trend. A follow-up question highlighted the increasing trend in WAA at the beginning of the fishery time series (1968-1975). One explanation offered for this increase was that fish from the 1963 year class would still be present in the population at the beginning of this time series and these fish would still be relative smaller in size.

Concerning the year class growth plot, a statement was made that the 2007 year class is larger at age 1 and is growing faster than the 2003 year class. It appears that if a year class starts out small, it stays smaller at age. Given that the 2007 year class is starting out at a 'normal' size, it was suggested that perhaps this cohort will continue on a normal growth trajectory.

There are some instances in the length-at-age matrix where fish appear to be losing body size, e.g. the 2000 year class decreases from 53.5 cm to 52.9 cm, but this is likely due to sampling

variability as haddock do not grow much at older ages. The age 7 weight in the 2008 DFO survey is inconsistent with surrounding ages, and is considered an anomalous value caused by low sampling of a very small year class. This anomaly was replaced with a more appropriate value in the projections.

Model Formulation

Clarification was provided on why F on the oldest true age group (age 8) was now based on the average of age groups 5-7, rather than ages 4-7 as in the previous assessments. The PR has changed in recent years and the Fs on age 4 fish are now much lower than at age 5.

With regard to the change in the values used to represent the time of the year when the surveys are conducted, it was noted that these corrected very minor errors and the adjusted values had a negligible effect on the model results.

Results

This assessment holds together well. There is good correspondence between survey indices and population estimates, and the retrospective analyses show little cause for concern.

Regarding the change in the estimate of fully recruited fishing mortality (4+ vs. 5+), it was pointed out that the Fs are a bit lower than those estimated last year. Changing the basis for F on the oldest age had an obvious effect, especially in 2004. This generated some confusion with respect to interpreting the age 5+ F and how this metric should be compared with the Fref reference point (which is based on age 4+ as these age groups were fully recruited when Fref was developed). It was suggested that it may not be useful to recalculate a 'new' age 5+ Fref reference point at this time. The 2007 year class seems to exhibit normal growth, which will likely return the PR pattern to one where haddock are fully recruited to the fishery at age 4+. It was therefore decided that the F on ages 5+ should be reported and highlight that the basis for the fully recruited F has changed, noting that during 2003-2007 several year classes grew slower than average. It was agreed that it was important to keep track of the productivity of the stock and determine whether the F reference point should be revised in the future.

A suggestion was made that a Ricker curve might fit the stock recruit data. An alternative view was offered that at lower biomass levels, opportunity exists for more recruitment and occupation of more habitat. With regard to the two most recent data points, these occur in a region of the curve (on the x-axis) where little is known about system behavior because of limited observations in this area. The 2007 point is below the 10 year average, but close to it. However, in the context of the two circles of cod productivity, the 2007 point for haddock would still be associated with a low productivity stanza. In summary, we'll have to wait and see what sort of stock productivity behavior emerges from the upper end of this axis.

Projections

Regarding the projection results, to the extent that the 2008 estimated TAC of 23,000 mt is not taken, then the F in 2009 will be lower and stock abundance higher; this is an obvious point, but still worth stating. It was noted that the projections were done using both low and high PR scenarios, resulting in a catch of 29,000 mt and 36,000 mt, respectively. Also, it was pointed out that the status report should mention that 89% of the current catch quota comes from a single year class.

Clarification was sought for the PR values in the projection inputs, and their relation to the numbers in the partial recruitment table. The PR value for age 3 looks high in 2007. In response, it was noted that the PR was based on the average pattern during 2003-2007, not the most recent year, as stated in the presentation.

A suggestion was made that some modifications might be appropriate to the weights at age used in the projections for the beginning of year calculations. For example, a more appropriate value than 1.73 kg might be used for age 7 in 2008 and 2009 (as this value is based on a weak year class that was poorly sampled). It is unrealistic to have weight at age decrease from age 7 to age 8. It was agreed that revised projections would be done with more appropriate numbers for these weights, and that the results would be made available to evaluate stock status.

The group considered the merits of a change in the fishing mortality reference point. If the reference point were to be revisited, the group felt that it would be more appropriate to do this during a benchmark assessment. The point was made that we should not confuse the reference point with an estimate of any particular F benchmark. The TMGC agreed to an F reference based on consideration of several F benchmarks, and happened that F40%, F_{msy} and F0.1 were very similar. While estimates of these benchmarks could be updated, this doesn't mean that the reference point for common management should be automatically adjusted. Recommending such an adjustment is up to the TMGC. The question for the TRAC is whether there are persistent changes in productivity that would lead to a recommendation to the TMGC that an update to the reference point was needed. The trend of a decline in size at age pre-dated the 2003 year class, which would suggest that this phenomenon was not a result of the 2003 year class. In fact, the persistence of the decline is now unclear as the average body size of fish of the 2007 cohort at age 1 is typical of that observed prior to the decline. The TRAC considered that a change in the fishing mortality reference point was not advisable at this time.

5Zhjmn Yellowtail

Legault, C., L. Alade, H. Stone, S. Gavaris, and C. Waters. 2008. Georges Bank Yellowtail Flounder. TRAC Working Paper 2008/05; GARM III

Rapporteur: Lou Van Eeckhaute

Presentation Highlights

Presentation by C. Legault

June Presentation

The Georges Bank yellowtail flounder stock assessment will be conducted as part of the GARM process in August 2008. The TRAC will review the assessment by correspondence the week following the GARM. At the June TRAC meeting, only a data update for yellowtail flounder was provided.

