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Background Paper on IBS

Consensus Report

of the
Technical Review of the
Maine Department of Marine Resources

Maine–New Hampshire
Inshore Groundfish Trawl Survey

Convened by the
Northeast Consortium on August 22 and 23, 2005
at Maine Department of Marine Resources, Boothbay Harbor, Maine.

Submitted by:
Mr. Ghislain Chouinard, Chair
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Executive Summary

Impetus and goals for the review

Since the fall of 2000, an inshore trawl survey has been conducted in the spring and fall of each year in coastal waters of Maine and New Hampshire. The "Maine-New Hampshire Inshore Groundfish Trawl Survey" project has been funded by the Northeast Consortium and NOAA Fisheries, Northeast Regional Office and is led by scientists at the Maine Department of Marine Resources. The main objective of the survey is to provide abundance indices of marine species in coastal waters that could be useful in stock assessments conducted by NOAA Northeast Fisheries Science Center. The data are also of use to the New England Fishery Management Council and the Atlantic States Marine Fisheries Commission. As one of the major sources of information available concerning the coastal waters of the Gulf of Maine, it was imperative that all aspects of the surveys be formally assessed. The goals of the review required an extensive examination of survey design, data processing, and survey results to inform and improve future work and to assess the viability of using the data in the management of the resource. This report represents the consensus view of the review panel on this project.

Main findings and conclusions of the panel

- Overall, the "Maine-New Hampshire Inshore Groundfish Trawl Survey" was considered to be a valuable project with high scientific standards.
- The panel considers that there is a need to clarify the objectives of the survey.
- There is also a need to adjust the design of the survey (random and fixed stations issue).
- The panel recommends some minor modifications and suggestions for improvement in survey operations, biological sampling and data collection.
- The work is considered to be an excellent example of a cooperative project with extensive outreach work and good data accessibility.
- Data collected has high potential for use in stock assessments, ecosystem analysis and increased understanding of coastal waters of Maine and New Hampshire.

Recommendations for next steps for the project and the use of the data.

- There is need to seek secure and long-term funding for this project.
- Adjustments to sampling design, survey operations, biological sampling and data collection should be implemented as soon as possible.
- A few small scale experiments should be conducted to help resolve some issues with the survey operations (towing in tide, depth-warp ratio).
- If the secondary vessel is expected to be used again, it would be useful to consider conducting a comparative fishing experiment.
- More detailed analysis of the data collected to date is encouraged as it may help identify issues relating to the survey. It would also be helpful to illustrate the value of the work.
- Closer contact should be established with stock assessment analysts at NMFS who are likely to be important users of the data.

I. Introduction

Background

This document is the consensus report of the independent technical review of the cooperative research project titled "Maine-New Hampshire Inshore Groundfish Trawl Survey". The review was conducted in August 2005 and was co-sponsored by the Northeast Consortium and the NOAA Fisheries, Northeast Regional Office, since both entities have provided funding for the project which started in the fall of 2000. The review was conducted by three independent scientists, one from Canada and two from New England. The review was chaired by one of the panelists. The views expressed in this report are those of the review panelists and do not necessarily reflect those of the Northeast Consortium or NOAA Fisheries.

This survey of inshore waters of the Gulf of Maine is led by scientists at the Maine Department of Marine Resources (MEDMR) in partnership with the New Hampshire Department of Fish and Game and commercial fishermen. A primary objective of the survey is to derive indices of abundance of marine resources in inshore waters of coastal Maine and New Hampshire which are largely not covered by surveys conducted by the National Marine Fisheries Service (NMFS). It is hoped that these indices can be incorporated in stock assessments conducted by the NMFS. The survey has a number of other objectives, including the collection of biological data on marine species, the collection of data for the basis of fisheries management regulations, to assist fishermen displaced by groundfish closures, and to improve the credibility of science within the fishing community.

