

SUMMARY REPORT

WORKSHOP TO DISCUSS BYCATCH REDUCTION TECHNOLOGIES TO REDUCE SEA TURTLE BYCATCH IN SOUTHERN NEW ENGLAND AND MID-ATLANTIC INSHORE TRAWL FISHERIES

Joseph DeAlteris
University of Rhode Island
Department of Fisheries and Aquaculture
Kingston, RI 02881

January 25-26, 2007

"Although released by NOAA, the information in this paper does not reflect, represent, or form any part of the support of the policies of NOAA or the Department of Commerce. Further, release by NOAA does not imply that NOAA or the Department of Commerce agrees with the information contained herein."

INTRODUCTION

The National Marine Fisheries Service has a record of involving fishermen in cooperative research to investigate technological solutions to reduce bycatch of protected species. To initiate this process for reducing sea turtle bycatch in the southern New England and mid-Atlantic inshore trawl fisheries, the Northeast Fisheries Science Center (NEFSC) contracted the University of Rhode Island (URI) to host a workshop with fishing industry leaders and fishermen in Ocean City, MD on 25-26 January 2007 at the Fontainebleau Hotel to discuss bycatch reduction technologies.

This report provides a summary of the presentations and discussions at the workshop. Selected individual presentations at the workshop are included as Appendices to this report.

Welcoming comments and the introductions of participants were made by Joe DeAlteris of URI. As background information prior to the group discussions, six formal presentations were made at the opening session of the workshop. Highlights of these presentations are subsequently provided in this report, along with comments made by participants. Copies of the six presentations (titles given below) are included in the report Appendices.

- A review of the workshop goals and a description of the NMFS NEFSC process for addressing gear research to reduce bycatch in fisheries off the northeast coast of the US [Maine-North Carolina] (Henry Milliken, NMFS, NEFSC).
- Synopsis of general life history, swimming physiology, and breathing of sea turtle species interacting with trawls in the mid-Atlantic region, and a discussion of the stress, injury or

lethal processes associated with the incidental capture of these animals (Kate Mansfield, VIMS).

- Bycatch information: turtle bycatch estimate in trawl fisheries and information from observer records (Heather Haas, NMFS, NEFSC).
- Review of the legal requirements and agency [NMFS] approach to sea turtle bycatch reduction in the Atlantic and Gulf of Mexico regions (Tanya Dobrzynski, NMFS Headquarters and Ellen Keane, NMFS, Northeast Regional Office)
- Review of sea turtle bycatch reduction technologies (specifically Turtle Excluder Devices [TEDs]) used in the Gulf of Mexico and southeast US trawl fisheries (Jeff Gearhart and John Mitchell, NMFS, SEFSC)
- Results of TED evaluations in the sea scallop trawl fishery conducted in summer 2006, and the potential/need for TED evaluations in other fisheries (Dan Lawson, URI)

The goal of the workshop was to solicit ideas and concepts from trawl fishing industry participants for Bycatch Reduction Technologies (BRTs) or other measures that would reduce the capture of sea turtles in the trawl fisheries in the Mid-Atlantic region, while minimizing impacts on the catches of target species. Additionally, suggestions were sought as to how to best conduct experiments and/or evaluations of BRTs. The results of these discussions, including potential research, are also summarized in this report.

Participants in the workshop included fishing industry representatives from Massachusetts to North Carolina, and scientific and management personnel from the conservation community, state agencies, academic institutions, and the National Marine Fisheries Service. A complete list of all participants that signed-in at the workshop is included in Appendix A, along with contact information.

SUMMARIES OF FORMAL PRESENTATIONS

Henry Milliken's presentation addressed the goal of the workshop and provided a review of the NEFSC strategy for addressing bycatch problems in commercial fisheries in the northeast region. Henry emphasized the NEFSC's goal of including the fishing industry in the entire process of designing, testing, and evaluating gear solutions to mitigate bycatch. Henry described the following seven-step sequential process:

1. Problem identification
2. Bycatch analysis to describe the spatial and temporal extent of the problem
3. Gear design coordinated with members of the fishing industry
4. A pilot study to evaluate the proposed gear modification,
5. A large scale evaluation in the commercial fishery
6. Establishment of an experimental fishery, and
7. The NEFSC provides scientific information to NERO and management agencies for use in decision and rule making.