The 2008 DFO survey had a single tow which caught more than 7.5 mt of yellowtail flounder. This single tow accounted for more than 12 times the total catch of yellowtail flounder in the other 56 tows conducted during the survey (approximately 0.5 mt). The previous largest catch of yellowtail flounder in previous DFO surveys was less than one mt. Calculation of the stratified mean catch per tow including this large tow resulted in a marked increase from 2007 to 2008 for ages two through five that could not be explained by standard population dynamics. Removal of this single tow from the calculation of stratified mean catch per tow resulted in a decrease from

2007 to 2008 for these ages. After much discussion, it was agreed that the most scientifically appropriate approach is to exclude the 2008 DFO survey as tuning indices at all ages, but to conduct two sensitivity analyses with and without the large tow.

There was no directed Canadian yellowtail flounder fishery in 2007, resulting in landings of only 17 mt. Canadian discards were 105 mt in 2007 resulting in a total Canadian catch of 122 mt, well below the quota of 350 mt. The US catch was slightly above (9%) the US quota of 900 mt based on the quota monitoring conducted by the NMFS Regional Office for the 2007 fishing year (May 1 – April 30). US landings in calendar year 2007 were 1061 mt, but US discards have not been estimated yet.

As part of the GARM Biological Reference Points meeting, the F_{msy} proxy of F40%SPR was updated but did not change from the previous value of 0.25. The SSB_{msy} proxy derived from fishing at F40%SPR and the estimated recruitment cumulative distribution function was 46.0 mt, a decrease from the previous estimate of 58.8 mt. Similarly, the MSY proxy decreased from its previous value of 12.9 mt to an updated value of 10.0 mt. These latter reference points only apply to US management, but are provided for context to the TRAC process.

Finally, a brief summary of a recent yellowtail tagging experiment using Petersen tags was given. This experiment was conducted in the southern portion of Closed Area II in June 2008. The project was led by Steve Cadrin (CMER Coordinator at SMAST) and tagged over 50,000 fish from five commercial fishing boats in five days and recaptured over 100 tagged fish the following two days. This experiment will produce a population estimate for yellowtail flounder in the southern portion of CAII, but will require analysis of mixing and migration rates into and out of the area to derive uncertainty estimates. It is hoped that these results will provide ancillary information for the GARM assessment, but it is not expected to be used as a tuning index or as a fixed point through which to drive the assessment.

August Presentation

The Georges Bank yellowtail flounder stock assessment was conducted as part of the GARM process in August 2008. The combined Canada/USA yellowtail flounder catch declined from 2006 (2,162 mt) to 2007 (1,686 mt) due mainly to the reduced quota. Adult population biomass (ages 3+) increased to 15,900 mt at the beginning of 2008, the highest level since 1983 due largely to the strong 2005 year class. The 2005 year class was estimated at 49.4 million age 1 fish in 2006, the strongest year class since the 1980 cohort. Fishing mortality rates for fully recruited ages 4+ have declined since 2005, but are still above F_{ref} (=0.25) with F in 2007=0.29 (80% confidence interval of 0.22, 0.38). Truncated age structure in the surveys and changes in distribution indicate current resource productivity is lower than historical levels. Assuming a 2008 catch equal to the 2,500 mt quota, a combined Canada/USA catch of about 4,600 mt in 2009 would result in a neutral risk (~50%) that the fishing mortality rate in 2009 will exceed F_{ref} . Fishing at F_{ref} in 2009 is expected to generate a 9% increase in median age 3+ biomass from 20,500 mt in 2009 to 22,300 mt in 2010.

Discussion

US Discards

It was clarified that for US discards from small mesh otter trawl gear, a 0% CV means no coverage; therefore, from 1994 to 1999 this fleet was not sampled and no discards could be calculated.

Upon noting the increase in yellowtail discards from the whiting (silver hake) fishery where most of the small mesh discards originate, it was questioned whether the landings of whiting had increased. In reply, it was explained that whiting catches had increased and that the discard ratio had remained the same. However, upon further investigation, it was reported that there had been an increase in the discard to kept ratio in 2007, but that the landings had remained fairly constant. The ratio was driven by the 2nd half value which had 3 observations. In early years, when there were no observed discards, there were very few observed trips (less than 4). The discard estimation is subject to high variability in the observations, resulting in an estimate of low reliability. This could be revisited in the next assessment but a large impact was not anticipated.

Concern was expressed that there may have been a mis-assignment of whiting for area allocation that would have an effect on the assignment of yellowtail flounder discards in this fishery. Further, although small and large mesh discards are pooled by the Northeast Regional Office for in-season monitoring for quota purposes, it was not known whether the small and large mesh gear calculations were split post-season. Clarification will be sought from the US Northeast Regional Office. The post season analysis is used to compare against the quota, and this issue is on the TMGC agenda.

