

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON DRIFT GILLNET HARD CAPS

Introduction

At its June 2021 meeting the Council revisited a proposal originally adopted in September 2015 to implement a hard cap closure regime on the California large mesh drift gillnet (DGN) fishery, which for a variety of reasons was never fully implemented (see the [situation summary, Agenda Item F.5, Drift Gillnet Fishery Hard Caps](#), June 2021). At that meeting the Highly Migratory Species Management Team (HMSMT) submitted reports outlining a revised purpose and need statement and a potential range of alternatives for renewed action on this matter (see Agenda Item F.5.a, [HMSMT Report 1](#) and [Supplemental Report 2](#)). Based on those reports the Council adopted [a motion](#) specifying a preliminary range of alternatives and revising the purpose and need to read as follows:

The purpose is: To incentivize fishing practices and tools in an effort to minimize bycatch and bycatch mortality, as well as to conserve other unmarketable non-target species, including Endangered Species Act- (ESA) listed species and marine mammals, in the drift gillnet fishery to the extent practicable.

The need is: To ensure that take and bycatch of unmarketable non-target species, including ESA-listed species and marine mammals, in the DGN fishery is minimized to the extent practicable and that such take and bycatch does not result in limitations on the economic viability of the west coast swordfish fishery.

The Council directed the HMSMT to further develop the range of alternatives so that the Council may adopt an updated range of alternatives at its November 2021 meeting and identify a preliminary preferred alternative, if warranted. The alternatives should be consistent with the revised purpose and need and address deficiencies identified in the original proposal that led National Marine Fisheries Service (NMFS) to find it inconsistent with Magnuson-Stevens Act (MSA) National Standard 7 (see [Agenda Item H.1.a, Supplemental NMFS Report 2, June 2017](#)). The HMSMT met online October 13, 2021, to discuss this assignment and offers this report in response to the Council's June 2021 action and guidance.

Range of Alternatives

The HMSMT provides the following range of alternatives (ROA) for hard caps in the DGN fishery for the Council's consideration, as well as brief explanations of the reasoning behind the different recommended closure periods and how they may alleviate the negative economic impacts found in the NMFS economic analysis. We also provide other approaches the Council may wish to consider for its adopted ROA, and discussion of all options.

Alternative 1: No Action

Under this alternative hard caps are not implemented; the fishery continues operation under current regulations.

Alternative 2: The Council 2015 FPA

Under this alternative, hard caps are implemented as in the Council’s original 2015 action, with rolling two-year caps based on observed mortality/injury for five marine mammal and four sea turtle species. Although NMFS found this proposal was inconsistent with MSA National Standard 7, implementation of other proposed actions by the Council could change circumstances such that this alternative may be consistent with National Standards under the MSA. Further in-depth analysis would be necessary to make that determination.

A description of how hard caps under this alternative would have functioned may be found in the Final Rule Notice ([85 FR 7246](#)) published February 20, 2020; subsequent litigation rescinded these regulations. The hard caps for this alternative are shown in Table 1.

Table 1: Alternative 2 hard cap numbers.

Species	Rolling 2-year hard cap
Fin Whale	2
Humpback Whale	2
Sperm Whale	2
Leatherback Sea Turtle	2
Loggerhead Sea Turtle	2
Olive Ridley Sea Turtle	2
Green Sea Turtle	2
Short-fin Pilot Whale (CA/OR/WA stock)	4
Bottlenose Dolphin (CA/OR/WA stock)	4

Under this alternative, if a cap is reached, the DGN fishery will close until the two-year (i.e., two fishing seasons) mortality and injury for all species falls below their hard cap values. The DGN fishery then reopens on May 1 of the next fishing season. NMFS reports observed protected species mortalities and injuries on an ongoing basis to help participants in the DGN fishery plan for the possibility of a hard cap being reached.

