

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT
ON DRIFT GILLNET MANAGEMENT AND MONITORING PLAN INCLUDING FINAL
ACTION ON HARD CAPS

1. Corrections and Clarifications to Highly Migratory Species Management Team (HMSMT) Briefing Book Statement on Drift Gillnet (DGN)

The HMSMT notes the following corrections to the Agenda Item H.4.b HMSMT Report in the briefing book:

- a) The last sentence of the second-to-last paragraph of Section 5.2 should read, “Hence a move to 100% observer coverage with all (70%) of additional costs borne by industry would reduce variable profits per set by about 71% to \$200.”
- b) The labels “Total Profits” and “Total Revenues” in Table 9. Should be interchanged.
- c) Regarding the statement in 3.2.2 that, “With partial monitoring, in most cases the one-year hard caps under consideration would result in a fishery closure if one take/M&SI is observed, ...” the HMSMT offers the clarification that “in most cases” refers to “for most of the one-year caps proposed for different protected species in the various alternatives” not “most of the time.”
- d) The HMSMT notes differences in the 1-year cap levels for fin whale, green turtle and olive ridley turtle between Alternative 1 (Table 1) and Alternative 4, the Preliminary Preferred Alternative (PPA), (Table 6) in Agenda Item H.4.b, HMSMT Report March 2015. Alternative 1 uses the ITS values for these species while under the Council’s PPA the cap levels for these three species were increased from the ITS values of one animal to two animals. Therefore, the PPA is not based strictly on the ITS values.
- e) The rollover provision in the Council’s Preliminary Preferred Alternative for performance objectives was omitted from the description of the alternatives in Agenda Item H.4.b, HMSMT Report, March 2015, Section 4.5 (pages 16-17). This provision is to consider a rollover option described in Supplemental HMSMT Report 5, September 2014. Under this rollover option if a performance objective cap exceeds bycatch, it is raised by the difference; if bycatch exceeds the performance objective cap, the cap is reduced by the difference. For example, for a performance objective of five animals per year:
 - If bycatch of three animals occurs in the first year, then the one-year cap would exceed the bycatch count by two, so the cap in the second year would increase to seven ($5 - 3 + 5$).
 - If bycatch of seven occurred in the first year, then the cap would be exceeded by two, resulting in a cap of three ($5 - 7 + 5$) in the second year.

2. Additional Analysis Requested by the Council

The HMSMT prepared an analysis of DGN observer records in response to a Council request to compare swordfish catch over the 2008-2009 through the 2013-2014 DGN fishing seasons to high priority protected species takes along with common mola, shark species and striped marlin bycatch. The results are displayed in Figures 1 through 3. The definition of bycatch used to produce these figures includes expanded catch estimates for swordfish, striped marlin, and marketable sharks; mortality estimates for non-marketable sharks, common mola; and estimated entanglements of high priority protected species (HPPS).

Figures 1 through 3 respectively compare swordfish catch to common mola, to shark species and to striped marlin bycatch. To facilitate comparison of catch and bycatch levels, numbers of individuals are shown on the same vertical axis scale for all species under comparison.

The effect caps would have had on fishery operations in these seasons are described below, along with definitions of the labels A, B and C as used in the figures:

Label A - Interaction with a single leatherback turtle September 2009. Turtle was released alive. Expansion results in an estimate of eight (8) interactions. Had the fishery closed after this point in the season, 1,525 swordfish would NOT have been harvested that year, in addition to 832 marketable sharks. A total of 54 common mola and 223 non-marketable shark mortalities would have not occurred.

Label B - Interaction with two sperm whales December 2010. Expansion results in an estimate of 16 sperm whales (one whale was determined dead, the other seriously injured). There was no observed fishing after this month.

Label C - Interaction with a single leatherback turtle October 2012. Turtle was released alive. Expansion results in an estimate of five (5) interactions. Had the fishery closed after this point in the season, 407 swordfish would NOT have been harvested that year, in addition to 838 marketable sharks. A total of 29 common mola and 191 non-marketable shark mortalities would have not occurred.

