



## ***CERT***

**Comité d'évaluation des  
ressources transfrontalières**

**Comptes rendus 2007/01**

## ***TRAC***

**Transboundary Resources  
Assessment Committee**

**Proceedings 2007/01**

### **Transboundary Resources Assessment Committee (TRAC)**

**Report of Meeting held  
12–15 June 2007**

**Hachey Conference Centre  
St. Andrews Biological Station  
St. Andrews, New Brunswick, Canada**

#### **Meeting Chairpersons**

R. O'Boyle  
Fisheries and Oceans Canada  
Bedford Institute of Oceanography  
Dartmouth, Nova Scotia, Canada

L. O'Brien  
National Marine Fisheries Service  
Northeast Fisheries Science Center  
Woods Hole, Massachusetts, USA

**October 2007**



## **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.

**TABLE OF CONTENTS**

ABSTRACT / RÉSUMÉ ..... ii

INTRODUCTION ..... 1

ASSESSMENT INPUTS ..... 1

    Discards of Cod, Haddock, and Yellowtail from the 2005 and 2006 Canadian Scallop  
    Fishery on Georges Bank ..... 1

    Discards of Cod from the 2006 Canadian Groundfish Fishery on Eastern Georges Bank ..... 3

    2007 Production Ageing Report ..... 4

    Yellowtail Bycatch Rates in Canadian Scallop Fishery ..... 5

ASSESSMENTS ..... 5

    5Zjm Cod ..... 5

    5Zjm Haddock ..... 7

    5Zhjmn Yellowtail ..... 12

MANAGEMENT RELATED ISSUES ..... 15

    Allocation Shares ..... 15

    Calculation of Fishing Mortality for Reporting to TMGC ..... 15

    Biomass Reference Points ..... 16

    2008 Terms of Reference ..... 17

CONCLUDING REMARKS ..... 18

APPENDICES ..... 19

    Appendix 1. Meeting Terms of Reference ..... 19

    Appendix 2. Meeting Agenda ..... 20

    Appendix 3. List of Participants ..... 21

    Appendix 4. Report of Eastern Georges Bank Cod and Haddock, and Georges Bank  
    Yellowtail Flounder U.S. Industry Consultation Meeting, New Bedford Free  
    Library, 7 June 2007 ..... 22

    Appendix 5. Report of DFO/Industry Pre-assessment Meeting, Rodd Grand Hotel,  
    Yarmouth, NS, 7:30 p.m., Monday 4 June 2007 ..... 25

    Appendix 6. Draft Terms of Reference for 2008 TRAC Assessment Meeting ..... 30

    Appendix 7. Notes of NMFS/DFO Teleconference of 9 July 2007 to discuss TRAC/GARM  
    Interaction for 2008 Assessments ..... 32

### **ABSTRACT**

The Transboundary Resources Assessment Committee (TRAC) met during 12–15 June 2007 in St. Andrews, New Brunswick, Canada, to review stock assessments of eastern Georges Bank cod, eastern Georges Bank haddock, and Georges Bank yellowtail flounder, and to consider a number of related scientific issues. Results of the meeting will be used by the Transboundary Management Guidance Committee (TMGC) in developing management guidance for the 2008 fishing year for these transboundary resources.

### **RÉSUMÉ**

Le Comité d'évaluation des ressources transfrontalières (CERT) s'est réuni du 12 au 15 juin 2007 à St. Andrews (Nouveau Brunswick), au Canada, pour examiner les évaluations des stocks de morue et d'aiglefin de l'est du banc Georges ainsi que de limande à queue jaune du banc Georges et pour étudier diverses questions scientifiques connexes. Les résultats de cette réunion serviront au Comité d'orientation de la gestion des stocks transfrontaliers (COGST) à formuler des orientations de gestion de ces ressources transfrontalières pour l'année de pêche 2008.

## INTRODUCTION

The Transboundary Resources Assessment Committee (TRAC) Co-chairs, Robert O'Boyle and Loretta O'Brien, welcomed participants (Appendix 3), noting that the first TRAC meeting was held in 1998. 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: annual assessment reviews are 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 will be applying these benchmarks to the most recent data on these resources to produce assessments to guide fisheries management in 2008/09.

Participants were reminded (a) that the TRAC is a forum for scientific review; (b) that management issues would not be considered; and (c) that the TRAC deliberations and conclusions would not be finalized until the Transboundary Status Reports (TSRs) had been made public.

The Terms of Reference and Agenda for the meeting are provided in Appendices 1 and 2, respectively. A number of changes were made to the Agenda. Specifically, presentations relevant to the assessments (discard determination, production ageing report, and industry meeting reports) were moved to Monday morning, and the rest of the Agenda changed accordingly.

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, U.S. scientists met with fishermen in New Bedford, Massachusetts, USA, on 7 June 2007. The minutes of this meeting are provided in Appendix 4. Similarly, Canadian scientists met with fishermen in Yarmouth, Nova Scotia, Canada, on 4 June 2007. The minutes of this meeting are provided in Appendix 5.

## ASSESSMENT INPUTS

### **Discards of Cod, Haddock, and Yellowtail from the 2005 and 2006 Canadian Scallop Fishery on Georges Bank**

Gavaris, S., G. Robert, and L. Van Eeckhaute. Discards of Cod, Haddock and Yellowtail from the 2005 and 2006 Canadian Scallop Fishery on Georges Bank. TRAC Working Paper 2007/02.

Rapporteur: C. Legault

#### *Presentation Highlights*

Discards rates (discards/effort hour) of Atlantic cod, haddock, and yellowtail flounder from the 2006 Canadian sea scallop fishery on Georges Bank were estimated from 11 observed trips. Since 2004, the prevalence of freezer trawlers has been increasing. Freezer trawlers tend to use a larger dredge. A multiplicative model was used to standardize freezer trawler and wetfish

trawler effort. It was determined that 1.0 freezer trawler hour was equivalent to 1.2 wetfish trawler hours. This factor was used to standardize effort of observed trips and for the total scallop fishery effort. Data were insufficient to determine spatial differences in discard rates, but temporal trends were taken into account using a 3-month moving window of discard rates. Discard rates were prorated to the total scallop fishery effort to obtain discards. Discards in 2006 were 565 metric ton (mt) for yellowtail flounder, 117 mt for Atlantic cod, and 67 mt for haddock. Discards for 2005 were updated using standardized effort and the 3-month moving window approach. The revised values were 255 mt for yellowtail flounder, 87 mt for Atlantic cod, and 50 mt for haddock.

### *Discussion*

A question was raised regarding why freezer trawlers have higher catch rates than wetfish trawlers. It was explained that freezer trawlers use wider dredges and are more powerful. The ratio of area swept is approximately equal to the conversion factor. A second question was raised regarding whether the relationship was linear between the two types of effort. A plot of the data was requested and presented. The plot showed high variability. It was concluded that there was insufficient reason to reject the conversion factor.

There was a long discussion regarding the observer scallop trip that had the highest bycatch of yellowtail flounder. This trip used 3 dredges instead of the usual 2 on some but not all of the hauls. Data were not recorded regarding which hauls used 2 and which hauls used 3 dredges. It was hypothesized that using 3 dredges may have increased yellowtail bycatch due to herding, but this was not observed for cod or haddock. It was suggested that other species could be examined for evidence of herding on this trip. This one trip is highly influential in terms of the total discard estimate for yellowtail (565 mt when included, 210 mt when not included), but makes only a minor difference for cod (117 to 105 mt) and haddock (67 to 55 mt). This one trip represents 0.4% of total scallop effort in 2006. It was concluded that there is insufficient reason to exclude this trip from the bycatch calculations. Further examination of this trip was recommended to ensure that it is representative of the fishery due to its importance in the 2006 yellowtail discard estimate. It was recommended that higher observer coverage be employed so that this is less likely to happen in the future.

It was suggested to compare the impact of using a moving window versus using calendar quarters on the impact of effort standardization on the discard estimates. This decomposition was conducted during the meeting and showed about equal impact on the cod and yellowtail results, but this almost entirely due to effort standardization for haddock. It was concluded there was no reason to reject the use of standardization or moving window in the discard estimation.

There was discussion of which method was better for estimating discards, effort or landed scallops. A disadvantage of using effort is that effective effort is difficult to measure, while a disadvantage of using scallop landings is that the ratio then depends on densities of both yellowtail and scallops. It was requested to present the bycatch estimates from the scallop landed approach to compare with the estimates from the effort approach. This was done, and the results were quite similar. The use of scallop landings appears to be promising for the future.

The maps of locations for observed and unobserved trips show that there may not be a random allocation of observed trips, although the positions recorded are not completely precise. Notwithstanding this, higher rates of observer coverage would provide a better view of the spatial distribution of bycatch.

A suggestion was made to include the ratio of observed to total effort in the final document: 6% of effort had observers on board, 3.5% of effort actually observed.

### **Discards of Cod from the 2006 Canadian Groundfish Fishery on Eastern Georges Bank**

Gavaris, S., L. Van Eeckhaute, and K. Clark. Discards of Cod from the 2006 Canadian Groundfish Fishery on Eastern Georges Bank. TRAC Working Paper 2007/03.

Rapporteur: C. Legault

#### *Presentation Highlights*

Discarding of cod is not permitted in Canadian groundfish fisheries. The disparity in cod and haddock quotas created an environment where catches and discarding of cod was a constraint in harvesting haddock in the Canadian groundfish fishery. Comparison of the cod:haddock ratio between observed and unobserved fishing was used to detect and estimate potential discarding of cod. The analyses were stratified by fleet, zone, and quarter. Based on evaluation of precision, bias, and robustness to low catch trips, a ratio estimator was deemed superior to logarithmic transformation. Bootstrap confidence distributions of the discard multiplier were used to determine if the evidence was compelling enough to warrant estimation of discards in each fleet by fishing zone and quarter.

Results indicated that discarding was not detectable for the fixed gear fleets, but that evidence for discarding was compelling for the mobile gear for most quarters. The estimated discards of cod from the groundfish fishery for 2006 were 237 mt.