Canadian Landings and Discards

The reduction in Canadian landings since 2004 has been due, in part, to a mandatory separation panel for the otter trawl fleet and to no allocation of yellowtail flounder in 2006 and 2007. The area closures for the scallop fishery during periods of highest bycatch of yellowtail flounder have also contributed to the recent decline in discards from the Canadian scallop dredge fishery. It was also noted that the 2005 Canadian discard estimate was highly influenced by a single observation.

Weights at Age

The weights at age from the fishery were the only weights examined. It was requested that survey weights also be examined. When the survey weight-at-age data were examined, they exhibited trends similar to those in the catch. Therefore, the catch weights at age were deemed appropriate for use in the projections.

Impact of DFO Survey Single Large Tow

It was noted that there were very few age group 6+ fish caught in the large tow, which prompted additional questions about this tow. Maturity data was not collected for yellowtail flounder on the survey and detail sampling (length and weight) was 1/cm/sex. Although the tow occurred in a deeper stratum than where most yellowtail flounder are caught, the tow depth was 55 fm and occurred at the shallower depth range of the stratum.

The very low number of age 6 fish in the large tow would make it very difficult to use tow data to tune the assessment. If the tow is ignored, a decline in all ages is apparent in the survey. It had previously been agreed at the TRAC meeting in June 2008 that the 2008 DFO survey would be excluded from the assessment analysis, and would also be omitted from future assessments as the 2008 survey data would distort future impressions of precision. The results of the sensitivity analysis examining the effect of the 2008 DFO survey indicated that the change in the size of the 2005 cohort was minor between excluding the 2008 DFO survey data and including them.

Maturity

A constant maturity at age vector was considered appropriate. Sample size at age 2 is low, but, although there are more fish to sample from at age 3, they are almost all mature and it is only the age 2 fish which are changing. Although there were some high proportion mature values associated with some low age 2 survey biomass indices, the number of data points associated with these values was extremely small and should, therefore, the age 2 maturity values should be treated with great caution. A constant proportion mature at age 2 was therefore used in the analyses as no consistent upward or downward trend was seen between proportion maturity and biomass for this age group. The maturity diagram shows that about 50% of age 2 are mature, which is close to the value of 0.462 used in the analyses. As the adoption of a constant maturity vector has implications for the strong 2005 year class, it was requested that the proportion mature of age 2 females in 2007 be shown for confirmation of the constant value used. In 2007, 45% of the age 2 females were mature, a result nearly identical to the assumed constant value of 46%.

Residuals

It was clarified that the residual plot for the scallop survey had a very small 2006 value and that no 2007 survey data were included in the figure.

Catchability

It was questioned whether the higher sampling density of the DFO survey could result in higher catchability (q) at age, although it was recognized that sampling intensity should only affect the variance. In reply, it was explained that mean catch per tow was used in conducting the DFO 2008 survey sensitivity runs and that these results were identical to those using total swept area, but the relevant table (Table C.9) would be changed to reflect the swept area catchabilities. Using swept area helps in interpreting the q's and in comparing q's across species.

It was noted that the q of middle ages increased proportionally more between the early and post 1994 surveys relative to the q of the 6+ age group. The recent period also exhibited lower catchability at age 6+ than earlier ages. However, it was pointed out that the 6+ error bars were well within the range of the others, i.e., confidence intervals overlapped with those of other ages, and so were not indicative of a strong domed PR in the surveys.

It was observed that of the four GARM stocks in which the DFO survey was used as a tuning index, those stocks with DFO survey q's greater than 1 had retrospective patterns associated with their assessments, but this could be coincidental.

A factor that could affect the q's could be a discrepancy in the wing spread value used in the determination of abundance from the survey. For NMFS, this value is based on measurements made using Scanmar gear. For DFO, the value used is determined from engineering specifications. It was reported that Scanmar had been used in DFO surveys and that data were available to check the actual wing spread. There are also other factors that could be confounded with a change in q's, for example, a change in M.

Biomass Results

The assumptions used for the calculation of age 6+ may have a greater effect on the assessment results when the 2005 year class enters the plus group in 2011, and therefore the assumptions should be re-examined before that time.

Projections

The weights at age to be used in the projections are the catch weights. The variability in the age 3 PR, which varied between 0.4 and 0.9, was noted. The PR proposed for the projections is the 5-year average - but this may not be appropriate given the large variability in the age 3 PR, which might be due to an increase in the discards in the total catch. However, it was noted that this type of variability is common in other stocks as well. The PR used could have an appreciable effect on the 2008 results for the 2003 year class. A sensitivity analysis using 0.4 and 0.9 for age 3 PR was suggested.

The change in the value of the SSB_{msy} reference point between GARM II, the initial GARM III and the final GARM III results was initially due to the switch to the Major Change model and subsequently to the changes in the recruitment estimates and the weights at age.

In the previous assessment, a projection was done assuming that recruitment of the 2005 year class was equal to the most recent 10-year average. This produced about half the catch. In the present assessment, this approach was deemed inappropriate as the 10-year average value is too low and the estimate of the 2005 cohort has stabilized.

The offset in US quota versus the calendar year quota prompted discussion on what to assume for the 2008 catch. Another issue with the offset quota is that it can look as if the catch exceeded the quota when this is not the case. With regard to the first issue, the 2008 catch might be estimated, as done in the previous assessment, or the 2008 quota could be used. As there was no practical way of anticipating catches, it was agreed that the 2008 quota of 2500 mt should be used. With respect to the second issue, it was decided to include both the fishing and calendar year catches in the status report and clearly indicate which catch matched the quota.