Two surveys of the area are conducted each year: one in the spring (early May to early June) and one in the fall (October-November). Since its inception, the survey team has faced a number of challenges including finding a bottom trawl gear design that is suitable for conducting the survey in difficult terrain, stiff opposition from lobster fishermen and other stakeholders concerned with potential damage to lobsters and marine habitat by the survey trawl, managing multiple and sometimes conflicting demands and objectives by those interested in the survey, insecure sources of funding, and lack of resources to conduct analyses of the data. Because the survey is conducted in lobster areas, the successful completion of the survey depends highly on the cooperation of lobster fishermen to temporarily remove their traps from survey stations. This has required the survey team to spend considerable amount of time in communication and outreach activities with the fishing community and the public at large. Despite the adversity, the survey team has managed to conduct both surveys every year.

Terms of Reference and Evaluation Criteria

The review panel was given the general task of reviewing the Maine-New Hampshire inshore groundfish trawl survey project with the overall objective of providing recommendations to inform and improve future work.

The panel was mandated to assess the project using general criteria that are specific to all projects funded by the Northeast Consortium (Appendix A). In order to guide the review, the panel was also given terms of reference specific to the Maine-New Hampshire Inshore Groundfish Trawl Survey (Appendix B). These related principally to survey design, survey operations, biological sampling, data recording, archiving and editing and the utility of the data in current and future biomass assessments.

Panel membership

The review panel was composed of three fisheries professionals who, as a group, had expertise in the areas of stock assessment, trawl gear design and trawl surveys, fish population dynamics, and fisheries statistics. A short description of their respective area of expertise and experience is provided below. All panelists have signed the Northeast Consortium's "Conflict of Interest and Confidentiality Policies for the Technical Evaluation of Projects" agreement. These individuals served as contractors independent of their employer. Views expressed do not necessarily represent those of their employer or government.

Mr. Ghislain Chouinard, Chair, Moncton, New Brunswick, Canada

G. Chouinard is a research scientist and Head of the Marine Fish Section, at the Gulf Fisheries Centre, Canadian Department of Fisheries and Oceans. He has been involved with stock assessments of cod, herring and flatfish of the southern Gulf of St. Lawrence. He has acted as Chief scientist on multi-species trawl surveys since the mid-1980 and has experience in the use of trawl survey data in stock assessment. Mr. Chouinard is a member of the Resource Management Committee of ICES since 2001.

Mr. David Beutel, Kingston, Rhode Island

D. Beutel is a research associate and fisheries operations supervisor at the University of Rhode Island since 1992. Mr. Beutel is a former commercial fisherman with experience in the design and construction of commercial fishing and experimental bottom trawls. He has been involved in mesh selectivity experiments and other outreach projects. Mr. Beutel is an instructor in the area of fishing gear and fishing operations for the National Marine Fisheries Service.

Dr. Christopher Legault, Woods Hole, Massachusetts

C. Legault is a research fishery biologist in the Population Dynamics Branch at the Woods Hole Laboratory of the National Marine Fisheries Service. Dr. Legault has extensive experience in fisheries research and the use of statistical techniques in the study and assessment of fish populations. Dr. Legault is a member of the ICES Working Group on North Atlantic Salmon and has served on several review panels in the area of fish stock assessment.

Review Process and Logistics

The review was conducted at the Maine Department of Marine Resources facility in Boothbay Harbor, Maine on August 22-23 2005. In advance of the review, the panel was provided with a number of background documents including:

- *Final Report to the Northeast Consortium on the Maine-New Hampshire Inshore Groundfish Trawl Survey: July 2000 – June 2001*; Maine Department of Marine Resources Research Reference Document 02/02.
- *Final Report to the NOAA Fisheries/NERO Cooperative Research Partners Initiative on the Maine-New Hampshire Inshore Groundfish Trawl Survey: July 2001 – June 2002*; Maine Department of Marine Resources Research Reference Document 03/01.
- *Final Report to the NOAA Fisheries/NERO Cooperative Research Partners Initiative on the Maine-New Hampshire Inshore Groundfish Trawl Survey: July 2002 – June 2003*; Maine Department of Marine Resources Research Reference Document 04/02.
- *Final Report to the Northeast Consortium on the Maine-New Hampshire Inshore Groundfish Trawl Survey: July 2003 – June 2004*; Maine Department of Marine Resources Research Reference Document 05/02.
- Sherman, Sally A., Keri Stepanek, and John Sowles, February, 2005; *Maine-New Hampshire Inshore Groundfish Trawl Survey Procedures and Protocols*; Maine Department of Marine Resources, Research Reference Document 05/01.
- Selected newspaper articles of the survey since its beginning.
- Project chronology, list of outsides uses and correspondence on feedback received from the National Marine Fisheries Service on previous project reports.