#### *Discussion*

Observed trips are allowed to remove panel (separator) for some hauls. These hauls are noted in the data records and are not used in the analyses. Sub-trips are a construct that vary in number of hauls.

U.S. gillnetters and longliners report discarding damaged fish (e.g., from dogfish). Do Canadians do this as well? Representatives from the Canadian industry reported they have not heard about this happening.

When multiplier is less than one for entire distribution, this implies that observed trips had a much lower ratio of cod to haddock than unobserved trips and therefore no discarding. However, observing these results causes concern that the distributions greater than one could also have problems.

It was suggested to add a note to Table 3 that values are standard errors in the final report. Two questions for future research were posed: 1) Are standard errors related to catch? and 2) Do multipliers change with amount of information available? Multipliers tend to be higher in Zone B than Zone A. In 2006, a strong seasonal signal was not observed as in previous years. It was again noted that increased observer coverage would improve the precision of bycatch estimates, although current sampling rates are about 25% of the observed landings.

An alternative approach is to use the cod to haddock ratio times the haddock catch or effort. This approach is similar to the U.S. estimation of yellowtail discards from the scallop fishery where the ratio of yellowtail discarded to scallop kept is used. However, one could still

encounter the problem of estimating fewer cod discards than actually observed. It was recommended that this approach be explored in the future for comparison.

It would be helpful to complete sums of columns and rows in Table 2 to see just how much of the total is being estimated.

The overall results are not very sensitive to choice of 20% cdf (cumulative density function) cutoff for inclusion of discards.

### **2007 Production Ageing Report**

Sutherland, S.J., L. Van Eeckhaute, B. Hatt, N. Monroe, S.E. Pregracke, N.L. Shepherd, and J.M. Burnett. Measures of Accuracy, Precision, Inter-laboratory Comparisons Associated with 2007 TRAC Production Ageing. TRAC Working Paper 2007/09.

Rapporteur: L. O'Brien

#### *Presentation Highlights and Discussion*

These analyses are valuable to confirm that ageing continues to be at acceptable levels of accuracy and precision within and among laboratories. There was agreement that this document should be included as a TRAC working paper, which could then be cited in each assessment.

How does one know the true age? Work done recently at Department of Fisheries and Oceans (DFO) at Bedford Institute of Oceanography (BIO) used bomb calorimetry that assigns the true age within six months.

The Northeast Fisheries Science Centre (NEFSC) has a reference collection of otoliths; however, the size of the collection and whether it was static or not were both unknown. The recommendation was to replace portions of the collection periodically, if this is not currently being done.

DFO at the St. Andrews Biological Station (SABS) does not have a reference collection, although there is a collection of digital images used for training. It was noted that a reference collection exists for Scotian Shelf groundfish, which has been useful in checking continued accuracy of age readers.

Precision in ageing of cod and haddock is checked by double ageing, and by the ability to follow cohorts in the catch-at-age. The recommendation was to start a reference collection at St. Andrews for cod and haddock.

It was noted that it would be good to double check ages on previous interpretations; however, if the reference collection was replaced periodically, this would also serve as a way to confirm that otoliths are being aged in the same manner.



## **Yellowtail Bycatch Rates in Canadian Scallop Fishery**

Stone, H. Comparisons of Bycatch Rates of Yellowtail Flounder in the Canadian Georges Bank Scallop Fishery with Biomass Trends from the Yellowtail Flounder Assessment. TRAC Working Paper 2007/01.

Rapporteur: H. Stone

### *Presentation Highlights*

The Canadian offshore scallop fishery is considered to be the main source of Canadian yellowtail flounder discards/bycatch on Georges Bank. A request was made by the Canadian scallop industry to examine the trends in yellowtail flounder bycatch rates from observed trips for synchrony with trends in population abundance from the 5Zhjmn yellowtail flounder stock assessment. A multiplicative model was used to generate a standardized catch per unit effort (CPUE) series for age 2+ yellowtail for comparison with age 2+ population biomass and the DFO survey age 1+ biomass index. The age 2+ bycatch rates did not exhibit the same trends as age 2+ population biomass from the assessment or the age 1+ DFO survey biomass index. The differences in trends were difficult to interpret, largely because of the shortness of the bycatch rate time series. Furthermore, bycatch rates may not reflect trends in population abundance since the scallop fishery is concentrated geographically in 5Zj with considerable effort occurring during the second quarter, the time of peak spawning (May-June) of yellowtail flounder on Georges Bank. Because yellowtail are gravid at this time of year, their catchability in scallop gear may be higher, particularly during Quarter 2.

### *Discussion*

There was agreement among participants that the standardized CPUE series was too short to draw meaningful conclusions about trends in relative abundance. However, it was felt that since the scallop fishery was concentrated in a small geographic area when the fish were in gravid condition, that bycatch rates would likely be biased. A suggestion was made to use a nested design for the multiplicative model since this would allow standardization by quarter within year and better reflect the data used in the analysis.

## **ASSESSMENTS**

### **5Zjm Cod**

Gavaris, S., L. O'Brien, K. Clark, and B. Hatt. Assessment of Eastern Georges Bank Atlantic Cod for 2007. TRAC Working Paper 2007/04.

Rapporteur: K. Clark

### *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 2006 were 1,615 mt, including 441 mt of discards. Canadian catches increased to 1,450 mt in 2006 from 861 mt in 2005. USA catches declined to 166 mt in 2006 from 277 mt in 2005.

Adult population biomass (ages 3+) declined substantially from 44,000 mt in 1990 to 8,500 mt in 1995, the lowest observed. The biomass subsequently increased to 19,500 mt in 2001, declined to 13,000 mt in 2005, but increased to 20,000 mt at the beginning of 2007 (80% Confidence Interval: 16,000 mt – 24,000 mt). Much of the increase in the late 1990s 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 increase in 2007 was due to growth of the 2003 year class. 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 7.7 million, is the first above average (6.3 million for 1978-2006) cohort since the 1990 year class. Prior to the 2003 year class, the 1996 and 1998 year classes, at over 4 million, were the strongest since the 1990 year class. The 2002 and 2004 year classes, at about 1 million each, are the lowest on record. The initial estimate of the 2005 year class is below average, at 2 million.

Fishing mortality (F) for ages 4-6 increased sharply between 1989 and 1993, from 0.5 to 1.0. In 1995, fishing mortality declined substantially to  $F=0.19$  due to restrictive management measures. It subsequently fluctuated between 0.19 and 0.5 until 2005 when it declined to 0.1 and was 0.15 (80% Confidence Interval: 0.13 – 0.20) in 2006, below  $F_{ref}=0.18$ .

Assuming a 2007 catch equal to the 1,900 mt total quota, a combined Canada/USA catch of about 2,700 mt in 2008 would result in a neutral risk (50%) that the fishing mortality rate in 2008 will exceed  $F_{ref}$  and a neutral risk (50%) that the 2009 adult biomass will be lower than the 2008 adult biomass. A 20% biomass increase is unlikely even with no catch, but a catch of 700 mt results in a neutral risk that biomass would fail to increase by 10%. A status quo catch of about 1,900 mt in 2008 would result in a low risk (less than 25%) that the adult biomass would decrease from 2008 to 2009 and a high chance of maintaining the fishing mortality below  $F_{ref}=0.18$ .

### *Discussion*

#### Fishery and Discards

The relationship between U.S. kept catch and discards was discussed. It was proposed that the change in U.S. management practices in 2004 might mean that the discards are related more to trip limits than minimum size limits. It was noted that, as part of the upcoming U.S. GARM III process, discard calculation methods will be examined. However, for the purposes of this meeting, the trawl data from 1989 to 2006 for the cod discard:kept ratios were extracted and presented. When the pooled data from the 3<sup>rd</sup> and 4<sup>th</sup> quarters of 2004 and all quarters from 2005 and 2006 were examined, the relationship between kept catch and discards appeared to be appropriate. An alternative analysis was presented using individual trips by quarters 1, 2, and 4 for 2006. There was very little data for quarters 1 and 4. The conclusion of the group was that the current method using the sum of discards to sum of kept is appropriate, but that examining the data by trip before pooling would help to identify outliers.

#### Indices

Data were presented from the National Marine Fisheries Service (NMFS) spring and fall surveys and the DFO spring survey. The age at which cod are caught by the survey gear was discussed. Cod are rarely caught at age zero but begin to be caught at ages 1 and 2. The age 1 data from the DFO survey are not used in the assessment because these data are so variable, but the NMFS spring survey age 1 data are used.

### Assessment Results

The model diagnostics were discussed. Although the model fits the data reasonably, the model seems to be creating some older fish that are not actually in the population. In the model, the final year has some negative residuals at older ages since there are very few older fish in the DFO and NMFS spring surveys. The “around the corner” method, used since the benchmark review when there were some small year classes and a large retrospective pattern, estimates a dome shaped partial recruitment (PR) at the older ages. Changing the partial recruitment (PR) at older ages reduces the retrospective pattern.

Although this year’s assessment predicts a small increase in stock size, concern was expressed that a single recruiting year class (2003) accounts for more than 50% of the projected biomass. Retrospective plots for the age 1 estimates were produced. These demonstrated that in recent years, there has been a tendency to underestimate year classes initially. The exception would be the relatively large 2003 year class which was initially overestimated. The 2 most recent estimates for this year class were lower than the initial estimate but are similar to each other.

Recruit survivorship was discussed and it was noted that survivorship is now lower than in the past. Although the cod resource has increased since 1995, it is still fluctuating around a low value which may be why there is low recruitment.

It was observed that F values increased on older age groups in 1993, and a strong domed PR has been evident since then. This can be explained in part by the change in management around 1994, when the U.S. implemented a year round closure of Area 2 and the Canadian winter fishery ended. These changes led to reduced catches of large fish.