In the projections, it was emphasized that the $F_{rebuild}$ should be based on a 75% probability of having the spawning stock biomass rebuilt to SSB_{msy} by 2014. It was noted that the GARM reference F of 0.254 and the TRAC value of 0.25 were nearly identical so the value of 0.25 was adopted for the GARM value. Two projections for 2009 were required, one using F=0.25 and the other using $F_{rebuild}$. In addition, a sensitivity analysis of the PR at age 3 was requested.

In the past, the geometric mean recruitment of the previous 10 years has been the standard input for future recruitment used in rebuilding strategy projections. This year a suggestion was made to use a shorter time period and exclude the 2005 year class. However, it was agreed to leave in the 2005 year class as is, since its abundance is not unusually high compared to recruitment values in the early time period and the geometric mean will dampen the effect. A comparison of projection results using a shorter time period (1998-2007) versus a longer time period (1973-2007) showed very little difference but the bootstrap 80% confidence interval was more variable for the shorter time period. This is because recruitment estimates in the early years of the assessment do not change between bootstraps due to the convergence properties of VPA.

Concerning the projection results, a question was raised as to why the 2009 3+ biomass was the same for the two F regimes. It was explained that the F in 2008, which would affect the 2009 beginning of year biomass, was the same in both scenarios. The Fs in 2009 would be different and would affect the 2009 SSB and beginning of year 2010 biomass. It was noted that the $F_{rebuild}$ catch quota in 2009 would be less than half of that predicted in the F_{ref} analysis and lower than the 2008 quota. This result seemed contradictory as stock biomass is projected to be at its highest since 1981 but the rebuilding analysis indicates a reduced quota. However, the USA participants noted that this result is commonly seen in rebuilding programs, especially as the end of the rebuilding period is approached.

The sensitivity projections for the PR on age 3 did not show as great an impact as expected. For PR at 40%, F in 2008 (ages 4-5) was 0.248 and for a PR at 90%, F in 2008 was 0.156. Although the change in PR had a significant effect on F in 2008, both PR scenarios generated F values below F_{ref}. When catch is set under one assumption of PR for a strong year class, but is caught with a different PR, the remaining age classes are either fished heavier to make up for missing fish - or fished lightly because more of the strong year class is harvested. It was decided that this sensitivity analysis did not need to be shown in the assessment document for TMGC.

Discussion ensued on whether to include the risk plot in the TSR or reference document. It was decided to include the plot in the reference document (as typically done in the reference documents for other stocks) and also to include the plot on an additional page in the TSR.

For comparison with the $F_{rebuild}$ projection, an additional projection to 2014 at F_{ref} of 0.25 was deemed useful as this would highlight the tradeoff in yield versus future biomass size. This comparison would be useful to include in the TRAC document as the TMGC has the scope to recommend quotas at Fs below F_{ref} or Fs associated with rebuilding scenarios. It was also suggested to include the risk plots for the % change in biomass in the near term for different catches, either as part of the text or as a figure. However, the existing software was not set up to calculate the risk, and so it was agreed to include in the TRAC document the % change in median age 3+ biomass for 2009 to 2010 under both F regimes.

It was also decided to include the $F_{rebuild}$ results in the status report. This would highlight the need for F to be lower than F_{ref} when biomass is low.

Final Reference Document

It was noted that the final reference document could be a separate document specifically prepared for the TRAC website, or the TRAC website could link to the GARM document. The lead author noted that the appendices were not included in the GARM document. As participants preferred not to have two separate documents, they were asked to identify which figures should be included in the GARM document to make it adequate for the TRAC.

TOR for 2009 TRAC

The co-chairs will update the TORs for the 2009 yellowtail flounder TRAC and email these to participants for review.

MANAGEMENT RELATED ISSUES

Allocation Shares

Gavaris, S., L. O'Brien, and R. Mayo. 2008. Update of Allocation Shares for Canada and the USA of the Transboundary Resources of Atlantic Cod, Haddock and Yellowtail Flounder on Georges Bank through Fishing Year 2009. TRAC Working Paper 2008/02.

Rapporteur: T. Worcester

Presentation Highlights

Development of consistent management by Canada and the USA for the transboundary resources of Atlantic cod, haddock, and yellowtail flounder on Georges Bank led to a sharing allocation proposal. The proposal was founded on agreement about management units, the principles upon which allocation shares would be determined, and computational formulae. For the purpose of developing a sharing proposal, agreement was reached that the transboundary management unit for Atlantic cod and haddock would be limited to the eastern portion of Georges Bank (DFO Statistical Unit Areas 5Zj and 5Zm; USA Statistical Areas 551, 552, 561, and 562). The management unit for yellowtail flounder would comprise the entirety of Georges Bank east of the Great South Channel (DFO Statistical Unit Areas 5Zh, 5Zj, 5Zm and 5Zn; USA Statistical Areas 522, 525, 551, 552, 561 and 562). Two principles were incorporated in the computational formulae of the sharing proposal: (a) historical utilization, based on reported landings during 1967 through 1994; and (b) temporal changes in resource distributions, determined from Northeast Fisheries Science Center (NEFSC) and DFO survey results which are updated annually.

