MEMORANDUM TO: Bonnie Ponwith  
Director, Southeast Fisheries Science Center

FROM: Sheryan Epperly
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SUBJECT: HMS Biological Opinion mortality ratio requirement

The 2004 Biological Opinion for the Atlantic Highly Migratory Species Pelagic Longline Fishery requires that post-release mortality of sea turtles be calculated quarterly. SERO and HMS use this information to estimate the number of mortalities from the total estimated incidental captures, and the final estimates are made annually once the logbook effort data are available. Currently, SEFSC provides all the information needed to estimate the mortality ratios in an appendix to the required quarterly and annual reports.

After discussions between SEFSC and SERO staff, a preliminary plan was devised to better meet the current BiOp’s mortality ratio reporting requirements. The purpose of this memo is to provide a detailed history of the mortality ratio development for the Center’s permanent record and to document the reasons why the SEFSC has been reluctant to perform the required calculations. In addition, this memo outlines an interim procedure, involving both SEFSC and SERO, to calculate the ratios and to describe future efforts to estimate the mortality in the Atlantic HMS fishery.

Background

In the 2004 BiOp, the Incidental Take Statement as well as the fisher performance measures were based on draft criteria contained in the Office of Protected Resources January 22, 2004 memo, as applied by Epperly and Boggs (2004). The draft criteria were based on a preliminary synthesis of information from a workshop held in Bethesda, Md. in January 2004. The meeting was attended by a mix of participants; not all were scientists. Due to FACA regulations, the group was not allowed to take the discussion to fruition and reach consensus. However, during discussion the group did appear to coalesce around the structure of a table which acknowledged that hooking location affected post-release survival, where some locations were more serious than others, as well as the amount of gear remaining at release. A table structure was developed by a small subgroup of veterinarians and a comparative vertebrate anatomist, and presented to
the larger group the following day. That second day, each invited participant was given a questionnaire to complete independently, and those responses helped the facilitator and agency conveners to populate the cells of the final table with mortality estimates. It is not transparent how single values reported by the agency were obtained from the given input of multiple contributors. However, there were almost no empirical data to populate the table. Thus, the table published in Ryder et al. 2006 represents expert opinions from persons with varying expertise.

Epperly and Boggs applied the draft criteria to the 2002-2003 NED pelagic longline experiment data and estimated the mortality ratio for animals captured on J and Circle hooks. There were some interpretations of the categorizations that required protocols be established, and these were outlined in their unpublished report. The authors were instructed by Laurie Allen, Director of the Office of Protected Resources, to “make the calls” as needed, which they did based on their scientific expertise and in consultation with the subgroup from the workshop that had created the basic structure of the table.

In the BiOp, SERO applied the same criteria to non-experiment data from the commercial fishery to set a baseline, and then set the fisher’s performance goal 3-yr hence equal to that achieved by the fishers contracted for the NED experiment. The mortality ITS levels were based on the predicted hooking locations and the fisher’s performance goals for removing gear. The BiOp requires that mortality ratios be calculated based on the draft criteria, using the methods of Epperly and Boggs (2004).

New Information/Long-term plan

Since the BiOp was signed, the final workshop document with a revised table has been published (Ryder et al. 2006). The final table, in part, reflected input from S. Epperly and C. Boggs about problems with the draft table, although some issues still exist. The modifications in the table’s structure dictate that the Epperly and Boggs estimates be revisited, as was done by Epperly et al. (2009).

Research conducted since the workshop appears to indicate that the mortality values in the table are much too high. For example, Sasso and Epperly (2007) and Swimmer et al. (2007) did not detect an increase in mortality in lightly hooked hardshell turtles when all gear was removed. Recent studies with deeply hooked animals held in captivity after capture showed that these turtles usually survived and expelled the hooks; those hooks not expelled usually were not causing significant internal lesions (Alegre et al. 2006).

Another factor warranting further consideration is that the criteria for assessing post-interaction mortality were based on experiments conducted in the NED, but hooking location and gear removal potential may vary in other regions. The turtles in the NED are among the smallest encountered by the U.S. pelagic longline fleet, and this is the region where the largest circle hooks (18/0) are required. Laboratory trials have demonstrated that as turtle size increases, the ability to swallow hooks increases, and as hook size decreases, the ability to swallow hooks increases (Stokes et al. 2011). The SEFSC expects that larger turtles outside the NED, where smaller 16/0 circle hooks are allowed, are more likely to swallow hooks, resulting in lower gear removal success than
was achieved in the NED. Also, smaller turtles are more likely to be boated, which facilitates gear removal. Therefore, the expectations of gear removal success based on NED results may be overly optimistic when applied to other regions of the fishery. The SEFSC suspects that these factors will result in a lower mortality ratio for the NED than is applicable to the rest of the fishery.

The SEFSC has engaged in a research project with the Department of Fisheries and Oceans, Canada to study the post-release mortality in loggerhead turtles. In the first year of work, commencing in summer 2011, the focus will be on tagging deeply hooked turtles. The SEFSC also has contracted with a vessel to dipnet and deploy tags on loggerheads on the Grand Banks, and these turtles will serve as controls to the treatment groups of hooked animals. Starting in 2009, the PIFSC has been deploying satellite transmitters on loggerheads hooked or entangled in longline fishing gear in the western Mediterranean to determine the turtles’ post-release movements, blood biochemistry, and survivorship. The SEFSC and PIFSC are committed to revisiting the post-release mortality table once additional empirical data are available, perhaps as early as 2013.

Interim Plan

After discussions between SEFSC and SERO staff, a preliminary plan was devised to better meet the current BiOp’s mortality ratio reporting requirements. Until such time as the post-release mortality table or the BiOp is revised, the SEFSC will categorize (by identifying the applicable row and column) each observed take according to the final post-release mortality criteria (Ryder et al. 2006), modified according to the concerns of Epperly and Boggs and the SEFSC, and provide that information to SERO on a quarterly and annual basis in the appendix of the required quarterly and annual reports. SERO can consult the appropriate row/column of the published table (Ryder et al. 2006) (modified as necessary and appropriate by the SEFSC according to their concerns and knowledge of the observer data) and extract the mortality rate attributed to that cell and calculate the mortality ratios. SEFSC also will provide SERO with a table containing categorizations for all turtles captured since the 2004 BiOp.

SERO may need to account for enhanced observer coverage in a given statistical reporting strata (e.g., Gulf of Mexico) by using observer coverage information to weight the data, as the table of incidental takes no longer represents a random sample proportional to the fishing effort. Moreover, to calculate the number of mortalities, SERO will need to access fishing effort data which is not available until the annual report is prepared for the year. Both observer coverage details and fishing effort data appear in the previous year’s annual report and can be used as a proxy for the current year until the annual report is prepared for the year of interest.

Currently, the observers record very detailed information on the hook location and gear removal, and that information is preserved in the codes of the SEFSC Sea Turtle Life History database. The attached protocols document details how each hook location code x gear removal will be categorized in the tables that we provide SERO.
References