The 2007 DFO and NMFS spring surveys showed a wider distribution of cod over the Bank than observed in previous years. Possible relationships between cod distribution, prey, and temperature over time were discussed. It was noted that the U.S. surveys collect stomach content data and that some diet information might also be available from the 2006 DFO survey conducted by the *Teleost*.

When the risk plot was initially presented, there was discussion on inclusion of a line representing status quo catches. This was not adopted when the status report was reviewed.

### **5Zjm Haddock**

Van Eeckhaute, L., R. Mayo, and M. Travers. Assessment of Eastern Georges Bank Haddock for 2007. TRAC Working Paper 2007/08.

Rapporteur: E. Brooks

### *Presentation Highlights*

The total catch of eastern Georges Bank haddock in 2006 was 12,642 mt under a combined Canada/USA quota of 22,000 mt. The 2006 Canadian catch decreased from 14,536 mt in 2005 to 12,051 mt, while the USA catch increased slightly from 569 mt in 2005 to 591 mt. Discards estimated from the Canadian scallop fishery were very low relative to the total catch. USA groundfishery discards were high in comparison to the total catch and amounted to 52% in numbers and 25% by weight of the USA catch.

The majority of the Canadian catch occurred in July, August, and September. As in 2005, a 2006 Canadian exploratory winter fishery took place in January and ended February 7<sup>th</sup>.

Observer coverage for the winter fishery was almost 100% and the fishery closed before peak spawning of cod and haddock commenced. Most of the Canadian landings were made by otter trawlers with long liners landing only 16% of the Canadian total. The USA fishery is almost exclusively otter trawlers. The Canadian landings were well sampled and included port and observer sampling. Observer coverage of the Canadian fishery was 31% by weight. The majority of the USA catch occurred in Quarter 2. Sampling was low in some calendar quarters, and length composition data were augmented from adjacent areas. Age data was augmented from the DFO and NEFSC spring surveys.

The 2000 year class dominated the landings, while the 2003 year class dominated the discards. Older ages are contributing more to the catch than during the 1990s. The contribution from the 2003 year class to the 2006 catch was much lower than predicted due to its failure to recruit as expected.

The recent survey distributions showed high widespread catches of adult fish in all 3 surveys. Some good catches of age 2 haddock on the southern flank were observed in the DFO survey; a somewhat atypical distribution. Catches of age 0 and 1 haddock (2006 year class) were low. There were good catches of the 2005 year class.

Most 2007 survey weights increased but not enough to offset the recent downward trend in weights-at-age observed since about 2001. Condition (weights at length) showed an increase in 2007.

The ADAPT formulation was the same as that used in the previous assessment and showed similar diagnostics and no persistent retrospective patterns of concern. The estimate for the 2003 year class has remained stable for the past 3 years.

Adult population biomass (ages 3+) has steadily increased from near an historical low of 8,500 mt in 1993, to 70,000 mt in 2003. Adult biomass subsequently decreased to 46,900 mt in 2005, but increased in 2006 and again in 2007 to 145,000 mt, well beyond the 1931-1955 maximum adult biomass of about 90,000 mt. The 2003 year class is estimated to be 322 million age 1 fish, similar to the previous year's estimate, and the largest ever observed in the assessment time series. The 2001, 2002, and 2004 year classes, at less than 8 million, are below the recent ten-year average of 18 million fish, while the 2005 year class, at 31 million, is above the average. Initial estimates of the 2006 year class suggest that it is about the size of the 2004 year class. Fishing mortality (ages 4+) was below  $F_{ref} = 0.26$  during 1995 to 2004. The failure of the 2003 year class to recruit as expected to the 2005 and 2006 fishery resulted in fishing mortality in 2005 and 2006 to be above  $F_{ref}$  ( $F_{2006}=0.36$ ).

The 2003 year class will account for the majority of the 2008 catch. The catch forecast for 2008 was made using beginning year lengths for the 2003 year class estimated using the relationship between growth rate and length from the 1998 to 2000 year classes. Fishery lengths were estimated using the relationship between survey lengths and fishery lengths for 1995 to 2006 (the fishery changed from diamond to square mesh in 1995). Partial recruitment values for the 2003 year class, which potentially contribute the most uncertainty to the catch forecast, were estimated from the relationship between survey average lengths at age and observed partial recruitment values during 2003-2005. For other year classes, the 2007 DFO survey weights (for beginning year weights), and 2006 Canadian fishery weights were used. With an assumed total catch of 19,000 mt in 2007, a combined 2008 Canada/USA  $F_{ref}$  catch was forecast to be 24,000 mt. The  $F_{ref}$  catch biomass for 2007, using the updated input values, was estimated at 15,000 mt, lower than the 19,000 mt forecast from the previous assessment which, if caught,

would result in a fishing mortality in 2007 higher than  $F_{ref}$ . A 2008 catch of 20,000 mt would result in a low risk (25%) that fishing mortality in 2008 would exceed  $F_{ref}$ .

### *Discussion*

#### Catch information

The Total Allowable Catch for haddock in 2006 was 22,000 mt, but only 12,000 mt were caught. The shortfall was on the U.S. side. In the first half of 2006, the U.S. fishery was closed due to the cod quota.

A plot of the U.S. length composition showed discards of haddock above the minimum size, which was surprising given that total U.S. catch was so far below the quota. The discards were identified as having come from otter trawls in Quarter 2. However, there were no trip limits, so that does not explain the discarding of legal sized fish. Fishermen were noted to have been complaining that they could not find large haddock, so it is unusual that there would be discards of legal sized fish. No explanation for the legal sized discards was found during the meeting.

On seeing the bar plots of historical eastern Georges Bank haddock catches, a fisherman remarked that most long term fishers would not believe that 2004 was the largest landing ever; most would think that a lot more were landed way back in the 1960s. A second question was raised as to why data were missing for the years 1955-1968. It was explained there is no information available to partition the catch, by unit area and fleet, in these years.

Several observational comments were made on various slides during the presentation. In viewing the scallop dredge discard slide, it was noted that one can pick out strong year classes. On the bubble plot of fishery age composition, it was noted that younger ages are no longer being caught, while the older ages are showing up. The quarterly length composition slide showed a bimodal hump in Quarter 4, and it was explained that this was a result of the recruiting 2003 year class, which contributed progressively more to the catches later in the year.

A question was raised as to why there is a peak of smaller discards (less than 36 cm fish) for the U.S. fishery (Figures 6 and 7 in the report). It seemed counterintuitive, given that the U.S. mesh size is 165 mm, while the Canadian mesh size is 130 mm. Several explanations were offered. One meeting attendee felt that it was most likely the diamond mesh of U.S. versus the square mesh of Canada, as well as the fact that Canadians do not use chafing gear. In addition, it was explained that any time there are a lot of "smalls" showing up, there will be plugging up at the cod end, regardless of the mesh size and type. Also, it was pointed out that Canadians measure in fork length while U.S. legal limit is in total length, although it was believed that this had been corrected for in the plots. Related to this point, it was noted that there are often comments by U.S. fishermen that the U.S. is using "the wrong mesh."

#### Surveys

After length information from the surveys was presented, a question was raised whether the change in length at age was real ("true") or simply a sampling artifact? The analyst responded that it was probably real. In discussing year class growth patterns, the 2004 year class was described as having started off small in body size but then catching up, and the 2005 year class appears to be growing in size like the 2003 year class. From the growth plot, it appeared as if the 2001 year class had shrunk, but this was attributed to low sampling.

### Stock Assessment

The stock was assessed using the ADAPT formulation that had been used previously. A bubble plot of residuals in age composition was examined and compared to information from the surveys. The surveys show that the population is increasing. A question was raised about the residual patterns. The virtual population analysis (VPA) results seem to suggest higher population increases than those in the surveys. It was mentioned that the timing of movement of fish relative to surveys could create this pattern.

A plot was requested to try to reconcile the population trajectory and the survey trends. The VPA shows consistent increases while the surveys seem to be fluctuating (having Figure 19 versus Figure 29 on same plot would help). The appropriate units for such a plot were debated. The assessment is done in numbers, so that this comparison should be done in numbers rather than biomass. But, it was argued that biomass is the currency for discussion. Finally, a question was posed regarding the variability in surveys over time, and whether or not this was increasing.

The retrospective plots for this assessment do not indicate a problem. It was noted that one year class estimate was initially low, and then the second estimate was higher, and subsequently, the estimates have stabilized (opposite of the usual pattern). Although the 2000 and 2003 year classes dominate the population, the group questioned the use of “weak” in describing the 2004 and 2006 year classes. The term “weak” seems subjective and is relative to a baseline. The strong year classes stand out, but the remaining year classes are probably varying around an average. It was suggested that year classes could be characterized by comparing to the median. Figure 2 from last year shows that most recent year classes are less abundant than the old historical year classes. Further discussion on the topic considered characterizing year classes in terms of the previous 10-year average, and whether or not the abundance of a year class is below the ten-year average. A caveat was suggested that the 10-year average should not include the strong 2003 year class.

In the plot of fishing mortality rate versus year, the plotted  $F$  switched from 5+ to 4+ because of the year classes. Year 2004 shows the biggest difference between those 2 trajectories, and that is due to the effect of the 2000 year class. A question was then raised as to whether or not we are comparing apples and oranges with  $F_{ref}$ . A good point was made that  $F_{ref}$  was computed on fully recruited fish (ages 4+), so if we now look at the  $F$  on ages 5+, that would imply a different  $F_{ref}$ . For the years 2005 and 2006, the status conclusion would be overfishing because for both 4+ and 5+ the  $F$  is above  $F_{ref}$ . The discrepancy between the overfishing status, and the fact that the quota was not met, is due to the slow growth of the 2003 year class. The expected contribution of the 2003 year class to landings was far below expectations. A follow up question was asked regarding whether or not yield would “catch up” in 2008 as the 2003 year class gains weight, i.e., will  $F$  on ages 4+ decrease next year? Perhaps, but this does not alter the fact that catch on the older ages was greater than it should have been. Clarification was made as to the meaning of “Surplus Production” on one of the slides—the quantity plotted is total production minus natural mortality.