The length of the closure period depends on when a hard cap is reached. The rolling window considers observed mortality/injury during the previous fishing season along with the current fishing season to determine whether a two-year hard cap has been reached or exceeded. Taking a hard cap of two as an example, if one observed mortality/injury occurs in season 1 and a second observed mortality/injury occurs in season 2, the rolling two-year hard cap has been reached and the fishery closes. The fishery would then reopen in season 3 once the level of observed mortality/injury is estimated at one animal during the rolling window for seasons 2-3, which is below the hard cap value of two. However, if two observed mortalities/injuries occurred in season

1, the fishery would close for the remainder of season 1, remain closed for the entirety of season 2 (since the season 1-2 rolling window value is still 2), and reopen in season 3. Under this alternative, the length of closure period can vary considerably under these scenarios, potentially extending up to nearly two entire seasons.

Since written description of these closures may be confusing and difficult to fully understand, the HMSMT intends to submit a supplemental report in which it will provide schematic depictions of closures under all alternatives in order to help visualize how each would affect the operation of the fishery.

Alternative 3: Annual Fleet-wide Hard Caps

Under this alternative, the hard cap numbers are the same as in Alternative 2, but would be applicable to a single May through January fishing season¹. The HMSMT proposes the following options for different closure period durations under this alternative for Council consideration:

- If a cap is reached, the DGN fishery will close for the specified period under each option, starting on the date/time specified in a closure notice issued by NMFS
 - Option 1 [14-day]: through the 14th day of closure or January 31, whichever is earlier. The fishery then reopens, either on the 15th day, if the closure begins on or before January 17, or May 1, if the closure begins on or after January 18.
 - Option 2 [30-day]: through the 30th day of closure or January 31, whichever is earlier. The fishery then reopens, either on the 31st day, if the closure begins on or before January 1, or May 1, if the closure begins between January 2 and January 31.
 - Option 3 [Remainder of season]: through January 31. The fishery then reopens on May 1, i.e., the beginning of the next fishing season.
 - Option 4 [14-day, and season remainder if interaction following closure]: through the 14th day or January 31, whichever is earlier. The fishery then reopens, either on the 15th day, if the closure begins on or before January 17, or May 1, if the closure begins on or after January 18. In case another interaction with any hard cap species occurs within the same season after reopening, the fishery closes through January 31.
 - Option 5 [30-day in early season or 14-day in late season]: through the 30th day of closure if a cap is reached before November, or through the earlier of the 14th day of closure or January 31, if a cap is reached during the November to January period.

¹ This is consistent with the original Council and California Department of Fish and Wildlife preliminary preferred alternatives, which had both annual and 2-year options with the same hard cap numbers applicable to each of these options (see Alternatives 4 and 5, pp. 15-17 in the [Final EA](#)).

With a shorter closure period, the fishery could reopen during the same season, possibly resulting in additional take of hard cap species. Without an additional bycatch reduction mechanism in place, hard caps could be exceeded multiple times in a single fishing season, which would diminish the intended conservation benefits of the proposed action. At its October 2021 meeting, the HMSMT discussed scenarios in which a cap was reached, then when the fishery reopened, an additional interaction with the same or another hard cap species occurred in that same season. To address this potential issue, Option 4 includes an additional closure period if an interaction occurs after an in-season reopening of the fishery. This approach may increase the incentives for bycatch avoidance following an in-season reopening after a cap is reached. This could be effective if fishery participants can modify fishing behavior to reduce their risk of reaching an individual cap or reaching a cap (individual or fleet) for a particular species.

The HMSMT also discussed the differential effects of closures across the fishing season. Table 2 below shows average monthly inflation-adjusted ex-vessel revenue from PacFIN landings data, for the years 2011-2020, arranged according to the May 1-January 31 fishing season. It can be seen that 81 percent of the revenue derived from the fishery has occurred November to January during this 10-year period. This is also a time of year when DGN fishery participants have few alternative fisheries to participate in to derive income. The HMSMT proposes Option 5 to take this into account by adjusting closure periods according to the time of year they are triggered.