The process as described has numerous feedback loops for refining gear modifications to minimize impacts on target catches. A copy of Henry's presentation is provided in Appendix B

Dr. Kate Mansfield presented background information on sea-turtle biology, and the life history, Endangered Species Act (ESA) status, size, diet, distribution, and nesting information of the sea turtle species most likely to be encountered in the mid-Atlantic area. Additionally, she described turtle diving behavior and response to stress and forced submergence. Finally, she presented a slide from Sasso and Epperly (2006) describing trawl interaction mortality rates, with respect to tow duration and season. While this slide generated discussion of the potential of regulating tow duration as a strategy to reduce sea turtle mortality in trawl interactions, considerable caution was expressed on the evaluation of the mortality results without explicit consideration of actual water temperatures during different seasons, specific areas of encounter, water depths, etc. A question was raised on the possible use of a water temperature criterion for determining when to require the use TEDs in the summer flounder trawl fishery, rather than relying on fixed date. This was identified as a potential research topic. A copy of Dr. Mansfield's presentation is provided in Appendix C.

Dr. Heather Haas presented information on the estimated sea turtle bycatch in the trawl fisheries in southern New England and the mid-Atlantic region. The presentation began with a review of observed sea turtle takes in the commercial fisheries by the dominant species caught, and characteristics of the gear and fishing practices that were associated with these takes. She also described the existing rules with respect to TEDs in the summer flounder trawl fishery. She presented data on turtle interactions as a function of tow duration which suggested (to some participants) that short tows, less than 1 hour, might be a potential strategy to investigate with respect to minimizing lethal interactions between sea turtles and trawls. She then presented data on observed tows where no sea turtles were taken, and on trawl fishing effort based on vessel trip report data. The results of an NEFSC analysis of observed sea turtle takes indicated the stratum with the highest turtle bycatch rate was in less than 50 meter water depth, had water temperatures greater than 18°C, was located south of 39° north latitude, and in which no functioning TEDs were used in the trawl nets. In this stratum, the sea turtle bycatch rate was 0.48 sea turtles per 24 hours fished (total net fishing time on the bottom), and accounted for an estimated take of 283 turtles per year out of a total annual bycatch estimate of 616 turtles in bottom trawl gear throughout the Mid-Atlantic region. Thus, NMFS has identified this stratum as having the highest priority in term of reducing sea turtle interactions. The fisheries involved are the summer flounder fishery (primarily off of Delmarva and secondarily off of Virginia and North Carolina), the sea scallop trawl fishery (primarily off of Delmarva), and the croaker fishery (primarily off of North Carolina). A copy of Dr. Haas' presentation is provided in Appendix D.

The next presentation addressed the legal requirements and agency [i.e., NMFS] approach to sea turtle bycatch reduction in commercial fisheries. Ellen Keane described the requirements of the Endangered Species Act (ESA) and the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), and how these legislative acts require NMFS to address sea turtle bycatch in trawl fisheries. Tanya Dobrzynski presented additional information with respect to the NMFS Sea Turtle Strategy, in which sea turtle bycatch is addressed across similar gear types rather than by fishery. A copy of Ellen's and Tanya's presentation is provided in Appendix E.

John Mitchell described the introduction of TEDs into the southeast and Gulf of Mexico shrimp fisheries, and stressed the importance of working cooperatively with the fishing industry to develop and test bycatch reduction gear, so as to maximize acceptance of such gear by the

fishing industry. A question was asked about the status of soft TEDs versus hard TEDs, and John indicated that only the Parker soft TED was now approved since the other soft TEDs had been decertified due to poor performance. Jeff Gearhart provided a review of TED research in mid-Atlantic trawl fisheries conducted cooperatively by the SEFSC and the fishing industry over the past 10 years. The fisheries in which most of the research has been conducted include, the summer flounder trawl fishery off NC and Delmarva, flynet croaker fishery off NC, and scallop trawl fishery off Delmarva. Notably, these are the same fisheries identified by the NEFSC bycatch analysis with the highest sea turtle bycatch rates. Research included the development of specialized TEDs for the flounder, flynet, and scallop trawl fisheries including several flexible prototypes and enlarged TED escape openings. A copy of their presentation is provided in Appendix F.

The last formal presentation was provided by Dan Lawson and he presented a summary of the performance of TEDs in the sea scallop trawl fishery off Chincoteague, VA conducted during summer 2006 and involving more than 80 paired tows. However, the use of a TED generated a significant reduction (about 7%) in the total weight of in-shell scallops. Moreover, the loss of scallop catch was about 14% when the total scallop catch was over 750 lbs. The experimental data also indicated that the scallop trawl fishery has a very low bycatch of marine finfish species. A copy of Dan Lawson's presentation is provided in Appendix G.