Because the ADAPT model run only goes back to 1969, a question was raised as to the scale in the earlier time period (1931-1950s), and whether the period from 1969 onwards is on the same scale. The paper by Clark et al. (1982, J. Northw. Atl. Fish. Sci. 3: 1 - 27) would be a good check; the catch-at-age from that paper could also be compared.

### Forecast

A question was asked about the level of recruitment used in the projections. Twenty million was used for recruitment, but it has no impact on projections because only two-year forecast results were evaluated.

Clarification was requested as to what was being shown on the slide of predicted growth of the 2003 year class. It was explained that the plot showed predicted length at age of this cohort in both the fishery (first red diamond) and the survey (second red diamond). There is a consistent difference of about 2 cm. Discussion ensued about 2 approaches for estimating growth: (1) Estimating the growth rate across year classes (which assumes the same  $L_{inf}$ ); and (2) Fitting a von Bertalanffy curve to each cohort, using fishery and survey data separately. It was noted that the fishery and survey occur at different times of the year, and that lengths at age in the fishery reflect a selectivity effect.

With respect to the partial recruitment (PR) plot for the 2003 year class, a substantial amount of vertical spread was apparent around the 46 cm point, ranging from about 25-80%. A sensitivity analysis was requested using the high and low PR to place bounds on the Total Allowable Catch (TAC) estimates. The fit to these points was accomplished using a Loess smoother, using 0.6 for the smoothing parameter. A suggestion was made to update this plot and use fishery length-at-age data rather than survey length-at-age data, because the PRs are estimates for the fishery.

After viewing the exploratory fishery slide, a question was raised about the timing of spawning. Cod generally spawn earlier in the year than haddock (which usually exhibits spawning peaks in April and May). It was noted that the exploratory fishery was shut down to avoid peak cod spawning.

### Requested analyses

A plot was shown with the 3 surveys (ages 3+) and the VPA predicted biomass for ages 3+ (each age specific index was converted to weight, adjusted by age-specific  $q$ , and summed for ages 3+). The fit seemed good, considering the lognormal error assumption.

An equation to predict the growth exponent for the survey growth curve for the 2003 year class was revisited by adding observations from 2 additional year classes, however, the resultant change was negligible. Including data points at younger ages altered the functional relationship from linear to curvilinear. Modifying the function further was not pursued, because the predicted lengths from the growth exponent followed from the range where the linear function fitted the data.

The partial recruitment was revisited in the context of the risk plots, this time with fishery weight (kg) on the x-axis rather than size. Smooth lines were drawn to bound the partial recruitment at ages 4 and 5. A discussion ensued about presenting projection results using the upper and lower bounds, and whether 2 or 3 scenarios should be considered (medium and low scenarios, and whether the high partial recruitment run should also be included as an additional scenario). After this topic, discussion focused on what managers would do with this information, i.e., how would they act on it? A question was also raised on whether a logistic fit would be more formal than the present smooth lines. It was decided that the current smooth lines would suffice for illustrating uncertainty in partial recruitment in the projections.

The question about which fishery weights to apply in the projections was revisited. Some of the differences between observed weights and predicted weights at length in Table 27 reflect the source and timing of the data used. The predicted weights were derived from a growth curve

using observed survey data, whereas the fishery data came from samples collected later in the year. It is, therefore, expected that the weights-at-age would be greater using data from the fishery than those predicted by a relationship based on survey data.

## 5Zhjmn Yellowtail

Legault, C., H.H. Stone, and C. Waters. Stock Assessment of Georges Bank Yellowtail Flounder for 2007. TRAC Working Paper 2007/07.

Rapporteur: H. Stone

### *Presentation Highlights*

The combined Canada/USA yellowtail flounder (*Limanda ferruginea*) catch decreased from 2005 (4,088 mt) to 2006 (2,206 mt) due mainly to a decrease in quota. Spawning stock biomass (SSB) has leveled off recently, but is currently low at about 5,000-9,700 mt, indicating that stock rebuilding is needed. There are indications of a relatively strong 2005 year class, appearing as 1 year olds in the 2006 NEFSC Fall survey and 2 year olds in the 2007 DFO and NEFSC Spring surveys. The 2005 year class is estimated to be 63-90 million age 1 fish in 2006, comparable to year classes from the 1970s. Fishing mortality rates for fully recruited ages 4+ have declined in the past 2 years, but are still well above the  $F_{ref}$  of 0.25. Truncated age structure in the surveys and changes in spatial distribution indicate current productivity may be limited relative to historical levels. Assuming a 2007 catch equal to the 1,250 mt quota, a combined Canada/USA yield of about 3,500-5,900 mt in 2008 results from the deterministic application of  $F_{ref} = 0.25$ . However, the estimated 2008 yield depends strongly on the 2005 year class, and recent experience has shown that subsequent estimates of initially strong year classes have been generally lower, so caution should be used when setting the 2008 quota.

### *Discussion*

#### Fishery and Discards

There was a large decrease in the U.S. landings between 2005 and 2006 due to a reduction in the quota. In 2006, the U.S. fishery was well sampled. It was pointed out that the spatial distribution of the U.S. fishery changed during the year and that yellowtail were targeted mainly during quarters 3 and 4 along the western and southern boundaries of Closed Area II (CAII). There was no directed Canadian fishery again in 2006 and catches were mostly bycatch from other groundfish fisheries and discards from the Canadian offshore scallop fishery.

A question was raised about the accuracy of the assignment of the U.S. yellowtail flounder catch to statistical area. It was pointed out that there is some difficulty in matching up the dealer reports with the log book data and that there may be some misallocation associated with catch proration among stock areas (i.e., Cape Cod, southern New England, Georges Bank). Work is underway to minimize/eliminate this misallocation problem.

It was pointed out that the weight-at-age is a weighted average that comes from all landings and discards reported by both nations. Current trends in weight-at-age could be influenced by environmental conditions or sampling bias.

The size composition of yellowtail dredge discards was similar for both nations; however, the mean length of yellowtail in the U.S. catch (overall discards plus landings) was slightly larger than in the Canadian catch (36 cm versus 34 cm total length). For the U.S., yellowtail flounder trawl discards are generally below the minimum size limit, while dredge discards include all



sizes. Approximately two-thirds of all U.S. discards originate from the scallop dredge fishery, very little of which is landed. In 2006, there were 33 observed scallop trips in Closed Area II during the second half of the year. The discard to kept ratio for these trips was used to estimate yellowtail discards of 252 mt. One reviewer noted the assumption that discards of yellowtail in the U.S. sea scallop fishery are proportional to kept catch, so as the scallop catch goes up, so do the amount of yellowtail discards. Concern was expressed that this assumption may be less applicable now because of changes in regulations. This was examined by plotting the discards of yellowtail against the kept scallops for each trip; a positive relationship emerged. It was emphasized that the actual assumption in the method is that the samples collected are representative of the entire fleet to which they are applied. This was thought to be true for the U.S. samples given the level of observer coverage.

Yellowtail discards by the U.S. scallop fleet in open access areas were thought to be very low in 2006 (9.9 mt). It was pointed out that this occurred because most of the scallop dredge effort outside of CAII was on southern flank (below the closed area) where the abundance of yellowtail tends to be low.

Scallop fishery discards of yellowtail are much higher for Canada (565 mt) compared to the U.S. (270 mt). It was suggested that this difference may be related to selectivity in U.S. scallop gear, which is rigged with a 10 inch mesh twine top. However, the size composition of yellowtail bycatch is similar for both nations. It may be useful to look at the results of yellowtail flounder size selectivity from U.S. experiments with different twine backs.

Concern was expressed about Canadian scallop fishery discard estimates being so much higher than USA discard estimates, especially this year when the U.S. scallop fishery landings of scallops were more than double that of Canada. Noteworthy is that there was one observed Canadian scallop trip with a very high estimate of yellowtail discards which greatly influenced the total discard estimate for Canada (565 mt when included, 210 mt when not included). However, it was decided that this trip should be included in the overall discard estimate since there was no way to know if other Canadian scallop vessels were experiencing similar bycatch rates in 5Zj during Quarter 2 in 2006.

### Surveys

While the stratification regimes are different between DFO and NMFS surveys, all 3 series show very similar trends, particularly over the past decade. Stratum 16 shows a gradual increase in yellowtail abundance over time for all 3 surveys (after the DFO survey results are adjusted using domain estimation). Hyper-concentration of yellowtail in Stratum 16 is continuing, but may be leveling off at around 90%. There were several indications that the 2005 year class is quite strong.

### Stock Assessment

Based on Benchmark recommendations, annual assessments currently involve examining relative F and survey Z, as well as VPA results. While there is no trend in survey Z, there is a strong trend in relative F, indicating that the basic input data is causing problems with the VPA. The Major Change VPA formulation is now similar to the Base VPA, the only difference being a split in the survey time series for the Major Change model. Although splitting the time series is aliasing an unknown mechanism, there remains a need to know what is happening with this stock and why. This is required for future assessments and for understanding how best to manage the stock. Things changed rapidly in 1995, and this change may be related to management decisions such as the implementation of the year-round closure of Area II.

At the request of one reviewer, the proportions of older ages (6+) in both the catch and the surveys were examined to determine if the ratios were similar over time. The analysis showed a great deal of variability throughout the various time series, but only a small proportion (usually less than 5%) of the population was represented by older (6+) fish. While no definite conclusions could be drawn, it was apparent that there were higher proportions of older fish in the surveys and the catch in recent years compared to the past, but that these proportions would be even higher if the stock was fished at  $F_{ref}$ .

The Major Change model has better residual patterns than the base model, but shows large increases in  $q$  for the most recent time period (1995-2006) in all of the survey series. Currently, there is no explanation why this is happening. An analysis of the projected catch-at-age from the last 3 years' assessments using Base and Major Change VPA formulations showed a progressive decline in realized catch compared to projected catch-at-age for ages 4 and 5.