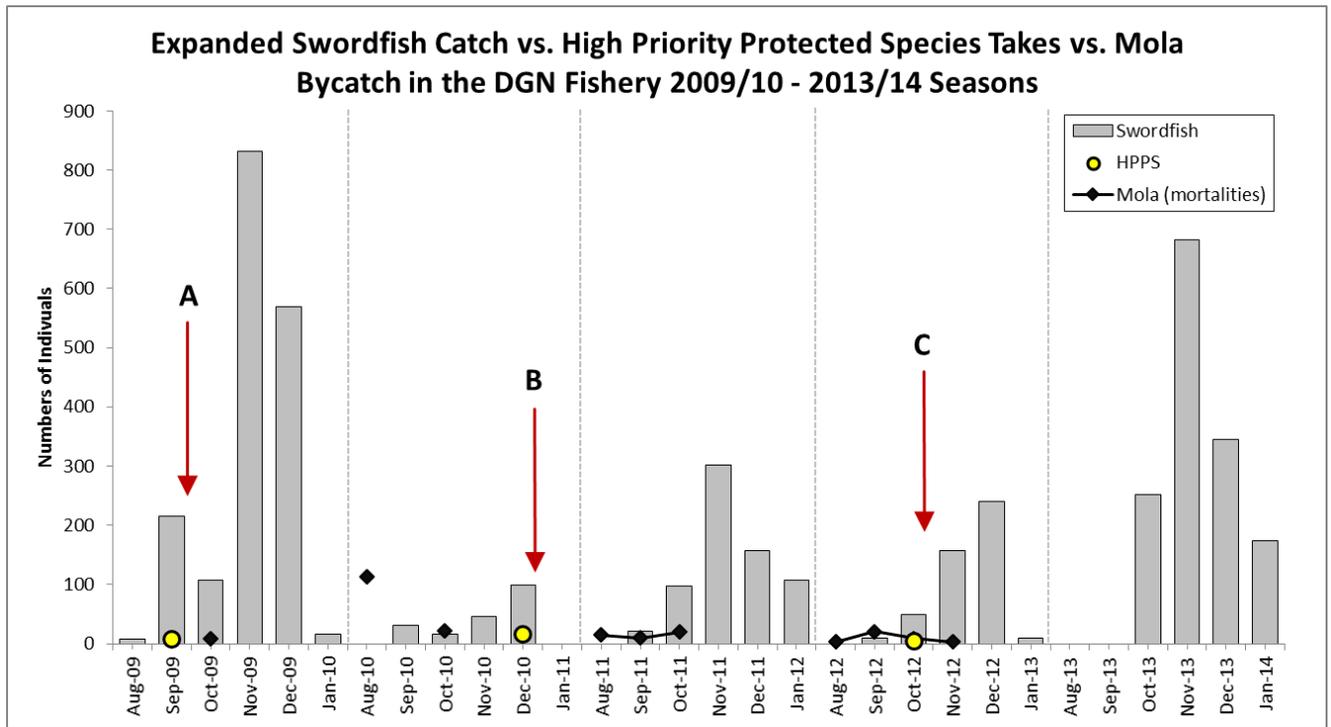


Figure 1. Analysis of Swordfish Catch vs. Common Mola Bycatch

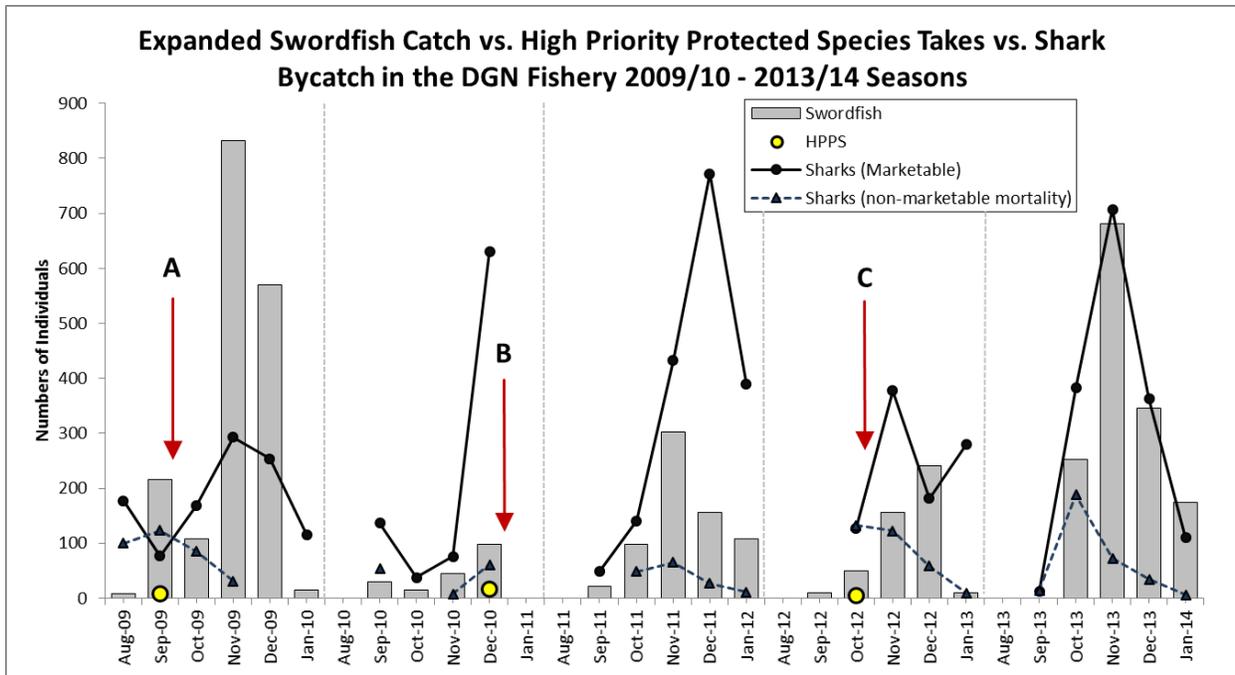


Figure 2. Analysis of Swordfish Catch vs. Shark Bycatch

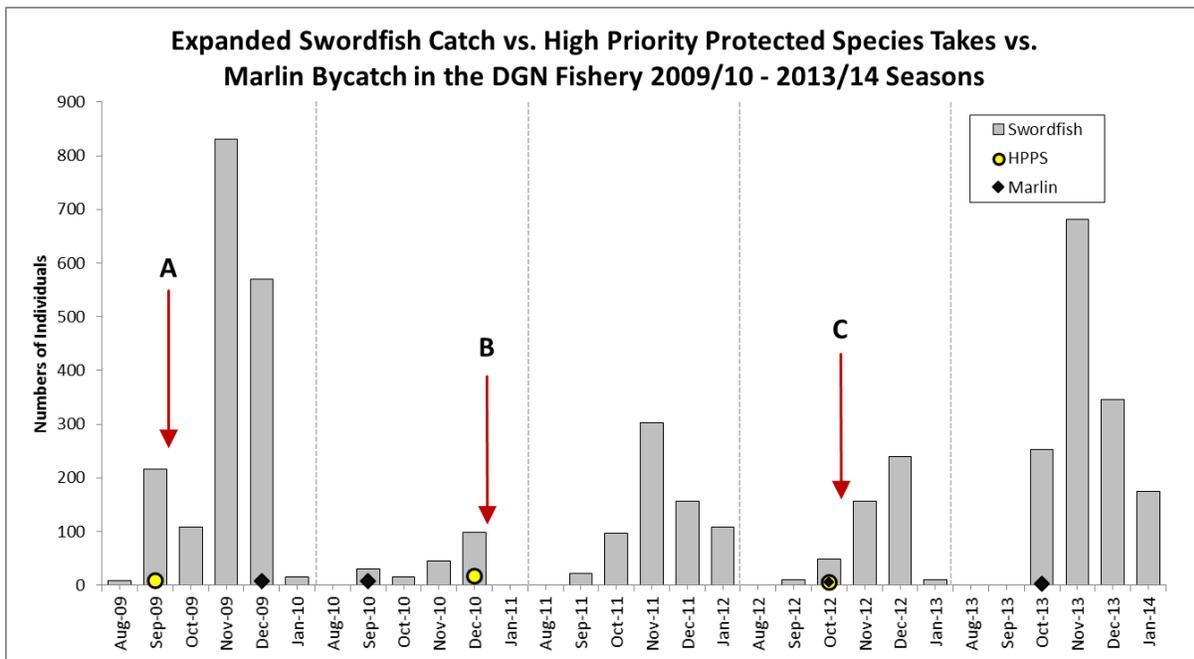


Figure 3. Analysis of Swordfish Catch vs. Striped Marlin Bycatch

The HMSMT notes that striped marlin catch would have only been affected by a HPPS closure in 2009, when observer data indicated that one (1) striped marlin was caught, and subsequently released alive. If expanded to reflect the level of observer coverage then effectively an estimate of eight (8) striped marlin might have been caught during the 2009/10 season. Were a hard cap regulation in effect then a portion of these interactions might have been avoided.

3. Further Discussion of Caps Alternatives

The HMSMT discussed the choice between one-year and five-year hard caps included under Alternatives 1-3. Five year hard caps offer the potential advantage of basing bycatch limits on longer periods which are more representative of average bycatch impacts over time, particularly for species with rare event bycatch. However this is offset by the potential drawback under five-year caps as currently proposed of shutting down the fishery over a period of years in case a cap condition is triggered which extends over multiple years.

The HMSMT emphasizes that if the Council chooses to use interaction numbers rather than M&SI to define cap levels, it would be necessary to examine the M&SI-based cap levels in the PPA to determine whether they remain appropriate as limits on the numbers of interactions.

The HMSMT received input from NMFS West Coast Region staff regarding the potential time from when an interaction occurs until a determination can be made whether a cap has been reached. Three to fifteen business days may be required to determine if a cap has been met or exceeded once an observer returns to port with documentation of an interaction. This includes observer travel time, observer debriefing and data verification, and species identification. There is then additional time required for closing the fishery. This timeline can be reduced by introducing an “automatic action” in the final rule as described in Chapter 5 of the HMS FMP.