Resource distributions in 2007, integrated over the NMFS and DFO surveys, indicated that the proportion of resource biomass within the USA portion of the management units increased for Atlantic cod, haddock, and remained the same for yellowtail flounder. Allocations for 2009 updated with these resource distributions resulted in shares for Atlantic cod of 69% Canada and 31% USA, for haddock of 63% Canada and 37% USA, and for yellowtail flounder of 23% Canada and 77% USA.

Discussion

There was limited discussion as the analyses were conducted as per the TMGC guidelines.

Review of TMGC Flowchart

As requested by the TMGC, the TRAC reviewed the flow chart outlining the TRAC/TMGC process and made minor revisions. The flowchart is presented in Appendix 5

2009 Terms of Reference

The Terms of Reference for the TRAC in 2009 were discussed and are presented in Appendix 6. The annual TRAC meeting has been held in June in the most recent years. The TRAC discussed the possibility of convening the annual meeting in July. Completing the processing and aging of commercial and survey data for cod, haddock, and yellowtail flounder by mid-May is difficult given the timing of the NEFSC survey and other aging obligations at the NEFSC.

The TRAC proposes to have a benchmark TRAC for Eastern Georges Bank cod, with a data meeting in winter 2009 and a model meeting in spring 2009. Terms of reference were drafted and are presented in Appendix 7.

CONCLUDING REMARKS

The Co-chairs thanked the participants for their review of the assessment and for the various issues brought to the meeting. The meeting was then adjourned.

APPENDICES

Appendix 1. List of Participants

Name	Affiliation	Phone	Fax	Email
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Appendix 2. July and August Meeting Terms of References.

Assessment of Eastern Georges Bank Cod, Haddock & Yellowtail Flounder
Woods Hole
23-26 June 2008

Context

The TRAC annually obtains requests for harvest advice on transboundary resources from the Transboundary Management Guidance Committee (TMGC). During February and April 2008, NMFS, through its Groundfish Assessment Review Meeting (GARM) process, will review benchmarks and reference points for 20 Northeast Region groundfish stocks, including Georges Bank cod, haddock and yellowtail flounder. Those benchmark model formulations and reference points may have implications for the management units of cod and haddock on eastern Georges Bank and of yellowtail flounder on Georges Bank, for which TRAC provides harvest advice to TMGC. TRAC members have the opportunity to participate in the GARM peer review of the benchmarks and reference points.

Objectives

- For:
  Eastern Georges Bank cod
  Eastern Georges Bank haddock
  Georges Bank yellowtail flounder

  - Evaluate the implications of the Georges Bank (5Z) GARM benchmark model review and GARM reference point review to determine if any revisions are appropriate for provision of 2009 harvest advice.

  - Review the biomass distribution relative to the USA/Canada boundary, updating results with the 2007 survey information, and apply the allocation shares formula.

- For:
  Eastern Georges Bank cod
  Eastern Georges Bank haddock

  - Apply the established benchmark assessments and any revised model formulations deemed appropriate, to report on the status of the stocks, updating results for the latest information from fisheries, including discard estimates, and research surveys and characterize the uncertainty of estimates.

  - For a range of total catch values in 2009, estimate the risk that the 2009 fishing mortality rate would exceed 0.18 (cod) and 0.26 (haddock) respectively and the risk that the 2009 fishing mortality rate would exceed any revised fishing mortality reference for cod or haddock that is deemed appropriate.

  - If stock condition is poor, for a range of total catch values in 2009, estimate the risk that the biomass at the beginning of 2010 would not achieve a 0%, 10% or 20% increase compared to the beginning of 2009.

- Draft terms of reference for 2009 June TRAC.

- Review process flowchart of TRAC/TMGC
- Other matters.

Outputs

TRAC Transboundary Status Reports for the cod and haddock management units
TRAC Reference Documents for the cod and haddock management units
TRAC Proceedings of meeting discussion

Participants

DFO Maritimes scientists and managers
NMFS Northeast Region scientists and managers
Canadian and US fishing industry
Provincial representatives (NB and NS)
NEFMC representatives

Assessment of Georges Bank Yellowtail Flounder
Teleconference
Woods Hole, MA; St. Andrews, NB; Halifax, NS
12-14 August 2008

Terms of Reference

Context

The TRAC annually obtains requests for harvest advice on transboundary resources from the Transboundary Management Guidance Committee (TMGC). During February and April 2008, NMFS, through its Groundfish Assessment Review Meeting (GARM) process, will review benchmarks and reference points for 20 Northeast Region groundfish stocks, including Georges Bank cod, haddock and yellowtail flounder. Those benchmark model formulations and reference points may have implications for the management units of cod and haddock on eastern Georges Bank and of yellowtail flounder on Georges Bank, for which TRAC provides harvest advice to TMGC. TRAC members have the opportunity to participate in the GARM peer review of the benchmarks and reference points.

Objectives

- For: Georges Bank yellowtail flounder

    - Apply the established benchmark assessment and any revised model formulations deemed appropriate, to report on the status of the stock, updating results for the latest information from fisheries, including discard estimates, and research surveys and characterize the uncertainty of estimates.

    - For a range of total catch values in 2009, estimate the risk that the 2009 fishing mortality rate would exceed 0.25 and the risk that the 2009 fishing mortality rate would exceed any revised fishing mortality reference that is deemed appropriate.