Although there is a positive sign of recruitment, it is too early to tell how strong the 2005 year class will actually be. This year's projections rely heavily on the 2005 year class (59%), which has not yet recruited to the fishery. If a 10-year average is used for age 2 abundance (instead of the actual estimate at age 2 for the 2005 year class), the total yield in the projections declines by 44%, indicating that the projections are highly dependent on this single year class.

A general discussion followed on whether the results of the assessment could be accepted.

While questions about a change in  $M$ ,  $q$  and management practices were examined during the framework review, these could not be resolved at that time, as is the case now. It is suspected that there is a closed area effect, especially now that most of population is concentrated in Stratum 16. This led to more questions about the consequences and usefulness of closed areas.

Concern was expressed over how much the  $q$ 's have changed. Most interpretations of model diagnostics have focused on residuals and retrospective patterns, but what about examining residual sums of squares or AIC's? Again, it was pointed out that different modeling approaches were tried during the framework review, but all suffered from the same problems. Nevertheless, it was considered that the benchmark formulation offered a useful basis for management advice.

Concern was also expressed over how much influence the 2005 recruitment estimate has in the projections. While the 2005 cohort appeared to be strong in all 4 surveys, it has not yet appeared in the landings or in the discards. It was recommended to use the 10-year average recruitment for age 2 for comparative purposes in the Transboundary Status Report (TSR) to downplay the high 2005 year class and its influence on projections. This sensitivity analysis would show the consequence of fishing with a TAC based on a strong 2005 year class versus an average 2005 year class.

A discussion ensued on whether it was useful to go forward with the Base Case model because of its large retrospective pattern, or whether it was better to base all advice on the Major Change model. Among the reasons for using the Major Change model is the difference in the trajectory for age 3+ biomass, which more closely follows the recent survey trends. Splitting the survey time series is like creating a new time series with a better catchability (Major Change approach). The recommendation was to use only the Major Change model for the TSR, but make reference (in a figure) to the differences in age 3+ SSB trajectories between the Base Case and Major Change models, as was done last year.

---

## MANAGEMENT RELATED ISSUES

### Allocation Shares

Gavaris, S., L. O'Brien, and R. Mayo. 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 2008. TRAC Working Paper 2007/05.

Rapporteur: S. Gavaris

#### *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 NEFSC and DFO survey results which are updated annually.

Resource distributions in 2006, 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 yellowtail flounder. Allocations for 2008 updated with these resource distributions resulted in shares for Atlantic cod of 71% Canada and 29% USA, for haddock of 65% Canada and 35% USA, and for yellowtail flounder of 22% Canada and 78% USA.

#### *Discussion*

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

### Calculation of Fishing Mortality for Reporting to TMGC

Rapporteur: C. Legault

#### *Presentation Highlights*

Estimates of fishing mortality at age from VPA can be highly variable for ages considered fully selected. A single annual value of  $F$  is desired for comparison to reference points. There are many ways to compute this single value; the most common use either an unweighted average or a population abundance weighted average. This topic has been examined many times in the past, but no resolution of a "best" approach has resulted. In this study, two simulation approaches were used to determine if one method consistently performed better than other methods, in terms of bias and variance of estimates. The results demonstrated that this was not the case, with different approaches for computing the summary  $F$  performing best for different data sets. This work was presented at the ICES Working Group on Methods of Fish Stock Assessment, which agreed that one method does not always work best and that decisions must be made on a case-by-case basis.

### *Discussion*

Clarification was requested regarding the term “fully selected” in the presentation. This was described as the range of ages reported in the assessments that are used for comparison with the fishing mortality reference points, and is meant to be the same thing as the age groups included within the “fully recruited” F.

The meaning of the confidence intervals in the figures was clarified during the presentation. These confidence intervals represent the percentiles of the 1,000 realizations accomplished in each simulation.

It was noted that the main source of difference between the weighted and unweighted F values in past TRAC assessments appears to be due to large F values (greater than 2) associated with low population abundance, either due to small cohorts or few survivors at old ages. In these cases, it is recommended to use the N weighted F to reduce the influence of these abnormally high F at age values. However, TRAC recommends that both unweighted and N weighted F values be calculated in each assessment and compared. If there are differences between the two, especially regarding status determination, then the cause of the difference should be determined and a decision made regarding which F is most appropriate. This recommendation only impacts the cod and haddock assessments, because in the current configuration the fully selected ages for yellowtail flounder all have the same F value and, thus, the unweighted and N weighted F are equivalent by definition.

### **Biomass Reference Points**

Gavaris, S. Discussion Paper on the Precautionary Approach: Transboundary Atlantic Cod and Haddock on Eastern Georges Bank. TRAC Working Paper 2007/06.

Rapporteur: R. Mohn

### *Presentation Highlights*

Harvest strategies that reduce the fishing mortality rate when the biomass is low perform better, in relation to both long term yield and conservation of the resource. The TMGC recognized this when it established the following common joint harvest strategies for Atlantic cod and haddock on eastern Georges Bank:

Maintain a low to neutral risk of exceeding the fishing mortality limit reference (Atlantic cod:  $F_{ref} = 0.18$ , haddock:  $F_{ref} = 0.26$ ). When stock conditions are poor, fishing mortality rates should be further reduced to promote rebuilding.

When the TMGC harvest strategy was being developed, there was some consideration of candidate biomass reference points. As there was some urgency to establish a workable common strategy and there was insufficient time to address differences in biomass reference points and their associated implied management actions, these aspects were not resolved. Biomass reference points are a feature of both Canadian policy and USA fishery legislation. An overview of some approaches that have been used to derive biomass reference points was presented to stimulate discussion on the merits of investigating the feasibility of establishing common joint biomass reference points at (or below) which “fishing mortality rates should be further reduced to promote rebuilding”.

### *Discussion*

Although there has been agreement of a common Canada/USA fishing mortality reference level for cod, haddock, and yellowtail, biomass reference points (BRP) for the harvest strategies were not established. BRPs are handled differently in Canada and in the USA. Canada has a three zone system with a critical zone in which there is risk of serious and/or irreversible harm. In the U.S. system, when the biomass is low, it triggers rebuilding to a higher target biomass. The discussion highlighted the need to clarify definitions of biomass reference points.

The principal question was whether or not TRAC should derive biomass reference points. It was questioned whether a common set of BRPs could be established that would satisfy each country's definition of reference points.

In the USA, guidelines for implementing recent changes to the Magnuson-Stevens Act have not been established. In Atlantic Canada, the BRPs are essentially untried. Initial attempts at implementation are being resisted because of their prescriptive nature. Consequently, it was felt that it was premature for TRAC to pursue the establishment of BRPs.

Further discussion focused on whether DFO and NMFS should initiate joint BRP research, even if TMGC does not wish to use BRPs at this time. It was felt that DFO and NMFS could pursue this matter as a scientific investigation as opposed to the provision of management advice. However, there was no consensus about the merits of initiating BRP research. Still, the question is relevant and important at a much wider level, and science managers in both countries might be interested in a broader ranging working group or study.

### **2008 Terms of Reference**

The Terms of Reference for the TRAC in 2008 were discussed. It was noted that a series of Groundfish Assessment Review Meetings (GARM III) have been planned for 2008 by the NEFSC to review: 1) February - benchmarks of 20 northeast groundfish assessments, including Georges Bank cod, haddock, and yellowtail flounder, 2) April – reference points for these stocks, and 3) August – assessments of these stocks. This is the third GARM that has been conducted, the first being in 2002 and the second in 2005. Discussion ensued about the relationship between this process and that of TRAC. The GARM will be reviewing stock status and evaluating progress against the objectives of the Northeast Multispecies Fishery Management Plan. The TRAC is tasked with reviewing stock status and advising USA and Canada on consistent harvesting for eastern Georges Bank cod and haddock and Georges Bank yellowtail flounder.

At the February GARM benchmark review, modifications to (or replacement of) the current models used to conduct the groundfish assessments may occur. It is desirable that the assessment models used by GARM and TRAC for yellowtail flounder be identical. Also, the assessment models used by GARM for Georges Bank cod and haddock should be congruous with the models used by TRAC for eastern Georges Bank cod and haddock. TRAC was not requested to schedule benchmark reviews for any of these stocks in 2008.

It was recommended that the Canadian and USA Co-Chairs of TRAC participate in all of the GARM meetings for the Georges Bank yellowtail flounder, cod, and haddock stocks. In addition, it is desirable for scientists from both Canada and the USA who regularly participate in the TRAC to be invited to the GARM meetings. If possible, these sessions should be considered joint GARM/TRAC deliberations, and a TRAC report documenting the consensus on

assessment models and reference points should be produced. This will likely entail additional work by the DFO and NMFS staff who have responsibility for the TRAC stocks.

Details of how to harmonize the Georges Bank cod and haddock assessments with the eastern Georges Bank cod and haddock assessments remain unresolved. There will certainly be a requirement for NMFS and DFO staff to collaborate. It might be useful to review presentations on the eastern Georges Bank management units at the February and April GARM meetings.

TRAC typically conducts assessments by mid-June to permit sufficient time for the NEFMC process to complete consultations before establishing quotas for the ensuing fishing year. Conducting the assessments in August may disrupt this schedule. It is recommended that NMFS review the schedule for assessments and consultations, and advise the TRAC on when in 2008 the Transboundary Status Reports are needed for eastern Georges Bank cod, eastern Georges Bank haddock, and Georges Bank yellowtail flounder.

It was agreed that these issues should be brought to the attention of the TMGC, which would work with the Canada/USA Steering Committee in their resolution. To facilitate this discussion, a draft set of Terms of Reference was prepared for presentation to the TMGC (Appendix 6).

Subsequent to the TRAC meeting, a teleconference between NEFSC, NMFS, and DFO Maritimes representatives was held to discuss the relationship between the GARM and TRAC processes and the Terms of Reference for TRAC in 2008. It was agreed that there would be two TRAC meetings in 2008, one focused on cod and haddock and the other on yellowtail. The notes of this teleconference and the draft TRAC Terms of Reference for each meeting are provided in Appendix 7. It was agreed that these would be presented to the TMGC for its consideration.

