NATIONAL MARINE FISHERIES SERVICE (NMFS) REPORT ON SWORDFISH MANAGEMENT PROJECT PLANNING AND REVIEW OF OBSERVER COVERAGE

The purpose of this report is three-fold: (1) to review recent swordfish landings to the U.S. West Coast by gear type, (2) to review the progress towards the Actions identified in the 2015 draft Swordfish Management and Monitoring Plan (SMMP), and (3) to provide the Council and its advisory bodies with information to aid in discussion of additional management options, revisions to the draft SMMP, or both.

1. BACKGROUND

Prior to development of the 2015 draft SMMP, NMFS explored opportunities to sustainably harvest an underutilized stock of swordfish, while minimizing bycatch, through two separate stakeholder workshops. Both workshops (one in 2011 and another in 2015) included presentations and discussions about what a sustainable West Coast swordfish fishery might look like. The workshops generated support for a number of ideas, including: (1) developing new gears (or modifications to existing gears) to reduce bycatch, (2) investing in observer coverage and electronic monitoring, and (3) examining equity issues among fleets fishing under the Fishery Management Plan for U.S. West Coast Highly Migratory Species Fisheries (HMS FMP) versus the Pelagics Fishery Ecosystem Plan (FEP)[1].

Council discussions on the SMMP initially centered on transitioning drift gillnet (DGN) fishery participants to other gear types. In June 2014 the Council began considering a more comprehensive approach. At that time, the Council enumerated a set of policy objectives for a West Coast swordfish fishery, and broadened the draft SMMP to serve as a guide for management of a holistic West Coast swordfish fishery, without focusing on a particular sector or sectors.

Section 3 of the 2015 draft SMMP outlines three goals to guide Council actions for the fishery: (1) reduce protected species bycatch in the swordfish fishery through mitigation, gear innovation, and individual accountability, (2) reduce unmarketable finfish catch in the swordfish fishery through the same mechanisms, and (3) support the economic viability of the swordfish fishery so that it can meet demand for a fresh, high-quality, locally-caught product. Section 4 of the SMMP identifies "Actions to be taken," and specifies a suite of mitigation and management Measures under each Action, many of which are consistent with ideas expressed during the 2011 and 2015 NMFS-hosted stakeholder workshops**.**

2. U.S. WEST COAST SWORDFISH FISHERY OVERVIEW

Below, NMFS presents an update on the status and performance of the U.S. West Coast swordfish fishery, based on landings data for all gear types.

From 2008 to 2017, average annual landings of swordfish to the U.S. West Coast by all gear types totaled 536.7 metric tons (mt) per year. However, annual landings in the last three years

[1] In the context of the West Coast swordfish fishery, the Pelagics FEP fleet of interest is the Hawaii longline fleet.

were 100-150 mt more than the 10-year average (see Appendix 1, Table 1)[2]. Overall, DGN and pelagic longline fleets, which target and land other marketable HMS in addition to swordfish, landed the majority of swordfish in any given year (e.g., up to 76.5 percent of total landings by DGN, and up to 81.1 percent by pelagic longline). Harpoon and Deep-Set Buoy Gear (DSBG) Exempted Fishing Permit (EFP)[3] fleets, which more selectively target swordfish, accounted for a smaller proportion of swordfish landings in any given year (e.g., up to 12.2 percent by harpoon, and up to 6 percent by DSBG).

Since 2008, the proportion of swordfish landings to the U.S. West Coast from the DGN and harpoon fleets have decreased (e.g., DGN low of 15.4 percent in 2015 and harpoon low of 0.9 percent in 2014 and 2015); while the proportion of landings by the pelagic longline and DSBG fleets have increased (e.g., longline high of 81.1 percent in 2015 and DSBG high of 6 percent in 2017). Similarly, total landings decreased for DGN and harpoon (e.g., DGN low of 61.6 mt in 2010, and harpoon low of 5 mt in 2014); and increased for pelagic longline and DSBG (e.g., longline high of 506.3 mt, and DSBG high of 41.1 mt in 2017) (see Appendix 1, Table 1).

Pelagic longline vessels made the majority of swordfish landings in every year since 2009. This indicates a major shift in the fishery dynamics from prior years, when the DGN fleet produced the majority of landings. The lowest proportion of annual landings contributed by longline vessels since 2009 was 60 percent (see Appendix 1, Table 1). Additionally, the number of longline vessels landing swordfish increased since 2009, while the number of DGN vessels landing swordfish decreased (see Appendix 1, Table 2) The longline vessels carry High Seas Fishing Compliance Act permits to fish on the high seas, in tandem with permits under the HMS FMP or Pelagics (FEP)[4]. From 2008 to 2017, fewer than three vessels landing swordfish to U.S. West Coast ports fished subject to the provisions of the HMS FMP permit; the rest of the vessels carried permits issued under the Pelagics FEP.