In addition, project data was available to the panelists through the Northeast Consortium's Fisheries and Ocean Data Management System, accessible at the internet site www.northeastconsortium.org/data.shtml. This information provided the panelists with an excellent initial understanding of the survey.

The agenda (Appendix C) of the meeting was structured to systematically review all aspects of the survey. One of the objectives of the review meeting was to complete the information base through presentations (Appendix D) by staff from MEDMR. This was followed by questions of clarification by the panel and general discussion. The review meeting also served to explore potential solutions that would be most appropriate given the context of the survey. In addition to the review panel and survey team (staff from MEDMR, commercial fishermen, net maker, vessel owner), the meeting was attended by representatives of the funding agencies (Northeast Consortium, and NOAA) and users of the data (see participants list in Appendix E).

Acknowledgements

The members of the panel wish to thank Rachel Gallant of the Northeast Consortium for organizing the review. We are grateful for the warm welcome received at the Marine Resources Laboratory where the meeting was held. Our task was made easier by the excellent preparation, cooperation and openness of the survey team and the participants at the meeting.

II. Review of the project with respect to the Northeast Consortium General Evaluation Criteria and the Terms of Reference for the review.

The panel has organized its findings according to the Northeast Consortium General Evaluation Criteria (Appendix A) and the terms of reference for the review (Appendix B). Since there was some overlap between the two lists, some comments may be repeated.

General Evaluation Criteria

1. Project success.

- Clarification of the primary objective of the survey is necessary. The project has currently too many stated goals and objectives, one objective should be made primary with all others secondary. Given the discussion and intended uses of the survey, we recommend that establishing consistent time series of abundance indices be declared the primary objective. Secondary objectives would need to be enumerated and are valuable as well. However, achievement of secondary objectives should not compromise the attainment of the primary objective. A significant secondary objective of the survey is the collection of biological information on the various species. It would be important to document the specific secondary objectives for each survey so that users of the data can be made aware of the data available.
- The project has been successful in demonstrating that an inshore survey in Maine and New Hampshire coastal waters is possible. To some degree, the survey has been successful in meeting the primary objective described above, but some modifications are necessary to fully meet this objective (see criteria 2).
- Long term funding will be required to ensure that this survey can be continued and achieve its true potential of providing time series of abundance for tuning stock assessments.

2. Certification of results.

- While some efforts have already been devoted to document the methods used in the survey (survey manual and draft sampling assistant manual), additional documentation of methods is needed to ensure consistency over time. In this regard, no detail should be spared. Many details were given in the presentations during the review. These details should be incorporated in the survey manual.
- The current survey design of mixing random stratified sampling with fixed stations needs to be revisited based on the objectives of the program. In particular, the panel recommends that the number of fixed stations be reduced to the bare minimum. In each stratum, the deleted fixed stations would be replaced by random stations. If fixed stations need to be retained for secondary purposes, consideration should be given to adding a corresponding number of random stations to achieve the initial sampling intensity (1 station per 40 sq. nautical miles) so that the primary objective is not compromised.
- Preliminary results of abundance time series are incorrectly shown due to changes in survey design and inappropriate statistical analysis. The additional depth strata and the use of fixed stations in the stratified random sampling calculations mean that the time series are neither consistent nor correct.

- Secondary results of biological information have already been produced from the survey and are being used for management purposes.

3. Data accessibility and dissemination of results.

- The final annual reports and the procedures and protocols manual, provide sufficient information to judge the quality of the data and is understandable to end-users. However, further documentation of methods is required to ensure that drift does not occur over time.
- Project description and the data are available on the web, however, some fields are not yet included in the data and meta-data is missing.