### **CONCLUDING REMARKS**

The Co-chairs thanked the participants for a very effective review of the issues brought to the meeting. They particularly noted the valuable contributions of new reviewers (E. Brooks and K. Trzcinski) to the TRAC, which bodes well for its future. The meeting was then adjourned.

## APPENDICES

### Appendix 1. Meeting Terms of Reference

**Transboundary Resources Assessment Committee**  
**Assessment of Georges Bank Cod, Haddock and Yellowtail**  
Conference Centre, Biological Station, St. Andrews, NB Canada  
12 – 15 June 2007

#### Terms of Reference

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 2008, estimate the risk that the 2008 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 2008, estimate the risk that the biomass at the beginning of 2009 would not achieve a 0%, 10%, or 20% increase compared to the beginning of 2009.
- Review the merits and drawbacks of summarizing annual fishing mortality using un-weighted average versus population weighted average of age specific fishing mortalities and establish consistent practices for reporting to TMGC.
- Review the biomass distribution relative to the USA/Canada boundary, updating results with the 2006 survey information, and apply the allocation shares formula.
- Taking spatial and seasonal patterns into account to the extent possible, evaluate the relationship between the observed bycatch rate of yellowtail flounder in the Canadian Georges Bank scallop fishery and the annual biomass trend from the yellowtail flounder assessment. Interpret similarities and/or differences.
- Draft remit for 2008 June TRAC.
- Other matters.

## Appendix 2. Meeting Agenda

**Transboundary Resources Assessment Committee**  
**Assessment of Georges Bank Cod, Haddock and Yellowtail**  
Conference Centre, Biological Station, St. Andrew's, NB  
12-15 June 2007

### Agenda

#### **12 June 2007 – Tuesday**

08:30 – 09:00 Welcome and Introduction (Chairs)

09:00 – 12:00 Discard estimation for Canadian groundfish & scallop fisheries  
Production ageing report  
Canadian & U.S. industry meeting reports

12:00 – 13:00 Lunch

13:00 – 17:00 Georges Bank yellowtail flounder  
Yellowtail bycatch catch rates in Canadian scallop fishery  
Eastern Georges Bank cod  
Share allocation calculations

#### **13 June 2007 – Wednesday**

08:30 – 12:00 Eastern Georges Bank haddock

12:00 – 13:00 Lunch

13:00 – 17:00 Fishing mortality calculation  
Biomass reference points  
Re-analysis reviews

#### **14 June 2007 – Thursday**

08:30 – 12:00 Report Review

12:00 – 13:00 Lunch

13:00 – 17:00 Report Review

#### **15 June 2007 – Friday**

08:30 – 12:00 Report Review

12:00 Adjournment



### Appendix 3. List of Participants

**Transboundary Resources Assessment Committee**  
**Assessment of Georges Bank Cod, Haddock and Yellowtail**  
 Conference Centre, Biological Station, St. Andrews, NB Canada  
 12–15 June 2007

Name	Affiliation	Phone	Fax	Email
Robert O'Boyle (Co-chair)	DFO, CSA Office	(902) 426-3526	(902) 426-5435	OboyleR@mar.dfo-mpo.gc.ca
Loretta O'Brien (Co-chair)	NMFS, NEFSC	(508) 495-2273	(508) 495-2258	loretta.o'brien@noaa.gov
Bette Hatt	DFO, SABS	(506) 529-5920	(506) 529-5862	hattb@mar.dfo-mpo.gc.ca
Heath Stone	DFO, SABS	(506) 529-5882	(506) 529-5862	stoneh@mar.dfo-mpo.gc.ca
Jamie Emberley	DFO, SABS	(506) 529-5887	(506) 529-5862	emberleyj@mar.dfo-mpo.gc.ca
Jon Hansen	DFO, FAM	(902) 426-9046	(902) 426-9683	HansenJ@mar.dfo-mpo.gc.ca
Julie Porter	DFO, SABS	(506) 529-5925	(506) 529-5862	PorterJM@mar.dfo-mpo.gc.ca
Kirsten Clark	DFO, SABS	(506) 529-5891	(506) 529-5862	clarkk@mar.dfo-mpo.gc.ca
Lou Van Eeckhaute	DFO, SABS	(506) 529-5938	(506) 529-5862	Van-EeckhauteL@mar.dfo-mpo.gc.ca
Rob Stephenson	DFO, SABS	(506) 529-5882	(506) 529-5862	stephensonr@mar.dfo-mpo.gc.ca
Stratis Gavaris	DFO, SABS	(506) 529-5912	(506) 529-5862	GavarisS@mar.dfo-mpo.gc.ca
Verna Docherty	DFO, FAM	(902) 426-4669	(902) 426-9683	DochertyV@mar.dfo-mpo.gc.ca
Kurtis Trzinski	DFO, PED	(902) 426-9781	(902) 426-1506	TrzcinskiK@mar.dfo-mpo.gc.ca
Robert Mohn	DFO, PED	(902) 426-4592	(902) 426-1506	mohnr@mar.dfo-mpo.gc.ca
Claude d'Entremont	Inshore Fisheries	(902) 762-2522	(902) 762-3464	inshore@inshore.ca
Cyril Boudreau	NS Fisheries and Aquaculture	(902) 424-2677	(902) 424-1766	boudrecy@gov.ns.ca
Michael O'Connor	Transboundary Management Guidance Committee (TMGC)	(902) 482-7747	(902) 482-8146	MCOConnor@eastlink.ca
Chad Demarest	Mass. Marine Fisheries Institute	(508) 910-6357	(508) 910-6371	cdemarest@umassd.edu
Chris Legault	NMFS, NEFSC	(508) 495-2025	(508) 495-2258	chris.legault@noaa.gov
Liz Brooks	NMFS, NEFSC	(508) 495-2238	(508) 495-2258	liz.brooks@noaa.gov
Tom Nies	NEFMC	(978) 465-0492	(978) 465-3116	tnies@nefmc.org
Tom Warren	NMFS, SF Div., Northeast Region	(978) 281-9347	(978) 281-9135	thomas.warren@noaa.gov

**Appendix 4. Report of Eastern Georges Bank Cod and Haddock, and Georges Bank Yellowtail Flounder U.S. Industry Consultation Meeting, New Bedford Free Library, 7 June 2007**

Northeast Fisheries Science Center (NEFSC) assessment scientists met with fishing industry participants in New Bedford, Massachusetts. The scientists presented the input data – commercial landings and discards, and trawl survey indices - that will be used in the 2007 assessments of eastern Georges Bank cod and haddock and Georges Bank yellowtail flounder. Industry participants shared their observations on the fishery in 2006.

**Georges Bank Yellowtail Flounder**

Total 2006 commercial catch for the U.S. and Canada was reported as 2,226 metric tons (mt). It was reported the Canadian groundfish fleet continues to be unable to locate commercial concentrations of yellowtail flounder; most of the Canadian catch was discarded by their scallop fleet. Twenty-three percent of the U.S. catch of 1,616 mt was discarded by the U.S. scallop and groundfish fisheries. There are indications in the surveys that the 2005 year class may be a strong year class. Surveys continue to show the stock concentrated in survey Stratum 16, straddling the Hague Line.

Industry representatives questioned the reason for the high discards by the Canadian scallop fleet. While a reason for the discards wasn't offered because these discards are estimated by Canadian scientists, the U.S. scientists reported that the Canadian industry has concerns over the estimation methodology.

Industry representatives noted that the landings history shows that the Canadian directed fishery did not catch yellowtail flounder before the 1990s. They suggested that recent Canadian difficulty in locating yellowtail flounder may indicate a return to the previous distribution of fish and may not be an indicator of stock status.

The group discussed whether observed fishing effort distribution provided any information on distribution of the stock over time. Fishermen advised that in 2006 the distribution of effort was driven by fisheries regulations and it was unlikely this information could be used to infer anything about fish distribution. Several commented that historically the size of fish caught could be reliably chosen by fishing in certain areas or times. For example, large fish were usually caught in an area that extends across the middle of Close Area II, and also at certain times of the year in the Great South Channel. One fisherman reported that along the Northern Edge fish are always small, while south of Closed Area II sizes are mixed.

A review of recruitment over time drew the observation that large year classes seemed to be episodic – that is, isolated instances preceded and followed by smaller year classes. It was noted that for much of the time series the stock was depressed. If recruitment is related to stock size, occasional large year classes might be expected but recruitment might otherwise be low. In the early years of the time series, before stock size declined, recruitment was persistently higher than in recent decades.

Fishermen asked if recent tagging studies shed any light on movements of yellowtail from this stock into other areas. Preliminary review of the studies does show seasonal movements - for example, from Stratum 16 into Stratum 13, and also to the Northern Edge and Cultivator Shoal. There are also indications of the fish remaining in the area.

### **Eastern Georges Bank Cod**

Total U.S. and Canadian catch was reported as 1,600 mt. U.S. discards, at 87 mt, exceeded the 79 mt of landings. Trawl survey indices are remaining stable. The 2003 year class continues to appear above average in size in all 3 surveys. Survey weights-at-age continue to decline, a trend that has been observed for about ten years.

The group discussed the fact that while the U.S. uses larger mesh, U.S. fishermen discard smaller fish. Fishermen expressed the opinion the U.S. was using the wrong mesh, and that this had an impact on haddock catches, as well as cod catches.

Fishermen questioned whether an explanation existed for the continued decline in weights-at-age. The NEFSC continues to investigate possible causes. Because of the low stock size, it is not believe due to density dependence. Generally, the food habits of cod and haddock are considered dissimilar enough that the large haddock year class would not be expected to affect cod growth.

One fisherman advised that in the past year his vessels have found cod, in abundance, over a wide area of Georges Bank. The fish are of different sizes, suggesting the presence of more than just the strong 2003 year class. The smallest are about twelve inches, which could be from the 2005 year class.