The HMSMT notes that the Council’s objective to reduce bycatch to the degree practicable is based on MSA National Standard 9. The HMSMT has not reviewed the proposed action or alternatives as they relate to [guidelines for implementing NS9](#).

4. HMSMT Recommendations

Provide guidance on the process and schedule for completion of the DGN Management and Monitoring Plan.

In the event that the Council does not take final action at this meeting, the HMSMT offers the following recommendations:

- Provide guidance on what additional analysis on hard caps could be useful for the June Council meeting, which could include following Scientific and Statistical Committee guidance on how to finalize the bootstrap analysis for further Council consideration
- If there is interest to expand the range of alternatives to include interactions rather than M/SI as take caps, provide guidance on adjusting cap levels under the alternatives to appropriate levels reflecting the possibility of live release
- Provide guidance on potential adjustment of take caps in response to future changes in ITS and PBR values

APPENDIX

Summary and Discussion of Presentation by Jeff Moore and Alex Curtis

The HMSMT heard a presentation at their February 2015 meeting by Drs. Jeff Moore and Alex Curtis of the Southwest Fisheries Science Center, on an approach they are developing for estimating biological reference points (e.g., bycatch limits) for marine megafauna, and for assessing the probabilities that those limits have been exceeded over the course of cumulative time periods. They suggested their approach could potentially be useful for informing the jeopardy analysis component of Biological Opinions under Section 7 of the Endangered Species Act (e.g., by comparing the anticipated take within the ITS to the limit estimate), as it provides biologically-based estimates of maximum mortality levels that are consistent with achieving various alternative management objectives. The presenters noted that the anticipated take levels stated as part of Incidental Take Statements are just that – an estimate of how many animals are anticipated to be taken by the fishery; they are not biological reference points. Drs. Moore and Curtis were of the opinion that if the objective is to manage the stocks of protected species, there is little basis from a population assessment standpoint for using ITS values as control-rule triggers, since catch exceeding the anticipated levels are not necessarily consequential to the population.

For observer coverage below one hundred percent, Dr. Moore proposed using model-based approaches for estimating bycatch and obtaining probabilistic inference about whether reference points are being exceeded. These approaches may provide more stable estimates of bycatch through time and are generally more accurate than simple ratio estimators, especially for rare-event situations, but these tools function on a multi-year (e.g., 5- to 10-year), not annual, time scale for the management of protected species stocks.

The presenters emphasized that for many marine fauna, especially those for which bycatch is a rare event, management of fisheries through annual caps is not necessary. He identified that this is particularly the case for bycatch species with slow life histories and average annual bycatch incidents which typically range from zero to several individuals – such as for leatherback turtles or sperm whales. His work suggests that for these species, bycatch estimates are most appropriately compared on a multi-year basis to biologically-based limits such as the Potential Biological Removal (PBR). For example, mean annual bycatch mortality from a 5-year period could be compared to the limit value. This approach is echoed in NOAA's formal Guidelines for Assessing Marine Mammal Stocks (GAMMS) under the MMPA generally recommend comparing 5-year means for mortality and serious injury to the sustainability threshold (PBR). This management recommendation for rare event bycatch species is based on many years of assessment and management experience of these stocks and represents current best practice.

Dr. Moore identified some possible drawbacks of regulating rare event bycatch interactions with one-year hard caps. Namely, annual ratio estimates, whereby the annual bycatch estimate is given by the number of observed takes divided by observer coverage, are highly prone to severe errors in rare-event situations. This can lead to a failure to detect when true bycatch exceeds a limit if no catches are observed, or falsely inferring problems that do not exist, as when observing the year's only entanglement based on 20% observer coverage results in a bycatch estimate of 5 animals. Complete (100%) observer coverage resolves this sampling error problem, but it is expensive and does not take into consideration that natural variation in bycatch levels may result in annual bycatch exceeding biological reference points in some years but not others.

The presentation noted that from an assessment standpoint, as long as annual bycatch is below the reference point *on average*, management intervention is unnecessary. However, applying one-year hard caps ultimately enforces a lower limit through time than the nominal cap level by truncating bycatch in those years when it might otherwise have exceeded the cap. This added level of precaution is not problematic *per se*, but reacting to process variation in this way adds instability to the fishery management process. This instability may be costly both to the fishery, in terms of lost fishing days due to in-season closures, and to the management organizations involved, due to time and resources required for procedures related to management intervention, without providing any measurable benefit to the protected populations.

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The HMSMT discussed the Moore-Curtis presentation in light of the Council's Goals and Objectives for DGN management. The HMSMT notes that the Council's intent is not to manage population impacts on the impacted protected resources stocks, but rather to motivate fishermen to conduct their operations in a manner to reduce the risk of protected species interactions.

PFMC
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