

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM
REPORT ON DRIFT GILLNET FISHERY HARD CAPS

At its October 2022 meeting, the Highly Migratory Species Management Team (HMSMT) discussed considerations for the Drift Gill Net (DGN) Fishery Hard Caps Range Of Alternatives (ROA) adopted by the Pacific Fishery Management Council (Council) in [November 2021](#). This report covers additional considerations to those covered in HMSMT Supplemental Report 1 ([G.3.a, Supplemental HMSMT Report 1](#)).

Alternative #2

The HMSMT discussed the feasibility of Alternative 2, for which the National Marine Fisheries Service (NMFS) previously issued a negative determination. Based on the quantitative impact analysis in the [draft Environmental Assessment](#) (EA), Alternative 2 appears to have the greatest adverse economic impact to the affected entities. The HMSMT is concerned that should Alternative 2 be chosen as the Final Preferred Alternative (FPA), the analysis prepared to date does not indicate that the conditions that resulted in NMFS' negative determination would be significantly different now than they were in 2015.

Behavior/Incentives

The bootstrap analysis does not attempt to quantify behavioral changes within the fishery upon implementation of any hard caps regulations due to the lack of data representative of fishing behavior under caps. Such behavioral changes could provide additional conservation and economic benefits. In the absence of a quantitative analysis of the incentive effects of caps, the HMSMT offers a qualitative analysis of the utility of hard caps to incentivise fishing behavior to further reduce interactions with hard cap species. While the Council's intent is understood, the HMSMT still struggles to understand what behavior could be modified to further reduce the already rare likelihood of an interaction except to cease fishing altogether. In discussions with DGN participants, the high cost of 1) damaged nets (estimated at \$80,000 for a new net), 2) time off the water to repair/change a net (several days to more than a week), 3) time and effort to strategically release bycatch with no compensatory economic benefit, and 4) the risk of injury or death to fishermen in case of an interaction with a large cetacean all provide a highly effective deterrent to reckless fishing behavior which may result in the entanglement of most hard cap species. Suter et. al (2022) determined that there was little statistical evidence for differences between observed and unobserved trips, neither for vessels that periodically carried observers nor those that were never observed. Relative to unobserved vessels, observed vessels likely have a greater incentive to reduce bycatch, and would presumably take steps to do so if it were possible. The lack of discernible differences between observed and unobserved vessel behavior indicates that it is unlikely that there are additional behavioral modifications that fishers could implement to further avoid catch of High Priority Protected Species (HPPS).

Regulatory and Enforcement Costs of Implementing Alternative 3

The HMSMT met with the Enforcement Consultants and discussed potential difficulties in enforcement and implementation of the suboptions of Alternative 3. A key issue is determining pathways to provide notice to individual and unobservable vessel closures. There are unique issues concerning lag times in determining mortality/injury (M/I) and providing notice of hard caps reached as well as data confidentiality issues given the low cap numbers and the few active vessels in the fleet. These issues mostly pertain to administering and enforcing individual vessel caps. The team notes that the logistics and implementation costs from an enforcement and administrative perspective have yet to be evaluated and could influence the Council's choice of an FPA.

HMSMT Comments on Bootstrap Analysis Results

The HMSMT reviewed the bootstrap analysis results presented in the draft EA ([Agenda Item G.3, Attachment 1](#)), based on data from the 2001/02 through 2020/21 fishing seasons, and considered the best way to evaluate each model output. Given the challenges with applying traditional hypothesis testing to simulation results, the team evaluated the practical significance¹ of the alternatives in terms of the reduced number of HPPS M/I per year for each alternative as compared to Alternative 1 (no action) for all three effort scenarios. Relative to Alternative 2, the Alternative 3 options reduce the costs to affected entities without offering practically significant changes in the benefits to HPPS or finfish.

The bootstrap results show minimal differences among options and suboptions under Alternative 3. In particular, for fleet size scenarios 1 and 2, which bracket the most likely future participation level, small numbers of observed vessels coupled with the limited number of observed HPPS M/I lead to similar results across action alternatives. The bootstrap analysis did not demonstrate any practically significant conservation benefit to HPPS as compared to Alternative 1 (no action). For example, in Scenario 2, no alternative reduced annual average HPPS M/I by more than 0.07 (7 total HPPS M/I per 100 simulated seasons; Table 1).