There are many similarities among the economic values produced by the DGN and longline fleets, versus the harpoon and DSBG fleets. Ex-vessel revenues from landings to the U.S. West Coast have generally increased over the past decade for the longline fleet, and decreased for the DGN fleet. These revenues are orders of magnitude higher than those for the harpoon and DSBG fleets (see Appendix 1, Table 3); however, both harpoon- and DSBG-caught swordfish appear to fetch a higher average price per pound than do DGN- or longline-caught swordfish (see Appendix 1, Table 4).

Lastly, the timing of fishing by the various fleets is likely to have some effect on pricing (and, potentially, gear selection by individual fishermen). The harpoon fleet typically fishes in the summer months, before landings from the DGN and longline fleet begin to arrive to the U.S. West Coast. The DSBG fleet also fishes in late summer months and into early winter months. Both the DGN and longline fleets generally fish in the fall and winter months. The timing of fishing is an important aspect to consider when developing a U.S. West Coast swordfish fishery that can meet local demand through a more constant supply, reducing dependence on imports.

[2] Appendix 1 of this report contains tables that summarize swordfish landings, vessels, revenues, and price per pound by gear type from 2008-2017; these. These tables are also found in the June 2018 Briefing Book: G.7 Attachment 2.

[3] Note, the DSBG EFP fleet has only had commercial landings since 2015 and from only a few vessels, the landings information here is not necessarily representative of the potential of a fully authorized fishery.

[4] By obtaining longline permits under the Pelagics FEP, vessels are able to fish in areas otherwise prohibited to longline fishing under the HMS FMP.

3. UPDATES ON DRAFT SMMP ACTIONS

As previously mentioned, Section 4 of the 2015 draft SMMP contains five Actions, each accompanied by a bulleted list of mitigation and management Measures. Below, NMFS provides a summary update on each of those five Actions, as well as potential next steps or revisions to the 2015 draft SMMP.

ACTION 1: Reduce bycatch in the DGN fishery through hard caps and performance standards

While hard caps have not been implemented for the DGN fleet, performance standards have been established for finfish and non-ESA-listed marine mammals. Interactions with all species continue to be monitored, regardless of performance standards. Appendix 2 of this report contains tables that summarize observed incidental catch of finfish (an update to Table 1 of the November 2015 G.2.a NMFS Report) and observed protected species interactions in the DGN fleet from 2013 to 2017. Observed incidentally-caught finfish are classified as mostly marketed, sometimes marketed, or never marketed based on retention rates. Of the never- and sometimes-marketed species, common mola *(Mola mola)* and blue shark (*Prionace glauca*) make up the majority. 97 percent of all common mola returned are returned alive, whereas 52 percent of all blue sharks returned are returned alive. Recent work at the Southwest Fisheries Science Center (SWFSC) indicates that (1) mola are more durable than other finfish and can actively ventilate their gills; thus, survivorship is expected to be high, and (2) the PRM rate for blue sharks caught in the DGN fishery during the 1990-2015 seasons was 33.6%. Pacific bluefin tuna (PBF) likely show up in the sometimes marketed category due to the regulatory discards put in place last year, when the annual U.S. limit for PBF was reached. Eight species (other than the target species) are mostly marketed. For the protected species table, species with no observed interactions in this time period were omitted. All protected species are released, though all observed caught during this time were released dead except for one. Protected species interactions include 62 individual animals spanning nine species.

NMFS has developed statistical methods to better estimate rare-event bycatch in the absence of 100 percent monitoring, and continues to make progress on testing electronic monitoring (EM). NMFS has also made progress on integrating HMS datasets to allow more detailed analyses of observer bias and DGN fleet activities. Given these efforts, and lessons learned with hard caps, the Council may want to consider revising the mitigation and management Measures listed under this Action such that costs to the small entities of the DGN fleet are reduced.

- *MEASURE: Implement hard caps for selected protected species such as Endangered Species Act (ESA)-listed sea turtle and marine mammal species and other marine mammals with population concerns. If hard caps are reached or exceeded during a fishing season, the fishery would be closed for the remainder of the season.*

In September 2015, the Council recommended that NMFS establish hard caps on the mortality and serious injury of certain protected species in the DGN fishery. The purpose of the Council's recommendation was to conserve non-target species and reduce bycatch, including incidental take of ESA-listed species and marine mammals, while maintaining or enhancing an economically viable U.S. West Coast swordfish fishery. In September 2016, the Council transmitted proposed regulations to NMFS to implement the hard caps, and NMFS published these proposed regulations in the Federal Register (81 FR 70660) in October 2016.