### **Eastern Georges Bank Haddock**

Total catch was reported as 12,642 mt. The U.S. catch was 591 mt, with 445 mt landed and 146 mt discarded. The Canadian catch was 12,051 mt with 11,984 mt landed and 67 mt discarded. Two year classes dominate the catch – age 3 and age 6. The 2003 year class continues to dominate the survey; the 2004 year class appears weak.

A large part of the U.S. catch was discarded sub-legal fish, with a length mode of about thirteen to fourteen inches. Scientists asked for opinions on why discards were so high, since theoretically the trawl mesh used should not retain many fish at that size. Fishermen explained that they were encountering so many fish that the mesh gets clogged and does not select for size. Sometimes the haddock are in schools of mixed size, and sometimes they move around so it is difficult to attempt to target large fish.

The group discussed the slow growth of the 2003 year class. Fishermen reported that most of the fish are still (May/June 2007) just less than nineteen inches, the legal minimum size. The NEFSC advised that the growth is similar to that of the 1963 year class of haddock, but is still difficult to predict how the 2003 year class will grow as it ages. The slow growth in this stock may be due to density dependence. The slow growth will reduce estimates of the yield this year class will provide the fishery. Fishermen asked the implications of the slow growth on the re-evaluation of reference points. The NEFSC advised that if this is a persistent trend, and not a short-term deviation from long term norms, it could indicate a change in productivity of the stock. That would not only affect biological reference points, including biomass targets, but it could affect future yields and rebuilding rates. The causes and full implications for slow growth of this stock, as well as GB cod, are not yet known.

Fishermen reported they are seeing a lot of ten inch haddock as well, which may be a sign of another year class.

The group briefly discussed the implications of slow growth on U.S. management measures. Fishermen said they thought more haddock could be harvested with a six-inch square mesh, with no negative impacts on cod. The current six and a half inch square mesh may be too large to catch this haddock year class. They said allowing retention of fish that were less than the current minimum size would benefit other stocks – fishermen would catch their haddock and go home, rather than continue to fish for cod and flounders. In response to a question, fishermen reported that they have seen fish in spawning condition that are probably from the 2003 year class.

**Participants**

**Affiliation**

Maggie Raymond	Associated Fishermen of Maine
Jim Odlin	NEMFC, TMGC
Vito Giacolone	Northeast Seafood Coalition
Jackie Odell	Northeast Seafood Coalition
Jim Kendall	New Bedford Seafood Consulting
Liz Brooks	NEFSC
Fred Serchuk	NEFSC
Ralph Mayo	NEFSC
Chris Legault	NEFSC
Amy VanAtten	NEFSC
Tom Nies	NEFMC
Chad Demarest	Massachusetts Marine Fisheries Institute
Sally Roman	SMAST, University of Massachusetts, Dartmouth
David Martins	SMAST, University of Massachusetts, Dartmouth
Steve Cadrin	SMAST, University of Massachusetts, Dartmouth
George Murphy	Canadian Consulate of Boston
Kevin Coyne	U.S. Coast Guard (vessel safety)
Richard Canastra	Whaling City Auction

(Several commercial fishermen attended but did not sign attendance sheet)

## Appendix 5. Report of DFO / Industry Pre-assessment Meeting, Rodd Grand Hotel, Yarmouth, NS, 7:30 p.m., Monday 4 June 2007

Rapporteur: Kirsten Clark

### 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 will present summaries of available information as a starting point for discussion. An outline of the assessment process and time table was presented.

### Cod

#### *Presentation Highlights*

- Recent survey biomass trends show fluctuation with no persistent increase or decrease.
- 2003 year class is one of the stronger ones in recent years and the 2001 year class is still contributing substantially to catch.
- The DFO and NMFS spring surveys show cod on the southern flank of Georges, which is different from other years.
- The DFO survey shows a slight increase in weights-at-age.
- There are no trends in the weights-at-length.

#### *Questions and Comments*

- In the figure comparing observer and port samples from the same trips, one of the graphs shows smaller fish in the port sample than the observer sample. If this was reversed, you would say it was evidence of discarding.  
Response: This was a small sample and so isn't considered representative.
- Why would the observer have missed the smaller fish that were seen in the port sample?  
Response: The observer might have been off watch when these cod were landed.
- The distribution of cod from the surveys showed more fish on the southern flank, and there is an indication that the 2005 haddock year class of haddock could be stronger. Did you look at the distribution for 2004 to see if the distribution was similar when the 2003 haddock year class was there? If this is a pattern, then it might be a way for us to avoid the cod if we know where they will be when there is a strong recruiting haddock year class.

**Action: Look at the historical distribution of cod when there is a strong recruiting haddock year class.**

- How much sand lance was in this year's DFO survey?  
Response: Not much.

### Haddock

#### *Presentation Highlights*

- The 2000 year class was dominant in 2006 fishery, followed by the 2003 year class at age 3. There was good representation of older fish in the catch.
- Distribution of haddock in the surveys: NMFS fall survey was similar to previous years, but there were not many age 0s. In the DFO survey, there were high catches of age 1 and 2

along the southern flank, which is not typical for age 2. The NMFS spring survey had good catches of age 2 and older, and the fish were widely spread over the survey area.

- The 2003 year class showed up strongly in all surveys.
- There has been a decreasing trend in the weights-at-age in the DFO survey and fishery since 2001, but in 2007 the survey weights-at-age increased.
- The lengths at age show a similar trend in the DFO survey.
- The weights at length increased for the DFO survey in 2007, although the overall recent trend has shown a decrease.
- The predicted catch has been close to the observed Canadian catch for all ages except age 3 because of the lower weight-at-age for that year class.
- The ratio between the quota and the fishable biomass for cod and haddock has improved.

#### *Questions and Comments*

- Why doesn't the 1963 year class show up at age 6 in the figure of the fishery age composition?  
Response: It was a big year class, but the figure shows a five year average so it is masked by the other year classes that it is averaged in with. Also, the figure shows the percent contribution of the different ages in the fishery and they were catching a lot of small fish in 1969-1974.
- There is a problem with the quota to biomass ratio for cod and haddock. You are creating a problem with having the quotas so far apart. There are more cod out there than you are saying. We have to use separator panels and steam all over the bank to avoid them. If so few cod, there wouldn't be a need for separator panel.  
Response: Cod are easier to catch with most gear, so that's why separator panels are needed. If you increase the cod quota to bring the 2 quotas closer together, then you would be overfishing the cod. You can bring them closer together by decreasing the haddock quota. There are only 2 good cod year classes and we are trying to rebuild the stock with an  $F$  of 0.15, rather than the higher  $F_{ref}$  of 0.26 on which the haddock quota is based. We are aiming to harvest 15-20% of the cod and 30% of the haddock making the discrepancy between quotas larger. However, the quota ratio did improve in 2006.
- The haddock quota was set too high because the reduction in weight-at-age wasn't taken into account.  
Response: When there is a huge year class, a mistake in the weight can have a large effect.
- A simple error in the assessment caused us to overfish haddock and underfish cod.  
Response: We used to do assessments in the spring and apply them to obtain quotas for the following summer. With the current agreement with the U.S., we have to predict one and a half years ahead which is more difficult and there is more uncertainty.
- What is the fishable biomass?  
Response: It is the biomass at each age multiplied by the fishery partial recruitment in that year.
- The haddock quota was 22,000 t and the fishable biomass was 40,000 t. Different decisions would have been made if there had been an 11,000 t haddock TAC instead of twice that. We tried to catch half of the fishable biomass.  
Response: Because of the decline in the weight-at-age, instead of 50% recruiting to the fishery of the 2003 year class, only 20% recruited, so the TAC was forecast too high. We ended up fishing age 5+ at twice  $F_{0.1}$ .

## Groundfish Discard Calculations

- Discards were calculated by fleet, zone, and quarter. There was not enough sampling to break the data down any further than this.

### *Questions and Comments*

- You can have two vessels fishing side by side catching totally different ratios of cod to haddock, so how can you generalize from observed to unobserved trips?  
Response: The average takes this kind of variation into account. If there was no discarding, you wouldn't see large differences by chance alone between average observed and average unobserved. The statistical odds that these kind of a differences would occur with no discarding are very small.
- What if your sample sizes are very different and there is wide variability in both?  
Response: The sample size will not change the difference in the means; it affects only the precision of the means.
- Discarding occurred and given the information we have, this is the best estimate.
- Is the height of the separator panels taken into account?  
Response: No.
- A 65' boat and a 45' boat fish with different nets, which can make a big difference. Is this taken into account?  
Response: With the amount of sampling we have, we can't break it down any further. Previous analyses looking at tonnage class 2 (mostly less than 45') versus tonnage class 3 (mostly 45' to 65') showed little difference in cod to haddock ratios.
- Why are the First Nations boats treated separately?  
Response: Management wanted discards by quota fleet.
- If there was discarding, it was because of a mismatch between cod and haddock quotas.  
Response: Quotas apply to catch, whether landed or discarded. It is all counted against the quota, so you might as well land it.
- In order to catch haddock that wasn't there, we caught cod. Now going to be stuck with \$30,000 of observer costs because the haddock quota was set too high.
- How are the offshore boats going to fish if the discards are taken off this year's quota? That's all their quota.
- What happens to cod that are left on licenses at end of year?  
Response: The Canada/USA agreement requires us to account for any overage so if we exceeded the Canadian allocation, we have to account for it in 2007. Canada exceeded its 2006 cod quota once the discards were included. Some fleets did not catch their allocation, but that was not enough to cover all the discards. This year we will be monitoring discards as we go along, and action can be taken to prevent an overage.

## Discards of Cod, Haddock and Yellowtail from Scallop Fishery

- There were 11 observed trips through the year.
- There is not enough observer coverage through the year to do comparisons by area.
- Yellowtail discards are the only ones that show a consistent seasonal pattern.
- Effort standardization was applied and a 3-month moving window average was used this year. The 2005 data were re-examined and this method gave a slightly lower estimate for 2005.