¹ Practical significance is different from statistical significance: "Practical significance refers to the magnitude of the difference, which is known as the effect size. Results are practically significant when the difference is large enough to be meaningful in real life. What is meaningful may be subjective and may depend on the context." Penn State Eberly College of Science, Elementary Statistics lesson 6.4. <https://online.stat.psu.edu/stat200/lesson/6/6.4>

Table 1. Bootstrap Estimates of Effects of Hard Caps Alternatives. HPPS/MI are for all species combined.

	Alt 2	Alt 3-AI	Alt 3-AII	Alt 3-B	Alt 3-CI	Alt 3-CII
Scenario 1 (2 vessels)						
Change in Annual Average HPPS M/I	-0.0028	-0.0009	-0.0009	-0.0009	-0.0009	-0.0011
Change in Annual Average Ex-vessel Revenues	-\$1,469	-\$465	-\$465	-\$465	-\$465	-\$820
O.C. of Revenues per Unit Reduction in HPPS M/I	\$524,719	\$517,155	\$517,155	\$517,155	\$517,155	\$745,346
Scenario 2 (11 vessels)						
Change in Annual Average HPPS M/I	-0.0688	-0.0233	-0.0233	-0.0105	-0.0126	-0.0171
Change in Annual Average Ex-vessel Revenues	-\$43,699	-\$11,917	-\$11,917	-\$5,898	-\$8,651	-\$14,119
O.C. of Revenues per Unit Reduction in HPPS M/I	\$635,163	\$511,480	\$511,480	\$561,724	\$686,562	\$825,648
Scenario 3 (30 vessels)						
Change in Annual Average HPPS M/I	-0.4894	-0.1674	-0.1674	-0.0482	-0.0488	-0.0608
Change in Annual Average Ex-vessel Revenues	-\$318,459	-\$86,056	-\$86,056	-\$25,635	-\$46,076	-\$64,159
O.C. of Revenues per Unit Reduction in HPPS M/I	\$650,713	\$514,071	\$514,071	\$531,836	\$944,182	\$1,055,243

The change in annual average ex-vessel revenues reflects the mean reduction in total fleet revenues across all 10,000 simulated seasons in the bootstrap analysis. Overall, Alternative 3-B has the lowest reduction in annual average revenues. The HMSMT notes that the annual average revenue reduction may not reflect the reality of the policy’s negative economic impact on the fleet, as the impacts are likely to be most strongly felt in individual seasons with closures as opposed to an averaged reduction across many seasons.

The HMSMT developed a metric of the opportunity cost of bycatch reduction, computed as the ratio of the reduction in annual average revenues to the reduction in annual average HPPS M/I. This provides a standardized comparison of the loss in revenue production relative to the reduction in HPPS M/I. Focusing on participation scenario 2, Alternative 3-AI and 3-AII have the lowest overall opportunity cost of preventing one HPPS M/I. Alternative 2 has the greatest economic impacts among the action alternatives.

Comments on SSC Review

The Scientific and Statistical Committee (SSC) reviewed the bootstrap analysis methodology and provided suggestions ([Agenda Item G.3.a Supplemental SSC Report 1](#)) for improvement in the presentation of results. In particular, the SSC recommended focusing on the 5 percent worst-case outcomes (i.e., the 5th percentile of simulated seasons in terms of revenues and 95th percentile of simulated seasons in terms of HPPS M/I under the action alternatives), to better reflect the risks in seasons where the hard caps are most impactful. The team began an analysis to address these suggestions, but determined that it could not be finalized in time for presentation to the Council for consideration at this meeting. The Council may wish to consider this in deciding whether to adopt an FPA or a Preliminary Preferred Alternative (PPA) at this meeting.

Conclusions

The HMSMT discussed challenges for the Council to adopt an FPA at this meeting resulting from incomplete Regulatory Impact Review/Regulatory Flexibility Act analyses, which would support conclusions about which, if any, alternatives are consistent with Magnuson-Stevens Act National

Standard 7 (or other binding language). Questions also remain about the feasibility of implementing any of the options in Alternative 3. The Council may therefore wish to choose a PPA or otherwise narrow the range of alternatives under consideration to allow for further impact and compliance analyses, or could choose Alternative 1 (no action) as its FPA, as the most practical alternative among those under consideration based on currently available information.

PFMC

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