Following public comment and further analysis of the effects of the proposed hard caps, NMFS made a negative determination on the Council's proposed regulations and withdrew the proposed rule. NMFS' final analyses showed that, given DGN participants' dependency on the fishery, they would experience significant adverse economic impacts that were not identified in the analyses supporting the proposed rule. These impacts were at odds with the Council's intended purpose for the proposed regulations, leading NMFS to reach a finding of significant adverse impacts to a substantial number of small entities (under the Regulatory Flexibility Act). No other alternative resulting in lower costs for these entities could be implemented. Additionally, implementing hard caps under Magnuson-Stevens Fishery Conservation and Management Act (MSA) offered little additional benefit to protected species beyond what has already been achieved through ESA Section 7 and Marine Mammal Protection Act (MMPA) Take Reduction Team processes.

When NMFS made a negative determination on the Council's proposed hard caps regulations, it advised the Council of revisions that would better meet their intended purpose for the proposed regulations. NMFS advised the Council that any management action to further reduce the probability of protected species interactions in the DGN fishery should do so without triggering the significant economic effects of a complete fishery closure lasting one or more fishing seasons. Specifically, NMFS suggested that the Council could minimize the adverse economic effects of its proposed regulations by specifying a reduced time or area that the fishery would be closed if a hard cap was reached. Such revisions may also improve consistency with the FMP, plan amendment, the MSA, and other applicable laws.

- *MEASURE: Establish bycatch performance standards; initially for non-ESA-listed marine mammals and at a later time potentially for finfish. The Council would routinely review available information on bycatch of these species. If performance standards are not met the Council may recommend additional management measures, as appropriate.*

In September 2015, the Council established performance metrics for finfish bycatch and non-ESA-listed marine mammal interactions in the DGN fishery. Establishing these performance metrics did not require regulations. In June 2017, after one full DGN fishing season operating under the performance metrics, the Highly Migratory Species Management Team (HMSMT) submitted the first report on the new metrics to the Council (June 2017 H.1.c Supp. HMSMT Report). The HMSMT will update the Council on DGN fleet performance during the June 2018 Council meeting (June 2018, G.3.a HMSMT Report 1).

- *MEASURE: Work with NMFS to increase fishery monitoring and/or develop statistical methods to better estimate rare event bycatch in the absence of 100% monitoring.*

In September 2015, the Council recommended that NMFS increase DGN monitoring, through the use of on-board observers or electronic monitoring (EM), by 2018. Appendix 3 of this report contains tables that summarize observer coverage for the DGN fleet from 2013-2017. Over this period, average observer coverage was 23.7 percent per season, with an average of 32.1 percent of all sets classified as unobservable[5]. At the March 2018 meeting, NMFS submitted a preliminary report on the Council's recommendation to increase monitoring (March 2018, I.1.a Supp. NMFS Report 3, reproduced as June 2018 G.7, Attachment 3). In that report, NMFS evaluated the potential impacts of increased monitoring alternatives ranging from 50-100 percent coverage, using observers or EM or both. This preliminary analysis indicated that the economic

[5] Some vessels are unobservable due to accommodations or other safety issues.

impacts to the fleet (assuming that the fleet would be responsible for funding increased monitoring) may be prohibitive to implementing the alternatives evaluated.

Despite concerns regarding the costs associated with increased monitoring, NMFS is interested in the feasibility of EM for the DGN fleet, especially for vessels that have historically been unobservable. The West Coast Region submitted a proposal for funding to test EM in the DGN fleet. This project will build on testing done in 2006 and 2007 with this fleet and other fleets in the Atlantic and Pacific Islands, and on lessons learned from the West Coast Groundfish EM program. This project will explore the use of EM on observable DGN vessels during observed trips. Goals include determining if the EM systems can adequately monitor for protected species interactions, acoustic pinger compliance, and finfish catch (including retention and discards), as well as developing review protocols. NMFS is working on a statement of work in hopes of receiving a grant for contract work to begin in the 2019/2020 fishing season.