*Questions and Comments*

- Do discards come out of the Canadian total?  
Response: Yes.
- What are the estimates of discards for scallop fishery for first quarter of 2007?  
Response: As of the end of March 2007, the preliminary discard estimates were 7 t yellowtail, 40 t cod, and 11 t haddock.
- How does that compare to last year's discards at the same time of year?
- Response: By the end of March 2006, the discard estimates were 8 t yellowtail, 10 t cod, and 4 t haddock, so the 2007 estimates are similar for yellowtail; about 3 times as much for haddock and 4 times as much for cod.
- Were there closed boxes that they didn't fish in?  
Response: Yes, but one box that they called a seed area that is also a high cod area wasn't closed.
- Why don't they land the cod? Why aren't they on quota?  
Response: There was a change in the regulations in 1996, so they were not allowed to land groundfish. This was done to prevent directing for the bycatch.
- Why isn't the scallop fishery closed when the cod quota is reached?
- Cod congregate around the scallop boats when they are shucking. If they held back the frills and stored them in a tank until they were finished fishing and then discarded them elsewhere, then they would likely catch less cod.

**Harvest Strategy and Precautionary Approach**

- There is some interest to try to bring harvest rules into line with the precautionary approach
- Should we be setting biomass reference points? DFO headquarters asked us to consider this, but ultimately it goes to TMGC for their consideration.

*Questions and Comments*

- In the U.S. they set a ten-year time period for recovery plans. Is this what is being discussed?
- Response: No. Biomass reference points would be used to indicate that when we should be concerned about low stock size? Recovery programs aren't being discussed at this point.
- The rigidity of this system is what makes it more difficult to fish. More rigidity is not appropriate at this point. There is not enough flexibility in the current system. More rules and more papers are not helpful.
- It needs to be communicated to upper levels DFO in Ottawa that there are problems with this approach.

**Yellowtail**

- Most of the landings and most of the fish are on the U.S. side of the line.
- Are the fish spread out more on the Canadian side?  
Response: No. They are still concentrated in the Yellowtail Hole during the surveys.
- Draggers caught more yellowtail up on the northern part of the banks even with a separator panel, but you can't fish for them because you don't want to catch cod.
- There is a project involving fin clipping of yellowtail on scallop boats to see if they survive being discarded. Only the fish that aren't fin clipped will be included in the discard estimates.



---

**List of Participants of the DFO/Industry Pre-assessment Meeting; 4 June 2007:**

<b>Name</b>	<b>Affiliation</b>	<b>Email</b>	<b>Telephone</b>
Gavaris, Stratis	DFO Science	<a href="mailto:gavariss@mar.dfo-mpo.gc.ca">gavariss@mar.dfo-mpo.gc.ca</a>	(506) 529-5912
Clark, Kirsten	DFO Science	<a href="mailto:clarkk@mar.dfo-mpo.gc.ca">clarkk@mar.dfo-mpo.gc.ca</a>	(506) 529-5891
Van Eeckhaute, Lou	DFO Science	<a href="mailto:van-eeckhautel@mar.dfo-mpo.gc.ca">van-eeckhautel@mar.dfo-mpo.gc.ca</a>	(506) 529-5938
Donaldson, Gilbert	DFO Science	<a href="mailto:donaldsong@mar.dfo-mpo.gc.ca">donaldsong@mar.dfo-mpo.gc.ca</a>	(902) 742-0895
d'Entremont, Frank		<a href="mailto:fdentremont8@wmeconnect.com">fdentremont8@wmeconnect.com</a>	
Comeau, Gilles		<a href="mailto:comeau@lobster.ca">comeau@lobster.ca</a>	
Van Buskirk, Mark	Vanco Fish		(902) 875-4239
d'Entremont, Claude		<a href="mailto:inshore@inshore.ca">inshore@inshore.ca</a>	(902) 762-2522
Bennehan, George	N.S.F.G. 45-65		(902) 875-2052
Belliveau, Ray		<a href="mailto:cvfishld@ns.sympatico.ca">cvfishld@ns.sympatico.ca</a>	(902) 762-2405
d'Entremont, Jean Guy	Scotia Harvest Seafoods	<a href="mailto:jean.guy@ns.sympatico.ca">jean.guy@ns.sympatico.ca</a>	
Dedrick, Gerry	Shelburne Co. Quota Group	<a href="mailto:g@dedrick.anikast.ca">g@dedrick.anikast.ca</a>	(902) 875-3948
d'Eon, Georges	Ocean's Finest Inc.	<a href="mailto:georgesdeon@hotmail.com">georgesdeon@hotmail.com</a>	(902) 648-8217
Surette, Lee	Ocean's Finest Inc.		(902) 762-0451
d'Entremont, André			(902) 762-0271
Comley, Mark	DFO-Barrington Passage		(902) 637-2851
Atwood, Roger	Fisherman		(902) 637-2764
Maxwell, Judith K.	SFIFA Rep		(902) 745-0994
Waybred, Troy	Fisherman		(902) 745-1576
Nickerson, Wade	Fisherman		(902) 745-0218
Ross, Mark	Fisherman		(902) 745-2058
Atwood, Sanford	Fisherman		(902) 745-3475
Boudreau, Cyril	NSFA	<a href="mailto:boudrecy@gov.ns.ca">boudrecy@gov.ns.ca</a>	(902) 424-0324
Sweeney, Anne	DFO Yarmouth	<a href="mailto:sweeneya@mar.dfo-mpo.gc.ca">sweeneya@mar.dfo-mpo.gc.ca</a>	(902) 742-0859
Giroux, Brian			

**Appendix 6. Draft Terms of Reference for 2008 TRAC Assessment Meeting**

**Transboundary Resources Assessment Committee  
Assessment of Eastern Georges Bank Cod, Haddock & Georges Bank Yellowtail  
Flounder  
Woods Hole  
4<sup>th</sup> week of June 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 – April 2008, NMFS, through its Groundfish Assessment Review Meeting (GARM) process, will review benchmarks and reference points for 20 northeast regional groundfish stocks, including Georges Bank cod, haddock and yellowtail flounder. TRAC will participate with concurrent sessions and produce Proceedings reporting on the consensus model formulations and reference points. Those benchmark model formulations and reference points will be used to conduct the assessments of eastern Georges Bank cod and haddock and Georges Bank yellowtail flounder at this meeting. The results of the assessments from this meeting will be presented at the August 2008 GARM for its information.

**Objectives**

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 2009, estimate the risk that the 2009 fishing mortality rate would exceed 0.18 (cod), 0.26 (haddock) and 0.25 (yellowtail flounder) respectively. [reference fishing mortality subject to review]
- 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.
- Review the biomass distribution relative to the USA/Canada boundary, updating results with the 2007 survey information, and apply the allocation shares formula.
- Draft terms of reference for 2009 June TRAC.
- Other matters.

**Outputs**

TRAC Transboundary Status Reports for each management unit  
TRAC Reference Documents for each management unit  
TRAC Proceedings of meeting discussion

**Participants**

DFO Maritimes scientists and managers  
U.S. NMFS scientists and managers  
Canadian and U.S. fishing industry  
Provincial representatives (NB and NS)

**Appendix 7. Notes of NMFS/DFO Teleconference of 9 July 2007 to discuss TRAC/GARM Interaction for 2008 Assessments**

Participants: Fred Serchuk, Loretta O'Brien, Paul Rago, Stratis Gavaris, Jim Weinberg

The following GARM meetings have been scheduled:

22-26 October 2007:	Data review
25-29 February 2008:	Model review
28 April - 2 May 2008:	Reference point review
4-8 August 2008:	Assessment review

There is no scope to alter dates. GARM Terms of Reference (ToR) includes estimation of data inputs, review of model formulations, derivation of reference points, and conducting the assessments. The spotlight will be on the reference points and the state of the resource relative to these. The GARM agenda is busy and ambitious. Therefore, adding TRAC ToR for review during GARM meetings is not practical.

Canadian fishery catches, including discards, and/or DFO survey indices are required for the data review. Early notification by NMFS on the list of species for which catches and/or indices are required will permit planning work to meet the schedule.

The model and reference point reviews may have implications for how TRAC provides advice for eastern Georges Bank cod and haddock and Georges Bank yellowtail flounder. Further, the assessment review is expected to conduct the Georges Bank yellowtail flounder assessment.

DFO participation at GARM, particularly by principals involved with Georges Bank fisheries, is desirable. The DFO Georges Bank survey, scheduled for 13-27 February 2008, presents a conflict.

To conduct the work efficiently and avoid duplication, it is proposed that TRAC convene two meetings in 2008. During 23-27 June 2008, the assessments of eastern Georges Bank cod and haddock would be reviewed to provide status reports. In addition, model formulations and reference points for cod, haddock, and yellowtail flounder arising from the GARM review would be evaluated with respect to implications for the management units that TRAC provides advice. A second meeting during 12-14 August, to be conducted by correspondence, will consider the GARM assessment for Georges Bank yellowtail flounder to provide a status report.

Status reports will provide advice using the established reference points and any revised reference points deemed appropriate.

Draft Terms of Reference for the two meetings are attached.

**Transboundary Resources Assessment Committee  
Assessment of Eastern Georges Bank Cod & Haddock  
Woods Hole  
23-27 June 2008**

**DRAFT 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:
  - Eastern Georges Bank cod
  - Eastern Georges Bank haddock
  - Georges Bank yellowtail flounder
- Evaluate the implications of the GARM benchmark model review and GARM reference point review to determine if any revisions are appropriate for provision of 2008 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.
- 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 U.S. fishing industry  
Provincial representatives (NB and NS)  
NEFMC representatives

**Transboundary Resources Assessment Committee  
Assessment of Georges Bank Yellowtail Flounder  
(by correspondence)  
12-14 August 2008**

**DRAFT 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 U.S. fishing industry  
Provincial representatives (NB and NS)  
NEFMC representatives