4. Project partnerships.

- Partnership was one of the strongest parts of this project. The panel felt that there was a very strong sense of commitment, shared responsibility and cooperation between the various partners.
- Involvement of commercial fishermen from the beginning has helped during project development, survey trawl design, during field sampling, and with getting buy-in of results from the commercial sector.
- Difficulties with the lobster fishermen have been overcome through open communication. Difficulties with the Downeast lobstermen continue, although there has been an evolution of acceptance. The partnership, constant communication and outreach must continue in this area. This work is crucial to the project success. The panel noted that the trend could be easily reversed and cooperation may falter if Downeast fishermen receive negative stock assessment results from the survey.
- As more data are collected, working with federal agencies and other partners will help with data analyses. This collaboration would help increase the value of the work and could result in further refinements to the survey.

5. Project impacts.

- The project has demonstrated that conducting an inshore trawl survey in the coastal waters of Maine and New Hampshire is possible, something that was previously considered impossible.
- The results will be that long time series of abundance indices for coastal waters of Maine and New Hampshire could be included in stock assessments of many commercially important stocks. The impact on the stock assessments will be stock dependent, but the increase in information will be beneficial to the understanding of the fisheries regardless of the resulting change in management.

6. End-Users.

- Federal and state stock assessment analysts, commercial and recreational fishermen and, the environmental community will benefit from a long time series of abundance data for many coastal species. The survey also provides a platform for collaborative work with universities in coastal waters.
- The bubble plots of survey catch per tow over time by species will show fishermen areas of concentration and how they change over time.
- With a long time-series, these data will be useful in detecting changes in the coastal ecosystem of the Gulf of Maine. This would be of interest to the public at large.

7. Overall rating.

- The panel rated the project as excellent. This project has demonstrated that a trawl survey is possible and needed for coastal waters of Maine and New Hampshire. Long term funding will now be required to ensure that the project persists long enough for the time series to become valuable to stock assessments. Project personnel overcame many obstacles and difficulties while maintaining high scientific standards.

8. Future research.

- This project should not continue to be funded on an annual or short term basis. Long term, more secure funding is required to ensure that useful time series of abundance can be generated for stock assessments. The Northeast Consortium and the Cooperative Research Partners Program have done their part to fund and develop this pilot program. These funding sources are designed to address fisheries issues, primarily through short-term projects. This project is among those that deserve long term funding and funding sources that are designed to address longer term research should be explored.
- Some small field research projects that could be conducted to improve the analysis of data collected to date include: changes in net geometry towing with versus against the tide and changes in net spread using different warp to depth ratios especially at shallower depths. Creating a warp to depth table using the door spread would be valuable for creating a consistent towing protocol. These issues should be given fairly high priority so that any changes can be implemented as soon as possible.
- The survey was initially conducted by two vessels and they have alternated in the first years of the survey. Since 2004, one vessel (F/V *Robert Michael*) is being used and the second (F/V *Tara Lynn*) is used as back-up. The two vessels are virtually identical: they are of the same mold and are similarly equipped (engines, winches, etc). While the panel considers that it is unlikely that there would be significant differences in fishing efficiency between the two vessels, some may raise this issue particularly if results from the survey give rise to contentious issues. In the absence of a comparative fishing experiment, survey results may be open to question. Because the F/V *Tara Lynn* was last used a few years ago, this would not be a major issue for future stock assessments since data from this vessel could be omitted in stock assessment models. However, a comparative fishing experiment using the

side by side method would be valuable in answering the potential fishing vessel comparability and would be important if F/V *Tara Lynn* is used again and often in the future

- Some computer simulation analyses that could improve the survey include: determining whether subsampling of lobsters can be achieved (currently all lobsters are sampled), determining the optimum number of tows per stratum based on variance calculations, and sample size needed for vessel comparisons.