In a full evaluation of the alternatives adopted by the Council in November, the HMSMT could explore available data on seasonal patterns in protected species interactions, which would influence the likelihood of a cap being reached at different times during the fishing season. Any such patterns could amplify or moderate the likelihood of severe adverse socioeconomic impacts of a fishery closure.

Table 2. Average ex-vessel revenue in the DGN fishery by month, 2011-2020. (Source: PacFIN, accessed 10/14/2021)

Month	Average inflation adjusted revenue	Percent of total average seasonal revenue
May	\$10,173	1%
June	\$5,563	1%
July	\$537	<0.5%
August	\$7,246	1%
September	\$29,550	3%
October	\$116,405	13%
November	\$243,147	26%
December	\$288,744	31%
January	\$223,397	24%

Alternative 4: Individual Vessel and Fleet-wide Hard Caps

Under this alternative hard caps apply both to individual vessels and the fleet as a whole based on the numbers shown in Table 3. When an individual vessel reaches or exceeds an individual cap,

both that vessel and all unobservable vessels would have to stop fishing. All vessels in the fishery would have to stop fishing when a fleet-wide cap is exceeded. As above, options for different closure period durations are included. The individual and fleet-wide caps under this alternative are shown in Table 3. The language in the Council’s motion from the June 2021 meeting states that a fishery closure is triggered when a hard cap number is “exceeded.” This is different from how hard caps would work under Alternatives 2 and 3 where the fishery closure is triggered when the hard cap number is reached. The HMSMT interprets “exceeded” to mean that a fishery closure is triggered when the hard cap number presented in the motion plus one additional observed mortality/injury is reached. “Plus-one” numbers are shown in parentheses in Table 3. The HMSMT is unclear whether the Council intended that the individual vessel closure would be triggered when a cap is reached or exceeded.

Using fin whales as an example, an individual vessel and all unobservable vessels would stop fishing when the individual cap is reached, by the occurrence of one observed fin whale mortality/injury, or if the individual cap is exceeded, by the occurrence of two or more observed mortalities/injuries for that individual. This would trigger the fishery as a whole to close when three total observed injuries/mortalities for fin whales occurred (i.e., the fleetwide cap is exceeded). When adopting an ROA the Council should clarify its intent as to whether an individual vessel should cease fishing when an individual cap is reached, or when it is exceeded.

Table 3. Alternative 4 hard cap numbers.

Species	Individual Cap	Fleetwide Cap
Fin whale	1 (2)*	2 (3)
Humpback whale	1 (2)	2 (3)
Sperm whale	1 (2)	2 (3)
Leatherback sea turtle	1 (2)	2 (3)
Loggerhead sea turtle	1 (2)	2 (3)
Olive-Ridley sea turtle	1 (2)	2 (3)
Green sea turtle	1 (2)	2 (3)
Short-fin pilot whale C/O/W	2 (3)	4 (5)
Common bottlenose dolphin C/O/W Offshore stock	2 (3)	4 (5)

* Exceedance level in parenthesis, i.e., the number of observed mortalities/injuries that would trigger a fishery closure.

While these cap numbers are derived from the original proposal that imposes closures based on a two-year rolling average, the original proposal as described in the Final Environmental Assessment (EA) included one- and two-year options with the same hard cap numbers. Applying the same cap levels to shorter closure periods within a single fishing season, as shown in the options below, is thus consistent with the original action.

As under Alternative 3, individual and fleetwide closures begin on the date specified in the closure notice issued by NMFS and end on the last day of the closure period or January 31, whichever is earlier, as specified in the notice. The fishery then reopens on the specified date.