    - If stock condition is poor, for a range of total catch values in 2009, estimate the risk that the biomass at the beginning of 2010 would not achieve a 0%, 10% or 20% increase compared to the beginning of 2009.

- Other matters.

Outputs

TRAC Transboundary Status Reports for the yellowtail flounder management unit
TRAC Reference Documents for the yellowtail flounder management unit
TRAC Proceedings of meeting discussion

Participants

DFO Maritimes scientists and managers
NMFS Northeast Region scientists and managers
Canadian and US fishing industry
Provincial representatives (NB and NS)
NEFMC representatives

Appendix 3. Meeting Agenda.

Transboundary Resources Assessment Committee
Assessment of Eastern Georges Bank Cod and Haddock
NEFSC Woods Hole Laboratory Stephen H. Clark Conference Room
23-26 June 2008

23 June 2008 – Monday

9:00– 9:30 Welcome and Introduction (Chairs)

09:30 – 10:30 Georges Bank cod (Clark,O'Brien)
10:30 – 10:45 Break
10:45 - 12:00 Georges Bank cod (Clark,O'Brien)

12:00 – 1:00 Lunch

1:00 – 3:00 Eastern Georges Bank haddock (Van Eeckhaute, Brooks)
3:00 – 3:15 Break
3:15 – 4:15 Implications of 5Z GARM benchmark assessments and Biological Reference Point review
4:15 - 5:00 Review process flowchart of TRAC/TMGC

24 June 2008 – Tuesday

8:30 – 9:00 Biomass Distribution (Gavaris, O'Brien)
9:00 – 10:00 Report Preparation
10:00 – 10:15 Break
10:15 – 12:00 Report Preparation

12:00 – 1:00 Lunch

1:00 – 5:00 Report Preparation

25 June 2008 – Wednesday

08:30 – 12:00 Report Review

12:00 – 1:00 Lunch

1:00 – 4:00 Report Review
4:00 – 5 :00 Draft Terms of Reference 2009 June TRAC

26 June 2008 – Thursday ..if needed

08:30 – 12:00 Report Review

12:00 Adjournment

Appendix 4. Report of DFO/Industry Pre-assessment Meeting, Rodd Grand Hotel, Yarmouth, NS, 7:30 p.m., Wednesday, 4 June 2008.

Introduction:

The purpose of the meeting was to review survey and fishery observations in relation to what they indicate about stock status and how they can be interpreted for the upcoming assessment. DFO science staff presented summaries of available information as a starting point for discussion. The assessment process and time table was outlined.

Cod:

Presentation Highlights:

- Recent survey biomass trends show fluctuation without trend.
- The 2003 year class continues to appear to be one of the stronger ones in recent years and is dominant in the 2007 catch.
- The 2005 year class is better than many recent year classes but not as strong as the 2003 year class.
- Ages 7 and above contributed only 5% to the 2007 catch and surveys showed low abundance for these ages.

Questions and Comments:

- Why are USA discards high in 2007?
  - Likely due to minimum fish size limits.
- How soon do recruiting year classes enter the fishery?
  - Cod enter the fishery at about age 3. You should start seeing the 2005 year class in 2008 fishery.
- Where are cod hatched?
  - While tagging indicates some movement of cod from coastal areas to Georges Bank, egg and larval surveys as well as the capture of adult spawning fish during winter and spring confirm that there is a resident population on the northeastern part of Georges Bank.
- Does the timing of the DFO survey vary?
  - Generally aim to conduct the DFO survey during the end of February. However, operational matters may result in some variation. The 2008 survey was later than usual.
  - *Suggested* that DFO should aim to conduct survey during same tides as well as about the same date.
- Doesn't the random location of survey tows add variation to indices?
  - A random survey design is required to detect changes in distribution. Tracking year classes more than once, at successive ages with annual surveys, helps to counter variability in individual survey estimates.
- What is the scale of the survey index in biomass?
  - The survey is an indicator of trend, not absolute biomass. The trend shows fluctuation but no persistent increase or decrease.
- How does the distribution of cod from the 2008 DFO survey compare to the areas closed to scallop fishing during winter 2008?
  - The closed areas were determined on the basis of past DFO surveys.
  - *Suggested* to compare cod distribution from 2008 DFO survey to areas closed to scallop fishing during winter 2008.

- Has there been a change in what cod eat?
  - Some stomach contents have been collected during surveys but an analysis has not been completed. Observations by port samplers suggest a diverse diet but no major changes over years.
- How are tag returns being interpreted in view of separator panel use?
  - Tag returns are low. A tagging program at a time when cod abundance is low and cod fisheries are curtailed limits interpretation of tagging program results. There are few returns from the eastern Scotian Shelf.