9. Additional comments and guidance.

- This project has suffered from having too many objectives. As a pilot project it has clearly demonstrated the ability to conduct a trawl survey in coastal waters of Maine and New Hampshire. A future challenge will be transitioning this project from its current state to a long term survey with one overarching objective. It is also possible to attain many secondary objectives, but they should not be allowed to interfere with the primary objective.
- The Northeast Consortium is not the correct funding source for such a long term survey and should state this clearly in its review of the project. Better documentation of the states in-kind contributions would improve the probability of getting federal long term funding. Participants and managers of stock assessments in the region need to participate in discussions of how best to sample the Gulf of Maine. It was also noted that there may be economies of scale when all the surveys currently conducted in the general area are considered. However, the Maine-NH survey is unique in its coverage of the coastal waters of Maine and New Hampshire.
- Throughout the review, the phrase "not enough time" was used many times as a reason for needed work not being completed. This is understandable given the staffing levels and amount of work involved. A long term source of funding would free a significant amount of time that is currently devoted to report writing for current fund providers and grant writing for the next year's funding.

Specific Terms of Reference

1. Survey design.

- The combination survey design of stratified random sampling with fixed stations needs to be revisited.
    - While statistically this design can be used to estimate population abundance and its uncertainty, it is highly unlikely that it can be done well in this situation. This is because the statistical analysis requires estimation of the bias introduced by using fixed stations. This estimation of bias must be conducted for each stratum. Stratum will have only one to five random tows and two fixed tows which is clearly insufficient to robustly estimate the bias introduced by fixed stations.
    - Estimation of time series of abundance for stock assessments should be made using only the randomly selected stations. Fixed stations can be useful for other purposes, but should not be included in the data used for time series of abundance. Justification for each fixed station should be clear.

- Project leaders will need to decide how much of their resources they want to devote to the two types of stations (random and fixed) and allocate appropriately. The panel considered the current level of 35% fixed stations too high.

- Difficulty caused by fixed gear, rough bottom, and strong tides.
  - Continued cooperation from lobstermen and other fishing interests is required and pivotal for the success of this survey. While strong measures such as requiring all traps to be pulled prior to the survey could be used, these could also create a backlash against the survey similar to that received at the beginning. Positive incentives might work much better. Outreach will continue to be most important action and will need to be unrelenting. In this regard, the staff at MEDMR has done an outstanding job.
  - The net used seems good for the conditions encountered on the survey. The bottom trawl used is appropriate for the range of marine organisms that are sampled. The speed of trawling is an issue in the stronger tides, and the trawl may be undersampling adult fish relative to juveniles because of the low towing speed (2.5 knots). Larger fish tend to be able to swim faster and a higher proportion (relative to juveniles) may be able to avoid capture. In itself, this is not a major issue for stock assessments so long as the trawl efficiency is sufficient to obtain representative samples and is relatively constant.
  - Survey documentation and discussions during the review indicated some variation in towing protocol (e.g. towing speed was cited as 2.2 to 2.3 knots at times and 2.5 in other). Establishing a consistent towing protocol is important. Towing speed, distance traveled (tow duration) and door spread are the parameters suggested for the protocol. Towing speed should be fixed and should not be allowed to vary too much between tows (suggestion +/- 10%), because the speed over ground of the trawl may produce changes in efficiency through escapement. Door spread and distance towed are needed to calculate area swept which could be among the standards for tow quality assessment. A formal protocol using the existing NetMind system (a real-time trawl monitoring and mensuration system) to determine the correct door spread combined with the GPS system to determine the towing track will ensure the consistency of tow quality. Overall, towing speed, towed distance, and door spread need to all be within an acceptable narrow range.
  - The current use of the NetMind system to determine when the trawl is fishing correctly is excellent and should be continued. The NetMind system is a valuable tool for this project. Using this system to quickly determine the net configuration can eliminate tows which are of a poor quality. Developing a protocol for an acceptable range of door spread would be valuable. Creating a table of towing warp lengths/depth to obtain correct door spread would be valuable. This would result in using the NetMind system for one of its intended uses and eliminate the practice of using an arbitrary and faulty convention of the 3:1 warp to depth ratio.

- Consider dropping one season if long term funding is not adequate to conduct survey in both spring and fall.

- Change name from "Inshore Groundfish Survey" to something like "Inshore Bottom Trawl Survey" to more accurately reflect the wide range of species encountered and analyzed.

- Level of coverage (tows per square mile) is good, if all tows are selected randomly (see discussion above).