With respect to unobservable vessels in the DGN fleet, the Eastern Pacific subgroup of the Highly Migratory Species Professional Specialty Group[6] has made significant progress on integrating HMS datasets. This will improve analysis of how fishing trips by unobservable vessels compare to those of observed vessels. This effort involves integrating landing, logbook, observer, and vessel monitoring system (VMS) data at the trip level. The integration and identification of set locations from the VMS data is nearly complete. Once complete, NMFS plans to examine potential observer bias, verify logbook information, and reconcile landings data in more detail than has previously been possible.

Lastly, the Southwest Fisheries Science Center (SWFSC) developed a regression tree approach to better estimate rare-event bycatch in the absence of 100 percent monitoring. This method was presented to the Council during its March 2017 meeting (March 2017, J.1.b Supp. SWFSC PPT). During its April 2018 meeting, the HMSMT discussed presenting a comparison of the current performance metrics, which are based on a ratio-estimator approach, with those suitable for using a regression tree approach, as well as a comparison of the fleet's performance under both. Currently, NMFS considers the regression-tree approach more likely to produce the best scientific information available, as that method takes into account historical interaction data instead of a single year. Regression tree methods are also less prone to over- or underestimating interactions with rare-event bycatch species. For MMPA management, the Southwest Fisheries Science Center currently uses regression tree bycatch estimates for the DGN fishery in its Marine Mammal Stock Assessment Reports, and notes the biases associated with ratio estimates. For these reasons, NMFS encourages the Council to consider alternative methods to the ratio-estimator approach for setting performance metrics and monitoring fleet performance, and to do so prior to considering management measures based on exceedance of the current metrics.

Regarding this Measure as a whole, the Council, in its most recent purpose and needs statement[7], indicated a desire for increased accountability in the fleet. This could be achieved through increased monitoring coverage, as identified by the Council. However, given limitations in funding such coverage, the Council may wish to consider increasing accountability in the DGN fleet by employing better bycatch estimation methods, analyzing observed versus unobserved

[6] The Eastern Pacific Subgroup of the Highly Migratory Species Professional Specialty Group (EP HMS PSG) is comprised of NMFS and Pacific States Marine Fisheries Commission staff that collect, analyze, or manage data for HMS fisheries on the U.S. West Coast.

[7] "The purpose of the action is to ensure adequate information is being collected from the DGN fishery to support Council decision-making on management measures. The proposed action is needed to document bycatch and protected species interactions for evaluation of costs and benefits of the use of DGN gear…"

vessel activities, and focusing on monitoring options for unobservable vessels. NMFS is hopeful that the efforts described above are useful in moving forward with this Measure.

ACTION 2: Limit fishing effort in the DGN fishery

As seen in Table 9 in Appendix 4, produced by California Department of Fish and Wildlife, between 1996 and 2017, the number of limited entry DGN permits (active or inactive) issued by the state of California declined from 167 to 69. Under the state program, if a permit was not renewed, it was no longer available for issuance. These stipulations of the state permit program served to limit potential fishing effort by the DGN fleet over time. However, the decline in the number of active permits from 1996 through 2017 suggests other factors limited participant interest. The percentage of permits that were inactive (i.e., latent) increased over this time. Over the last ten years, an average of 55 percent of permits were inactive.

The Council may want to revise or prioritize actions that could reduce fishing effort in the DGN fleet with respect to the overall goals of the draft SMMP. If the goal of this Action is to reduce bycatch (finfish and protected species) in the fishery, addressing inactive permits in the DGN fleet may not be an effective route. That is, inactive permits in this fleet are not contributing to bycatch in the swordfish fishery. However, reducing the number of inactive permits could be an effective means to limit the potential for increased levels of bycatch, should the Council consider changes to management of the swordfish fishery that might incentivize inactive DGN permits to become active.

- *MEASURE: Implement a federal limited entry permit for the DGN fishery. Possession of this federal limited entry permit would be required to fish with DGN gear in federal waters.*

In March 2017, the Council recommended that NMFS create a Federal LE DGN permit. In March 2018, NMFS issued a final rule (83 FR 11146) establishing a Federal LE DGN permit program under the authority of the MSA. Under the new regulations, all current California LE DGN permit holders are eligible to apply for, and receive, a Federal LE DGN permit. No additional permits were created; therefore, the rule is not anticipated to result in increased activity, effort, or capacity in the fishery. It is possible that an initial reduction of capacity will occur during issuance of the Federal LE DGN permit: state permit-holders have until March 31, 2019 to obtain their federal permits, and three months after that to appeal if they miss the deadline. If any permit holder does not obtain their federal permit by this deadline, they will lose their opportunity to do so, subject to any decisions resulting from an appeal process.