- Option 1: individual closure period 7 days, fleetwide closure period 14 days
- Option 2: individual closure period 14 days, fleetwide closure period 30 days
- Option 3: individual closure period 30 days, fleetwide closure until May 1 (i.e., the remainder of the fishing season)
- Option 4: Closure periods as in any one of the above options, but 1) when the fishery reopens during the same fishing season, should a vessel that previously reached/exceeded an individual vessel cap again hit any of the caps, that vessel plus all unobservable vessels are prohibited from fishing for the remainder of the current season, and 2) when the fishery reopens during the same fishing season, should any of the fleetwide caps be reached, the entire fishery closes for the remainder of the current season.

Individual closures and fleetwide closures are applied independently, meaning that an individual could be subject to both the individual closure and the fleetwide closure (i.e., potentially 21 days, 44 days, or the remainder of the season).

Option 4 addresses the same considerations discussed under Alternative 3 with respect to a cap being reached more than once in a single fishing season. Under this option, if a cap is reached again, either the individual vessel or the fleet as a whole closes for the remainder of the season, depending on which type of cap applies.

The HMSMT recommends that when the Council adopts its final range of alternatives it narrows the range of options included under Alternatives 3 and 4, potentially specifying a single closure period (or periods under Alternative 4). This would substantially simplify the subsequent analysis of the alternatives.

Preliminary Evaluation of the Alternatives

As mentioned above, with this action the Council is revisiting an action it adopted in September 2015. The specifics of the rulemaking process are rather complicated, involving substantial litigation preventing enforcement of hard caps regulations as originally proposed. (For an account of this history see [Agenda Item I.4, Situation Summary, March 2020](#) and [Agenda Item F.5, Situation Summary, June 2021](#).) Ultimately, the rationale that the Council's original hard caps recommendation was inconsistent with MSA National Standard 7 prevailed in this litigation. This finding was, in part, due to the likely significant, adverse economic impacts to a substantial number of small entities participating in the DGN fishery. The Final Regulatory Impact Review and [Final Regulatory Flexibility Analysis](#) published June 8, 2017, and a letter NMFS sent to the Council around that time, explains the anticipated economic impacts of the Council's original hard caps recommendation ([Agenda Item H.1.a, Supplemental NMFS Report 2, June 2017](#)). Specifically, NMFS stated "Based on the analyses in the final RIR, EA, and FRFA, NMFS found that implementing the Council's proposed regulations to establish protected species hard caps for the DGN fishery would have minor beneficial effects to target and non-target fish species and protected species at the cost of significant adverse economic effects to the participants in the fishery if and when closures would occur." Further, NMFS concluded "Pursuant to MSA National Standard 7 (i.e., conservation and management measures shall, where practicable, minimize costs

and avoid unnecessary duplication) and given the findings above, implementing protected species hard caps for the DGN fishery under MSA authority is not warranted at this time.”

The action the Council is considering now must address the tradeoff between the conservation benefits of a hard caps regime against the adverse socioeconomic impacts of potential closures on fishery participants. Since NMFS has previously concluded that hard caps “would have minor beneficial effects to target and non-target fish species and protected species,” the focus of any analyses would be on the scale of the socioeconomic impacts of missed opportunities.

In its revised purpose and need statement, the Council emphasizes that the threat of a hard cap closure is intended to incentivize changes in the individual and collective behavior of fishery participants so as to further reduce the risk of mortality/injury to the hard cap species consequent of fishery operations. While it is possible to evaluate the direct socioeconomic impacts of different closure periods in terms of foregone revenue, determining how the risk of foregone revenue, at different levels, would affect fishing behavior is likely impossible. Furthermore, given the relative rarity of bycatch events for the capped species at the individual level, fishers may not have enough information to figure out what behavioral changes would effectively mitigate bycatch risk.

As a start on an analysis of these factors, the HMSMT presents information on potential foregone revenue of varying closure periods. Further analysis would entail assessing the likelihood that a hard cap closure would be triggered during a fishing season. This could entail modeling seasonal patterns of fishing effort and, if possible, time-variant estimates of bycatch probability for the hard cap species. Since both the length and time of closures would affect the socioeconomic impacts, these factors would be useful in an analysis.