- Use of two vessels can always be questioned, but in this case seems unlikely to be adding a large amount of variance to survey because the two boats are so similar. A simple side by side comparison study might eliminate some of the questions. The comparison might be conducted on bottom clear of obstructions where the boats can tow adjacent to one another. The gear should be the survey gear, but even a capacity comparison of equal groundfish gear might provide some answers regarding the fishing efficiencies of the two vessels (see also item 8 in the Northeast Consortium General Criteria)
- Percentage of total area that was originally excluded as "untowable" should be reported.
- Office disqualification of tows is a necessary procedure but needs to be better documented both in terms of process and total number of randomly selected tows impacted. If the number of disqualified tows changes a lot over time it would cause concern with the indices of abundance.
- Strata selection appears to be appropriately based on depth and changes in bottom sediments.
- It would be useful to establish detailed guidelines to determine when a haul should be declared invalid. For example, this could include a description of the location and extent of damage to the trawl, entanglement with fixed gear and other instances that would result in a haul being classified null.

2. Biological sampling.

- A schedule for intensive sampling of different species or characteristics should be created because some detailed information (e.g. maturity stages, age reading material) cannot be collected for all species in one survey.
- Subsampling of lobsters should be considered. If this is done, then a nonrandom sampling method such as measuring every second or third lobster would be most appropriate due to the difficulty of getting a random sample of lobsters.
- Subsampling schemes for species other than lobster match those used by NMFS and are appropriate.
- Length frequencies for species that exhibit differential growth between sexes (e.g. flatfish, white hake, etc) could be collected by sex. This is particularly useful when age data are to be applied to the length frequencies. Decisions on collecting sex-specific length data for sexually dimorphic species could be made on a case by case basis in consultation with stock assessment scientists.
- If age material or other parameters are collected on the basis of length, it would be important to determine and document the stratification method (e.g. 1 per cm, etc).

3. Data recording, archiving, and editing.

- The panel considered that the on-board data collection and processing was good, especially the proofing of datasheets after each tow. However, there is a need to have more complete documentation of the process.
- Codes need to be added for tow quality (similar to the NMFS rating system) and document reasons a tow would be rejected and redone.

- Fields need to be added to the database to identify fixed and random stations and tow length
- Weather could be recorded following international standards.
- There is an important need to add metadata to the database and to create a data dictionary.
- Raw data should be in database with queries used to generate expansions.
- Backups should be made of electronic data (e.g. NetMind, CTD data) more frequently, preferably after each tow, but at a minimum at the end of each day.
- The development of NetMind datalogs is a good initiative and should continue because this may help improve ability to standardize tows.
- Data should only be entered once, not twice as is current practice for some data.
- The NMFS audits should be used once the data is in Oracle database to identify outliers and data inconsistencies.
- There is a need to get the CTD data into MARVIN so these are accessible to other researchers.
- It would be an improvement to record on the datasheets the name of the persons measuring and recording so that analysts can look for individual effects in data. This could be important particularly if a number of volunteers or less experienced personnel participate in the survey.

4. Survey operations.

- The amount of public outreach is exceptional and the only way this survey can be completed. Staff members are commended for their dedication to public outreach as it helps not just this specific survey but science in general.
- The current use of the NetMind system to get out of trouble early is appropriate. It is important to use the NetMind system to determine if the gear is functioning properly. If it is not functioning properly, a tow can be aborted and restarted without wasting too much time. Adhering to the towing protocol, where door spread, towing speed and distance traveled are specified, thus resulting in relatively consistent swept area, should help reduce variation in catachability. If the NetMind system is used in new ways in the future, it is important not to use the system to improve catchability (e.g. increasing door spread above the maximum or some other maneuver). Regarding door spread, increasing speed to achieve the target door spread is not acceptable, however changing warp length would be acceptable.
- Possible solutions to heavy tides causing shape of net to change are not obvious. Increasing the speed over the bottom within the tolerance of the towing protocol can help but, if the increase required is greater than specified in the protocol, it could confound other issues, such as the herding ability of the net for a given time. It may be better to repeat the haul at a more suitable time (slack tide) although it may not always be practical. Using the above towing protocol parameters would help to determine tow quality in heavy tides.