Haddock:

Presentation Highlights:

- Catches in 2007 were dominated by the 2003 year class at age 3. Fishery weight at age for 2003 year class was slightly lower than predicted in last year's assessment.
- The fishery weight at age 3 for the 2003 year class is lower than weight at age 3 for previous year classes
- The age composition of the 2007 fishery catch was similar to the age composition predicted in last year's assessment.
- DFO and NMFS spring surveys fluctuating without trend at high abundance since 2003 while NMFS autumn survey showing increasing trend over last 4 years
- Survey indices for 2006 year class are low and initial indications for 2007 year class suggest it is stronger than 2006
- The size at age 3 for 2005 year class is higher than size at age 3 for 2003 year class and the size at age 1 for 2007 year class is similar to size at age 1 for pre-2000 year classes

Questions and Comments:

- The 2008 winter fishery did not catch as many big fish as in 2007.
  - Catches from the 2008 winter fishery were dominated by the strong 2003 year class which is now entering the fishery.
  - It was observed that the size/age composition of the catch in Dec 2007 was similar to the catch in Jan 2008. A similar observation was made for Dec 2006 and Jan 2007, although tows were longer in 2006/2007.
  - It was also observed that larger fish come up on bank Nov to Jan.
  - *Suggested* that Dec length/age composition be compared to that of following Jan.
- Could maturity and gonad development affect changes in weight at age?
  - The trends in length at age from the survey are similar to weight at age. This suggests that the weight changes are due to growth, not variation in weight contributed by gonads.
  - It was observed that early results from the 2008 fishery catch shows increase in fillet yield, contradicting DFO survey results of decline in condition.
- Could fishery selectivity be removing the faster growing fish?
  - Fisheries do select faster growing fish from each year class. However, high fishing mortality and slow growth are required to result in appreciable population and/or genetic impacts.

Yellowtail:

Presentation Highlights:

- USA landings of 1,061 mt in 2007 were about the same as landings in 2006.
- Canadian landings in 2007 were again low at 16 mt and discards declined to 105 mt.

- Survey indices declined from a peak during late 1990s/early 200s and fluctuated without trend at a moderate level.
- The 2008 DFO survey had a very large catch of 7,526 kg in stratum 5Z1 which inflates the index substantially.
- Aside from the very large catch, which was eastward of the Yellowtail Hole, the spatial distribution in the 2008 DFO survey was similar to past years.

Questions and Comments:

- How does the distribution of yellowtail from the 2008 DFO survey compare to the areas closed to scallop fishing during June 2008?
  - The closed areas were determined on the basis of past commercial fishery catch rates from observed trips.
  - *Suggested* to compare yellowtail distribution from 2008 DFO survey to areas closed to scallop fishing during June 2008.

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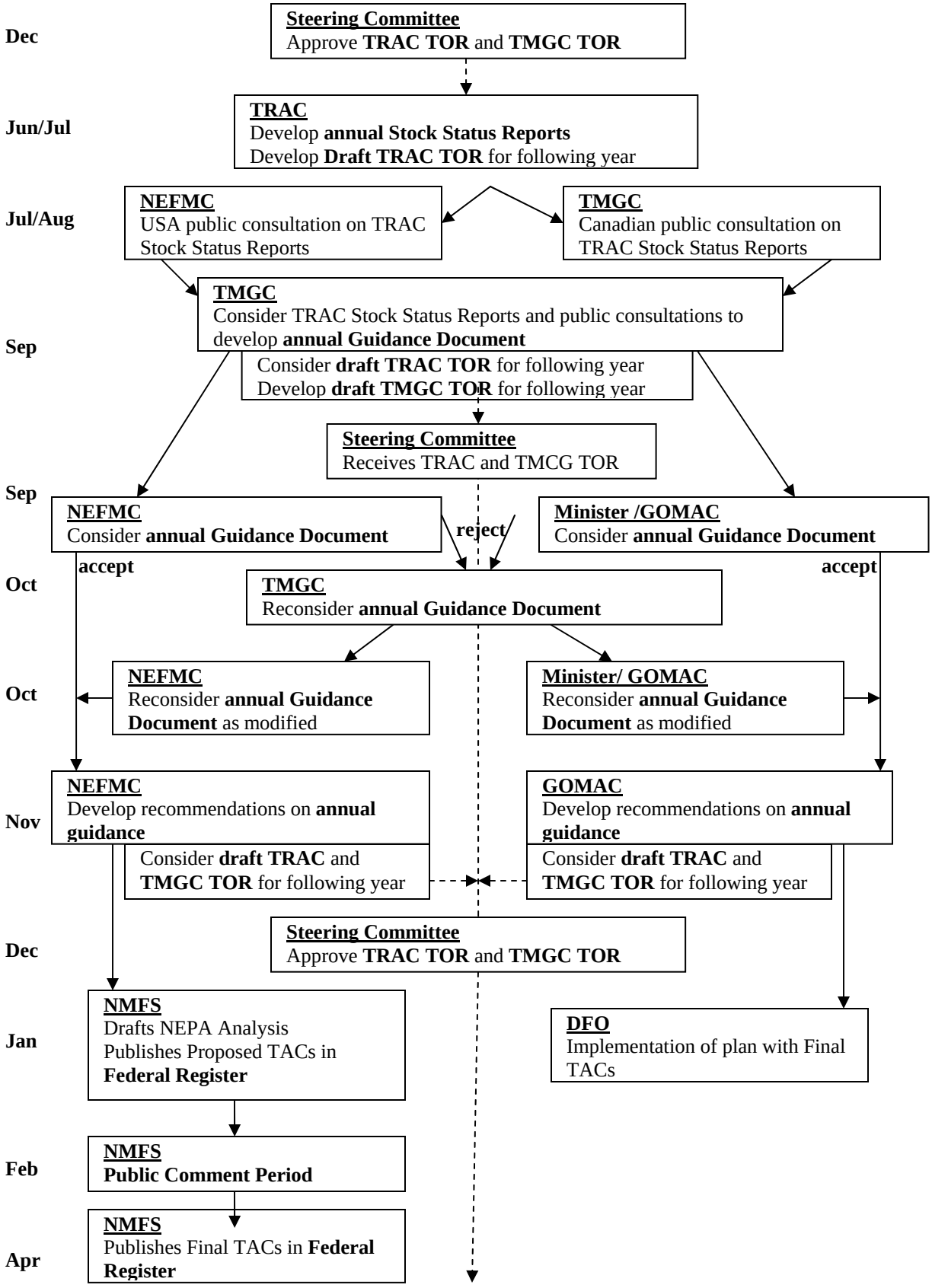
Appendix 5: Annual Process for Determining Harvest Levels of Transboundary Resources of Cod, Haddock and Yellowtail Flounder.