The Council discussions, and ultimately its recommendation, to implement this Measure were based on the idea that doing so would transition the DGN permit program from state to federal authority (Agenda Item J.6, Attachment 1 Supplemental NMFS/CDFW Report). However, a full transition has yet to become effective. The state of California continues to require DGN fishermen to obtain a state LE DGN permit to target and land swordfish in California.

- *MEASURE: Determine the appropriate number of federal limited entry permits based on the bycatch reduction goal.*

To date, neither the Council nor NMFS has determined a bycatch reduction goal by which to ascertain the appropriate number of federal LE DGN permits. However, the Council may have an interest in the work of the Gulf of Mexico Fishery Management Council and the Southeast

Regional Office of NMFS examining permit pools (for latent permits) as a mechanism for maintaining the appropriate number of permits for the federal Gulf shrimp fishery, without increasing bycatch.

- *MEASURE: Develop appropriate qualification criteria to obtain the federal permit.*

As mentioned above, all current California LE DGN permit holders qualified for the Federal LE DGN permit. During its discussion of the federal program, the Council considered whether to recommend reducing the number of current DGN permits. Ultimately, the Council did not include such measures as part of its recommendation, and instead noted that these issues could be taken up after the Federal LE DGN permit was established.

If the Council intended this Measure to further limit the number of permits issued, the Council may wish to revise this Measure now that the Federal LE DGN permit program has been established. For example, the Council may be interested in developing a license limitation permit (LLP) program. The North Pacific Fishery Management Council developed, and the Alaska Region of NMFS implemented, two actions to reduce latency in a LLP program.[8] In these examples, the LLP program is not a catch share program, so no exclusive harvest privilege is associated with the LLP license. In that sense, these actions may be useful comparisons to the swordfish fishery. In both actions, referred to as "recency" actions, the Council established a participation threshold (i.e., minimum number of landings) that a license had to meet to continue participating in the fishery.

- *MEASURE: Consider how a federal limited entry permit could facilitate transitioning DGN fishery participants to other gear types. For example, a limited entry permit could be designed to include endorsements for more than one gear type or to encourage swapping a DGN permit for a permit for another fishery/gear type.*

During its discussion of the federal LE DGN permit program, the Council considered whether to impose additional requirements on permit transfers, but decided that such decisions could be taken up after the Federal LE DGN permits were established. Currently, LE DGN permits do not include endorsements for any other gear type. The permits must be renewed annually, and can be transferred at most once every three fishing years (the fishing year starts April 1 and ends March 31 of the following year). DGN permits may be transferred to another individual, with a specified vessel, only if the current permit holder has held the Federal LE DGN permit for a minimum of three consecutive years (counted April 1 to March 31 of the following year). The length of time an individual held a California drift gillnet limited entry permit carries over (e.g., if an individual held a California drift gillnet limited entry permit for 2 years, they are eligible to transfer the Federal LE DGN permit after 1 year). There are few exceptions to this permit transfer limitation.

Currently, discussion of this Measure may be premature given the limited suite of fishing gears authorized under the HMS FMP for targeting swordfish. Nonetheless, the Council could consider such a Measure after DSBG or other potential gear types are authorized, perhaps as part of a LLP.

[8] Amendment 92 to the BSAI FMP and Amendment 82 to the GOA FMP (Groundfish trawl gear recency): Council/NMFS analysis document and Final rule to implement amendments 92/82.
Amendment 86 to the GOA GMP (Pacific cod fixed gear recency): Council/NMFS analysis document and Final rule to implement amendment 86.

- *MEASURE: Investigate mechanisms to compensate state permit holders that do not qualify for a federal permit.*

As mentioned above, all state permit holders qualified to receive Federal LE DGN permits in March 2018; however, the state of California continues to require DGN fishermen to obtain state permits to target and land swordfish in California. Given this scenario, NMFS recommends the Council examine this Measure as a candidate for revision.

Irrespective of the status of state permits, the Council may wish to consider mechanisms to compensate permit holders in the event that measures are adopted to reduce the number of permits in the DGN fishery. Buyback programs are often considered for this purpose. However, it is presently unclear how a buyback program could be financed. There is some evidence that a buyback program, when implemented with catch shares, can increase the profitability of the remaining vessels enough to justify its costs.[9] However, the benefits of such a program are typically only realized after a fishery is fully- or over-utilized. In the case of the DGN fleet, the Western Central North Pacific swordfish stock located off the U.S. West Coast has been considered underutilized for years, and the swordfish fishery, as currently managed, is not experiencing overcapacity.