At the conclusion of the six formal presentations, workshop participants posed questions and offered comments. Several comments addressed the variable characteristics of the various inshore Mid-Atlantic trawl fisheries. It was also noted that the VTR database may not accurately reflect the operations, practices, or even target species of specific Mid-Atlantic fisheries on a localized basis. For example within the broad category of the summer flounder fishery, there are sub-fisheries with distinct local characteristics which should be considered if possible regulations to protect sea turtles are to be both effective and not cause severe economic harm. The horseshoe crab trawl fishery based in Ocean City MD was offered as an example where a TED would probably not allow for the capture of the target species due to the size of the animal; however, because of short tow durations on small boats, a maximum tow time might be a more reasonable and equally effective mitigation strategy. A comment was offered that a single mitigation strategy may not be appropriate for all fisheries, due to differences in vessel size, gear, fishing area, etc. Another comment indicated the need for dynamic management. Because sea turtles respond to environmental conditions (water temperatures), it seems appropriate to have regulations that seek to minimize interactions between sea turtles and fishing gear with respect to water temperatures. Industry participants noted that sea turtle populations may be increasing in abundance, but insufficient resources seem to be devoted to investigating population trends. A final comment addressed the low level of observer coverage in various fisheries, and the perceived non-representative nature of the coverage.

RESULTS OF GROUP DISCUSSIONS

In this session, participants identified potential research and mitigation strategies for reducing sea turtle interactions and mortality in the Mid-Atlantic trawl fisheries. The discussion began by reviewing the characteristics of the fisheries with the highest estimated turtle takes, that is those conducted south of 39° north latitude, in waters less than 50 meters deep, and at water temperatures greater than 18°C. The fisheries identified within this stratum were the summer flounder fishery (primarily off of Delmarva and secondarily off of Virginia and North Carolina), the sea scallop trawl fishery off of Delmarva, and the croaker fishery off of North Carolina. The discussions first addressed the major fisheries identified as having the highest bycatch estimates, and then attempted to identify potential research topics related to mitigation strategies for these fisheries. This following summary presents the discussions in the order they occurred, so as to best capture all thoughts expressed, realizing that there may be some repetition in the report.

The croaker fishery, south of Cape Charles, was characterized as a large mesh fishery, with the potential for very large catches of croaker. The fishery was characterized as cyclical, with a limited number of participants. The participants suggested the following research topics:

- Consider flexible (soft) TEDs for vessels with net drums
- Consider altering the design of TEDs by increasing bar spacing so as to improve efficiency in retaining the target species
- Evaluate effectiveness of TEDs on other bycatch species (e.g., stingrays) so as to interest fishermen
- Evaluate effectiveness of one hour tows, and methods to monitor/enforce tow duration

For the northern sector of the croaker fishery, the participants suggested an additional research topic:

- Evaluate potential for dynamic management related to water temperature

For the summer flounder fishery, south of 39° north latitude and north of Cape Charles, (off of New Jersey and Delmarva), the participants suggested the following research topics:

- Evaluate larger TEDs appropriate for stern trawlers
- Improve TED efficiency for retaining fishery target species and releasing bycatch species, possibly using staggered bars or flat bars in the grid and by increasing the bar spacing. Industry participants noted that clogging of the existing required TED is a significant problem
- Evaluate effectiveness of one hour tows, and methods to monitor/enforce tow duration
- Evaluate dynamic management of northern boundary line related to water temperature

Other fisheries and sub-fisheries using similar gear in the area were also considered, and participants made some suggestions for research:

- Separately consider the inshore sub-fishery off Ocean City MD that targets horseshoe crabs. Develop appropriate mitigation measures for this fishery acknowledging the unique characteristics of the fishery, specifically short tow durations.
- For the squid fishery south of Long Island with water temperatures greater than 18°C, but north of 39° latitude, potential mitigation strategies identified included tow duration, flexible grids, and dynamic management triggered by water temperatures.

For the scallop trawl fishery, the participants suggested the following research topics:

- Evaluate improved TED designs that minimize the loss of the target species using larger bar spacing or staggered bars
- Evaluate alternative trawl designs (e.g. topless trawls)

At the end of the first discussion session, several general comments were made. The first identified the need for an expedited process to apply for (and receive) experimental fishing permits. The second comment addressed improved communication between fishermen at sea as a potential strategy to reduce interactions. Other comments highlighted the need for a better understanding of sea turtle response to the stress of capture and the duration of forced submergence, and the relationship of these factors to sea turtle mortality. A final comment reiterated the need for dynamic management to minimize the regulatory burden on fishermen.