Assessing potential economic impacts: 14-day and 30-day closure periods

Table 4 shows the variation in potential foregone revenue by means of the sum of revenue within rolling 14-day and 30-day periods in terms of the maximum, minimum, and average values. The underlying data is the daily average inflation-adjusted ex-vessel revenue, 2011-2020, extracted from the PacFIN database. So that only complete periods are summarized, some landings data were excluded from the summaries presented here: 1) The period from May 1 to August 15 when fishing is prohibited within 75 nm of the mainland shore and 2) rolling sums overlapping with the February-April closure period (i.e., beginning on January 18 or January 2 respectively). The 14-day period with the maximum ex-vessel revenue (Nov 26-Dec 10) represents 20 percent of the average total season revenue, 2011-2020, while the maximum 30-day period (Nov 19-Dec 19) represents 38 percent. The periods with minimum revenue only represent <0.5 percent and 1 percent respectively. Of course, the data here represents landing dates, while the corresponding fishing would have occurred at some point preceding the landing date. Thus, these date ranges are lagged by an unknown amount in terms of the impact of potential closures. If the HMSMT were to pursue further analysis along these lines we could explore use of the integrated database developed by PacFIN where trip and landings data have been matched (see [Agenda Item F.1.a, NMFS Report 2, June 2021](#)) to address this shortcoming.

Table 4. Maximum minimum, and average ex-vessel revenue for 14- and 30-day closure periods. Average daily inflation-adjusted ex-vessel revenue during the May-January fishing season, 2011-2020 was used. (Source: PacFIN, accessed 10/14/2021)

Closure length	Maximum		Minimum		Average
	Amount	Date Range	Amount	Date Range	
14-day	\$186,454	Nov 26-Dec 10	\$2,340	Aug 28-Sep 11	\$78,201
30-day	\$350,557	Nov 19-Dec 19	\$10,313	Aug 16-Sep 15	\$173,682

Assessing potential economic impacts: Closures for the remainder of the fishing season

Options where a closure for the remainder of the season is triggered may be evaluated in terms of the cumulative revenue over the length of the season. Obviously, the earlier such a closure is triggered the more revenue will be foregone. But because most revenue is generated in the November to January period, season closures from May to October have about the same effect on forgone revenue. Thereafter, the amount of foregone revenue would decline significantly as the end of the season approaches. This is illustrated in Table 5 (using the same data set described above). It shows the cumulative foregone revenue (i.e., potential revenue for the remainder of the season) for the first day of each month, May through January. Because landings are so strongly biased to the end of the fishing season, only closures in December and January would result in substantial reductions of the fraction of potential revenue foregone.

Table 5. Cumulative potential revenue on the first day of each month during the fishing season. (Source: PacFIN, accessed 10/14/2021)

Month	Cumulative revenue	Percent of total revenue
May	\$924,756	100%
June	\$912,477	99%
July	\$909,021	98%
August	\$908,484	98%
September	\$900,815	97%
October	\$871,689	94%
November	\$753,841	82%
December	\$505,416	55%
January	\$223,397	24%

Additional Considerations

Changes in the swordfish fishery since the original proposal should be considered in the evaluation of alternatives. Three possible factors include the following:

1. While DGN fishery participation has declined over the long term and state and Federal efforts to phase out the fishery are ongoing, it has been relatively stable over the past decade.

2. The authorization of a deep-set buoy gear (DSBG) fishery is reasonably foreseeable, and may provide an additional source of revenue which may offset financial loss during closure periods if DGN participants are able to effectively use DSBG.
3. The timing of the DSBG fishing season differs from that of DGN.

The HMSMT plans to discuss the above factors at their November 2021 meeting and provide additional input to the Council based on this discussion at their November 2021 meeting.

PFMC
10/26/21