ACTION 3: Allow access to the Pacific Leatherback Conservation Area (PLCA)

NMFS assumes this Action refers to DGN fleet access to the PLCA, as the regulations implementing the PLCA only prohibit the use of DGN gear. This Action could incentivize additional effort from DGN vessels in the U.S. West Coast swordfish fishery.

The PLCA was implemented in 2001 to mitigate takes of endangered Pacific leatherback sea turtles in the DGN fishery. The PLCA prohibits large-mesh DGN fishing from August 15 to November 15 in roughly 213,000 square miles within the U.S. exclusive economic zone (EEZ). This is an area of historically high swordfish production. Thus, NMFS encourages the Council to consider this Action as subsequent to or in tandem with measures to further limit DGN permits or effort (or both). Additionally, NMFS is interested in additional testing of dynamic ocean modeling tools to evaluate their potential use in protected species hotspots like the PLCA. EcoCast is one such tool that can assist in decisions about how to allocate fishing effort across space and time, to maximize target catch while minimizing bycatch.

- *MEASURE: The PLCA was implemented in 2001 to mitigate takes of endangered Pacific leatherback sea turtles.*

A 2017 study by Eguchi et al.[10] on the overlap between leatherbacks and DGN fishing showed that the current closure parameters are effective. The study presented statistical models of leatherbacks in the PLCA to determine whether the current timing and area were still based on the best available science. The results showed that the PLCA is still the shortest and most effective closure to balance sea turtle interactions and fishing.

[9] Holland, D., E. Steiner and A. Warlick. 2017. Can vessel buybacks payoff: An evaluation of an industry funded fishing vessel buyback. Marine Policy 82: 8-15.

[10] P. Santidrián Tomillo, N. J. Robinson, A. Sanz-Aguilar, J. R. Spotila, F. V. Paladino and G. Tavecchia, High and variable mortality of leatherback turtles reveal possible anthropogenic impacts, Ecology, 98, 8, (2170-2179), (2017).

- *MEASURE: Based on fishery performance under hard caps outside the PLCA and experimental fishing permit (EFP) performance within the PLCA, consider allowing access to the PLCA with individual vessel and/or fishery accountability for bycatch using limits such as hard caps.*

In the draft SMMP, the Council noted the potential to allow vessels access to the PLCA with accountability mechanisms in place for bycatch, such as hard caps. Although NMFS withdrew the hard caps proposed rule, the Council continues to monitor the DGN fleet and could revise its proposed hard caps regulations in the future based on its experience monitoring according to performance metrics.

In February 2015, consistent with discussions around the draft SMMP, the Alliance for Sustainable Fisheries (ACSF) submitted an EFP application to fish with modified DGN gear in time/area zones, including in the PLCA, when concentration of swordfish is high and concentration of bycatch species is low. The Council recommended approval of the EFP application to NMFS, but suggested further adjustments be made to the fishing activities proposed in the application. NMFS subsequently published a Federal Register Notice (81 FR 10593) requesting public comment on this EFP. A component of the EFP application is contingent on the use of an ocean dynamic model - EcoCast - which, until recently has not been available for use. Given this (along with workload issues related to issuance of deep-set buoy gear EFPs) NMFS has made little progress on analysis of the proposed action to issue an EFP to the ACSF. Furthermore, preliminary analyses by NMFS Protected Resources Division about this EFP raised many questions and concerns. NMFS has communicated with ACSF on a possible way forward and will continue to keep the Council briefed prior to issuance of an EFP to ensure that it is consistent with SMMP goals.

ACTION 4: Develop longline fisheries

In 2004, NMFS partially approved the Council-recommended HMS FMP, including proposed measures to prohibit longline fishing within the U.S. West Coast EEZ. NMFS disapproved authorization of a West Coast SSLL fleet operating on the high seas outside the EEZ, east of 150° W longitude and north of the equator. NMFS advised the Council in a February 4, 2004 letter of actions it could take to address the disapproved portions of the FMP, improving consistency with federal laws (starts on page 26). In that letter, NMFS indicated that gear modifications and bait restrictions aimed at reducing sea turtle interactions, injuries, and mortality were showing success in Atlantic swordfish fisheries, and that NMFS was promoting these mitigation measures for longline fleets. Additionally, NMFS highlighted other techniques and mitigation measures being incorporated in the Hawaii-based longline fleet around the same time, and noted a commitment of staff resources to keep the Council apprised of new information.