The final session identified research areas that were perceived to be of the highest priority by the fishing industry. The following topics were identified as having the highest payoff for research:

- Investigate the relationship between sea surface temperature and the abundance and distribution of sea turtles with respect to the potential use of dynamic management as an interaction mitigation strategy
- Improve the efficiency of the TED currently required in the summer flounder trawl fishery. Fishermen believe that they are losing too much of the target species due to clogging of the TED.
- Investigate sea turtle diving behavior to provide information about where in the water column interactions are occurring.

Other research topics mentioned in the final session included:

- A re-analysis of the relationship between sea turtle survival (condition on release) and tow duration, using data in the existing database
- Evaluation of the technology required to monitor tow duration so as to allow for effective enforcement of possible tow duration regulations
- The study of sea turtle behavior with respect to trawl interactions and possible measures to deter sea turtles from entering the trawl mouth
- Cost-benefit analysis of sea turtle interaction mitigation measures that address the size of a fishery, catch and revenue lost by the fishermen due to mitigation, the establishment of appropriate triggers for mandatory use of a particular mitigation measure, etc.

- Investigate the size of turtles encountered in the Mid-Atlantic as compared to the Gulf of Mexico, and conduct an evaluation whether an increase in the bar spacing is likely to exclude most turtles occurring in Mid-Atlantic waters.

PROPOSED SHORT-TERM RESEARCH PLAN

The 1.5 days of presentations and discussions resulted in many research suggestions, some of which can be addressed in the short term, but others will require years of study and considerable resources. The following important research topics are identified as relatively short-term; that is, they are tractable for study within the next year. These are divided into two sections; the first is devoted to gear technology issues, and the second is related to basic science on sea turtle biology and behavior.

Gear technology research:

1. Improve the TEDs currently required in the summer flounder fishery. Participants stated that the use of the currently mandated TEDs in this fishery results in a loss of target species catch. Possible improvements to the TED may involve increasing the bar spacing, staggering the bars, reducing the bar diameter, increasing the size of the TED, and making the TED flexible for better handling on vessels with net drums. A redesigned TED could be tested as early as summer 2007 with industry cooperation.
2. Evaluate the opportunity for using some technology to monitor tow duration that is enforceable.
3. Develop an improved TED for the sea scallop trawl fishery that minimizes loss of target species.
4. Develop a TED appropriate for the croaker fishery that is capable of handling large catch rates.

Basic scientific research:

1. Investigate the spatial and temporal distribution of sea turtles with respect to water temperature, as related to the potential use of dynamic management as a mitigation strategy.
2. Investigate the effects of duration of forced submergence on sea turtle health, as related to the potential use of tow duration as a mitigation strategy.

APPENDICES (appendices B-G are included on a CD)

- A. List of Participants and Contact Information
- B. Henry Milliken's presentation
- C. Kate Mansfield's presentation
- D. Heather Hass' presentation
- E. Ellen Keane's and Tanya Dobrzynski's presentation
- F. John Mitchell's and Jeff Gearhart's presentation
- G. Dan Lawson's presentation

APPENDIX A

NAME	ASSOCIATION
Andrew Jackson	F/V Rita Diane
Chelsea Doepp	AIS/NMFS observer program
Chris Hager	VA Sea Grant
Cindy Driscoll	MD DNR
Daniel Lawson	URI
Dave Rudders	VIMS
David Cottingham	NMFS PR
Eddie Newman	Commercial fisherman
Elizabeth Griffin	Oceana
Ellen Keane	NMFS NERO
Glenn Salvador	NMFS
Greg DiDomencio	Garden State Seafood Association
Heather Haas	NMFS NEFSC
Henry Milliken	NMFS NEFSC
Jack Forrester	NMFS SEFSC
James Fletcher	United National Fisherman's Assoc.
Jeff Eutsler	F/V Tony&Jan
Jeff Gearhart	NMFS SEFSC
Jim Kendall	NBSC
Jimmy Ruhle	MAFMC
Joe DeAlteris	URI
John Mitchell	NMFS SEFSC
Kate Mansfield	VIMS
Lauren Shilling	MD DNR
Merrill Campbell Jr.	SCOC Fisheries
Michael Barnette	NMFS SERO
Nicole Mihnovets	NY DEC
Phil Ruhle	NEFMC
Rich Seagraves	MAFMC
Rodney Avila	NEFMC
Ronald Smolowitz	Fisheries Survival Fund
Sean McKeon	NCFA
Sima Freierman	Montauk Inlet Seafoods
Sonny Gwin	F/V Skill-jalee
Tanya Dobryznski	NMFS OPR
Tricia Kimmel	MD DNR
Vicki Cornish	Ocean Conservancy