5. Utility of data.

- It is not recommended to try to calculate conversion factors between this survey and either the NMFS or Massachusetts surveys, because differences in gear used will make this

exceedingly difficult. The survey nets are very different and any conversion factor between them would be a source of questioning the results. There is also usually no reason for this because almost all stock assessment models can utilize multiple indices of abundance.

- There is a need to manage the public's expectations that appears to be present already. These data will not bring only good news for the fishermen and they should be prepared for both good and bad news.
- Age data for many species will be required for stock assessment purposes. Currently, there is no systematic collection of material for age determination during the survey. The best approach is to collect age samples to generate an age-length key for the fish sampled in the survey. The next best is to borrow an age-length key from another survey. The use of age-slicing should be a last resort. However, given that many species will be mainly ages zero, one, and two, length information may be sufficient to separate the ages without an age-length key in a number of species.
- Length frequency data should be expanded to account for strata areas.
- In 2008, NMFS scientists will be conducting benchmark assessments for all the groundfish stocks in the area. Results from this survey would be quite helpful to a number of the assessments as time series of abundance. In this regard, it would be important to establish contact soon with the respective stock assessment scientists to ensure that the important parameters are collected.
- Collections of ichthyoplankton data are time consuming and could be dropped in favor of more bottom trawl tows or for collecting biological parameters of the various species. The interpretation of icthyoplankton data in the area which is characterized by strong tides and the sampling intensity could be discussed with experts in this field. This collection should not come to the detriment of the main objective of the survey.

Appendix A
Northeast Consortium General Evaluation Criteria

1. Project success: Did the project accomplish its stated goals and objectives?

2. Certification of results: Is there adequate description of the approaches to experimental design, methods, and data analysis? Were these approaches appropriate? Are there other approaches that the participants should have considered or used? Are the data accurate, precise, and believable? Are the results and conclusions well supported by the data and statistically valid? Can the results and conclusions contribute to a sound basis for management decisions and policies?

3. Data accessibility and dissemination of results: Are the data available through the Northeast Consortium Fisheries and Ocean Data Management System? Are the data being served via another internet-accessible database? If so, are the data formatted suitably for data integration by the Northeast Consortium database? Is the final report complete, sufficient, of high quality, and understandable to end-users?

4. Project partnerships: Consider the degree to which the project was of mutual interest to participants and whether partners were key participants throughout the course of the project, including project design, data collection and analysis, and application of the results or products. What were the most and least successful aspects of the partnership? Were all parties equally interested and engaged in the project?

5. Project impacts: What impacts has the project had or could it have? What are the potential effects on fishing practices; socio-economics; and fisheries, coastal, and ocean management?

6. End-Users: Being as specific as possible, who could benefit from knowing about the research? How can a fishing sector incorporate any new information from the project? Which fishery management organization, working group, or plan development team could use the data?

7. Overall rating. Rate the overall project as excellent, very good, good, fair, or poor. Explain the reasoning behind the rating.

8. Future research. Is additional research needed to answer the original questions posed by the project? Are there obvious avenues of further research that should or must be pursued? Should this future research be a high priority for the Northeast Consortium?

9. Additional comments and guidance. Provide any additional comments that will assist the Northeast Consortium in evaluating this project.

Appendix B
Specific terms of reference for the review of the Maine-New Hampshire Inshore Groundfish Trawl Survey.

1. Review the various survey designs used, including their strengths, weaknesses, and potential biases. Consider transect selection, survey area estimation, biomass estimation, and partitioning by size/age class and by species. Recommend any changes to current survey design and timing given the results of the review.

2. Review the biological sampling aspects of the surveys. Recommend modifications if necessary.

3. Review the data recording, archiving, and editing methods. Recommend modifications if necessary.

4. Review the survey operations conducted in each year and comment on the credibility and consistency of the methods used. Provide recommendations on improvements to these methods.

5. Provide recommendations on the utility of the data in current and future biomass assessments and management (interoperability of the data with the Massachusetts Inshore Survey and the NMFS survey).