Appendix 6. Draft Terms of Reference for 2009 TRAC Assessment Meeting.

Transboundary Resources Assessment Committee
Assessment of Georges Bank Cod, Haddock and Yellowtail
Conference Center, Biological Station, St. Andrews, NB Canada
June/July 2009

Terms of Reference

Context

The TRAC annually obtains requests for harvest advice on transboundary resources from the Transboundary Management Guidance Committee (TMGC).

For the following resources:
Eastern Georges Bank cod
Eastern Georges Bank haddock
Georges Bank yellowtail flounder

- Apply the benchmark assessments to report on the status of the stocks, updating results for the latest information from fisheries, including discard estimates, and research surveys, and characterize the uncertainty of estimates.

- For a range of total catch values in 2010, estimate the risk that the 2010 fishing mortality rate would exceed 0.18 (cod), 0.26 (haddock) and 0.25 (yellowtail flounder) respectively

- If stock condition is poor, for a range of total catch values in 2010, estimate the risk that the biomass at the beginning of 2011 would not achieve a 0%, 10% or 20% increase compared to the beginning of 2010.

- Review the biomass distribution relative to the USA/Canada boundary, updating results with the 2008 survey information, and apply the allocation shares formula.

- Review and determine an appropriate metric for reporting biomass for GB yellowtail flounder.

- Draft terms of reference for 2010 June TRAC

- Other matters.

Outputs

TRAC Transboundary Status Reports the eastern Georges Bank cod and haddock, and Georges Bank yellowtail flounder management units.
TRAC Reference Documents for eastern Georges Bank cod and haddock, and Georges Bank yellowtail flounder management units.
TRAC Proceedings of meeting discussion

Participants

DFO Maritimes scientists and managers
NMFS Northeast Region scientists and managers
Canadian and US fishing industry
US State and Canadian Provicial representatives (NB and NS)
NEFMC representatives

Appendix 7. Draft Terms of Reference for 2009 TRAC Eastern Georges Bank Benchmark Assessment Meeting.

Context

The TRAC was established in 1998 to peer review assessments of transboundary resources in the Georges Bank area and thus to ensure that the management efforts of both Canada and USA, pursued either independently or cooperatively, are founded on a common understanding of resource status. While stock assessment results are needed routinely to serve the management system, it is not practical to evaluate the assessment approach each time the assessment is conducted. Instead, review of the assessment approach (benchmark assessments) are conducted periodically, generally at a separate meeting. The last TRAC benchmark for cod was conducted in February 2002.

At present, the US assessment for the whole of Georges Bank is conducted independently from the TRAC assessment of eastern Georges Bank. There is some concern that differing assessment approaches may make reconciliation of results difficult. A benchmark that reviews the assessment approaches for both areas together would address this issue.

Objectives

1) To review the assessment frameworks for the two Georges Bank cod management units (5Z+6 for USA and 5Zjm for Canada). The agreed benchmark would be used in the June/July 2009 TRAC for 5Zjm cod.

Data Inputs

- Review fishery landings and estimates of discards from all fisheries
- Determine most appropriate methods for calculating fishery landings at age
- Determine most appropriate methods for calculating discards at age from all fisheries
- Determine most appropriate methods for calculating weights at age for the fishery catch
- Determine most appropriate methods for calculating survey indices of abundance at age
- Determine most appropriate methods for calculating weights at age for the population
- Explore fishery catch per unit effort indices for use as tuning indices
- Examine tagging data for application in stock assessment

Assessment Methods

- Explore full range of assessment methods for estimating current abundance and exploitation rate such as, but not limited to, catch curves, separable VPA, index based approaches, surplus production, delay-difference, calibrated VPA, statistical catch at age models
- If required, update reference points for harvest strategy based on agreed assessment approach
- Formulate projection procedures for harvest advice based on agreed assessment approach

2) Review if an assessment of eastern Georges Bank can be reconciled with an assessment of Georges Bank as a whole.

- Review the documentation on rationale for the current management unit

Outputs

TRAC Proceedings, which will document the details of the benchmark

TRAC Reference Documents

Participants

DFO Maritimes scientists and managers
NMFS Northeast Region scientists and managers
Canadian and US fishing industry
US State and Canadian Provincial representatives
NEFMC representatives