During the November 2017 Council meeting, NMFS presented a review of bycatch mitigation measures in the Hawaii longline fishery (November 2017 H.1.a Supp. NMFS Presentation), as well as the results of a recent study showing that mitigation measures used in longline gear (e.g., circle hooks and mackerel-type bait) led to a 95 percent decline in the bycatch rate for loggerhead sea turtles, and an 84 percent decline in the bycatch rate for leatherback sea turtle (Swimmer et al. 2017[11]). This study provides the most recent evidence of the effectiveness of

[11] Swimmer Y, Gutierrez A, Bigelow K, Barceló C, Schroeder B, Keene K, Shattenkirk K and Foster DG (2017) Sea Turtle Bycatch Mitigation in U.S. Longline Fisheries. Front. Mar. Sci. 4:260. doi: 10.3389/fmars.2017.00260

circle hooks and whole finfish bait at reducing bycatch and bycatch mortality of sea turtles. It also highlights mitigation measures intended to reduce interactions with seabirds and marine mammals. These results indicate that mitigation measures employed in longline fishing have proven successful.

The following is a list of key mitigation measures implemented in longline fisheries since NMFS disapproved the SSLL portion of the FMP:

- Gear and bait requirements under 50 CFR 665.813(f) and (g) (e.g., use only 18/0 or larger circle hooks, if the hook point is offset, it must be offset by no more than 10°, use of mackerel-type fish bait, etc.). Since requiring finfish bait and circle hooks leatherback mortality has decreased by 95 percent and loggerhead by 84 percent (Swimmer et al. 2017). The switch from squid bait to mackerel-type bait may correlate with reduced blue shark catch rates (Foster, et al. 2012[12])
- Requirement of safe handling, resuscitation, and release of sea turtles for all HMS Fisheries (50 CFR 660.712(b))
- Requirement to add a streamer line has shown to be effective at reducing seabird mortality (ACAP 2015[13]; PSMFC 2013[14])
- Compliance with seabird avoidance and protection measures pursuant to 50 CFR 660.712(c), such as specified handling of hooked animals, proper discharge of offal, utilization of proper branch line weights, and use of blue dyed bait
- Requirement to side-set and set the gear at night is intended to reduce accidental hooking and/or entanglement of seabirds (50 CFR 665.815(a))
- Required use of a "weak" hook, defined as a circle hook with hook shank containing round wire that can be measured with a caliper or other appropriate gauge, with a wire diameter not to exceed 4.5 mm (0.177 in), and use of leaders and branch lines with a diameter of 2.0 mm or larger if the leaders and branch lines are made of monofilament nylon. If any other material is used for a leader or branch line, that material must have a breaking strength of at least 400 lb (181 kg) (50 CFR §229.37). These requirements are intended to reduce mortality and serious injury of marine mammals (e.g., the Hawaii Insular stock of false killer whales)
- Required possession of a valid Protected Resources Workshop certification pursuant to 50 CFR 660.712(e)
- Increase in observer coverage to allow independent verification of total catch (including bycatch), protected species take and interactions, and area of operation

In light of the success of the above-mentioned mitigation, NMFS continues to support assessing the feasibility of a West Coast-based longline fishery under the HMS FMP.

- *MEASURE: Revisit the 2009 proposed action to authorize a SSLL fishery outside the west coast EEZ in light of current conditions including west coast landings by Hawaii-permitted SSLL vessels.*

In April of 2009, the Council considered authorizing a SSLL fishery outside the West Coast EEZ. The effort to consider the authorization was motivated in part by an increase in swordfish

[12] Foster D.G., Epperly S.P., Shah A.K., Watson J.W. 2012. Evaluation of Hook and Bait Type on the Catch Rates in the Western North Atlantic Ocean Pelagic Longline Fishery. Bulletin of Marine Science 88:529–545. doi: 10.5343/bms.2011.1081

[13] Agreement of the Conservation of Albatrosses and Petrels (ACAP). 2015. Bycatch Mitigation Fact-sheet 1 v1. 4 pages.