Appendix C
Agenda for the meeting

August 22, 2005

8:00 - 8:45	Meeting of the panel
8:45 – 9:00	Project participants arrive
9:00 - 9:15	Welcome and introduction
9:15 - 10:00	Project background
10:00 - 12:30	Survey design
12:30 - 1:30	Lunch at Maine Department of Marine Resources
1:30 – 2:00	Industry participation/public outreach
2:00 - 5:00	Survey operations, data collection, and other methods

August 23, 2005

8:00 - 8:10	Arrival
8:10 - 8:40	Review of yesterday's discussion
8:40 – 10:00	Biological sampling
10:00 - 11:00	Data processing and editing
11:00 - 12:15	Survey results and biomass trends
12:00 - 1:00	Lunch at Maine Department of Marine Resources
1:00 – 2:30	Survey results and biomass trends (cont.)
2:30 – 4:30	Reporting
4:30 – 5:00	Wrap-up

Appendix D
List of presentations

August 22, 2005

9:15 Project Background: Presentation and open discussion of survey beginnings and rationale, context within other Gulf of Maine Surveys, vessel selection, and staff and partners (Linda Mercer and Bob Tetrault).

10:00 Survey Design: Presentation and open discussion of areas of interest, spatial extent, timing, and transect design (John Sowles and Sally Sherman).

1:30 – 2:00 Industry Participation/Public Outreach: Presentation and open discussion of the project industry-science partnerships through each stage of the project as well as project outreach to the fishing industry (John Sowles and Sally Sherman).

2:00 Survey Operations and Data Collection: Presentation and open discussion of equipment, gear types, and shipboard methods. Discussion of matters pertaining to the manual and future survey methods (Sally Sherman).

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8:40 Biological Sampling: Presentation and open discussion of sampling operations, sampling locations and restrictions, and sample data recording methods (Sally Sherman).

10:00 Data Processing and Editing: Presentation and open discussion of the processing of data from edited transects to biomass estimates (Kerri Stepanek).

11:00 Survey results and biomass trends: Presentation and open discussion of the interpretation and application of results and conclusions (Sally Sherman).

2:30 – 4:30 Reporting: Open discussion of project reporting in the four final reports and the methods manual.

Appendix E
List of Participants

Name	Affiliation
David Beutel	Fisheries Operations Supervisor/Fisheries Extension Specialist Department of Fisheries, Animal and Veterinary Science Rhode Island Sea Grant URI Fisheries Center, East Farm Kingston, RI
Josh Carloni	New Hampshire Fish and Game, Durham, NH
Yong Chen	Associate Professor, University of Maine, Orono, ME
Ghislain Chouinard	Head, Marine Fish Section, Department of Fisheries and Oceans, Gulf Fisheries Centre, Moncton, NB, Canada
Jeff Flagg	Net builder, Portland Trawler Supply Co., Brownfield, ME
Rachel Gallant	Fisheries Specialist, Northeast Consortium,University of New Hampshire, Durham, NH
Sam Galli	Captain of F/V *Tara Lynn*, Portland, ME
John Hoey	Manager, Cooperative Research Partners Program, NOAA Fisheries Service, Northeast Fisheries Science Center,Woods Hole, MA
Christopher Legault	Research Fishery Biologist, NOAA Fisheries Service, Northeast Fisheries Science Center, Woods Hole, MA
Linda Mercer	Director, Resource Management, Maine Department of Marine Resources, Boothbay Harbor, ME
Chris Moore	Acting Director, Cooperative Research Partners Program, NOAA Fisheries, Northeast Regional Office, Gloucester, MA
Curt Rice	Captain of F/V *Robert Michael*, Portland, ME
Sally Sherman	Chief Scientist, Maine Department of Marine Resources, Boothbay Harbor, ME
John Sowles	Ecology Division Director, Maine Department of Marine Resources, Boothbay Harbor, ME
Keri Stepanek	Assistant Scientist, Maine Department of Marine Resources, Boothbay Harbor, ME
Robert Tetrault	Commercial fishing vessel owner, T/R Fish, Inc., Portland, ME