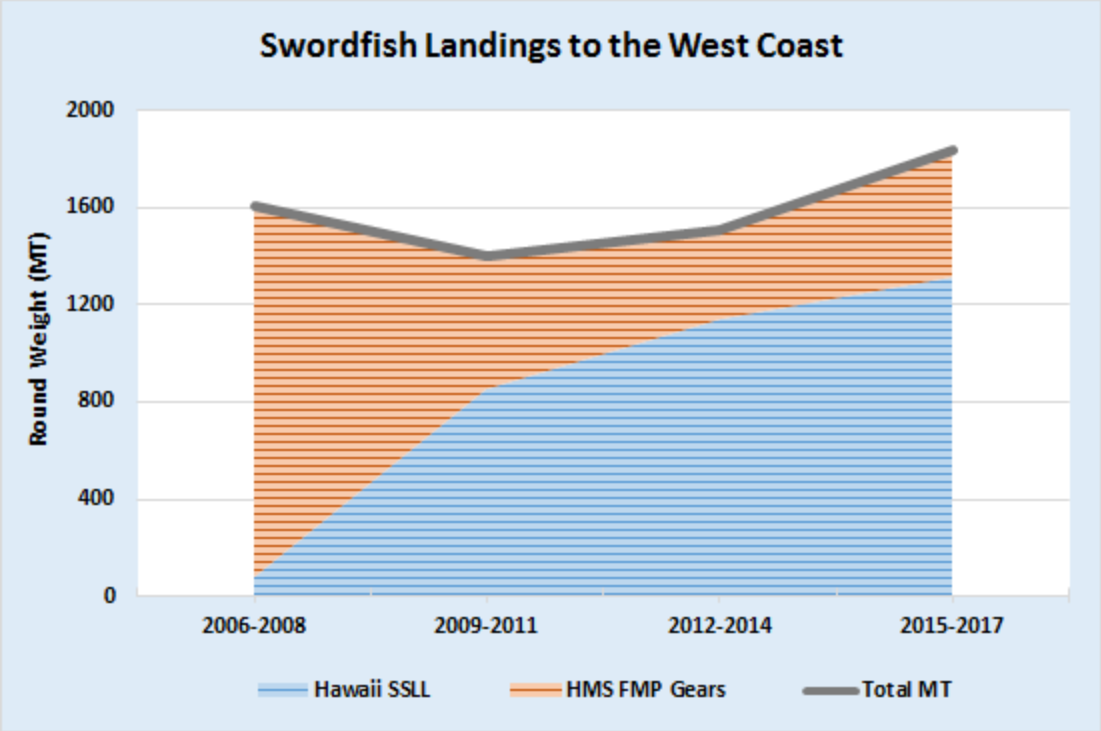
[14] Pacific States Marine Fisheries Commission (PSMFC). 2013. Streamers. https://www.psmfc.org//streamers.

landings in California ports by longline vessels fishing outside the EEZ (primarily by vessels permitted under the Pelagics FEP). Figure 1 (below) shows swordfish landings to the West Coast by Hawaii SSLL vessels compared to all West Coast HMS FMP gears. Eight of the 26 Hawaii longline vessels that have landed swordfish to the West Coast between 2006 and 2017 currently have West Coast business addresses listed on their permits. During its April 2009 meeting, the Council decided not to move forward with authorization.

The Council put this Measure on its agenda again in 2015, and Council staff prepared a scoping document (September 2015 G.3 Attachment 1). However, Council discussion of this agenda item was cancelled prior to the meeting, after some members of the public, the Highly Migratory Species Advisory Subpanel (HMSAS), and the Western Pacific Fishery Management Council (WCPFC) submitted comments (September 2015 G.3.a Supplemental WPFMC Letter, and September 2015 G.3.b Supplemental Public Comment). The HMSAS indicated support for the Measure, while the WCPFC expressed concerns about potential ramifications for the management of the longline fleet operating under the Pelagics FEP. Some members of the public expressed opposition to the action, while others conveyed a desire for the Council to remain open to a discussion on whether longline fishing effort east of 150^{o}W could be responsibly increased (as fishing activity was already ongoing under the Pelagics FEP).

This Measure is currently listed on the Council's Year-At-A-Glance for its November 2018 meeting (June 2018 C.11 Attachment 1), though it has been moved to future meetings several times before. NMFS is interested in keeping this Measure on the Council's agenda for November, as an opportunity to assess stakeholder interest and to better understand the Council's current intention. As stated in the February 4, 2004 letter from NMFS to the Council, NMFS remains committed to working with the Council and its advisory subpanels, and to coordinating with the Pacific Islands Region to the extent possible to ensure that the best scientific information available is used in developing potential alternatives and evaluating potential impacts.

Figure 1. Swordfish landings to the West Coast: Hawaii Longline relative to all WC HMS FMP fisheries. (Data are aggregated to 3-year periods to preserve confidentiality)



- *MEASURE: Revisit the current FMP prohibition on the use of pelagic longline gear inside the west coast EEZ.*

In 2011, 2012, and 2013, the SWFSC performed fishing trials to explore potential gear alternatives for targeting swordfish off California, building on previous efforts to reduce turtle bycatch in longline fisheries. Swordfish are typically fished at shallower depths and during nighttime, which coincides with nocturnal feeding behaviors near surface waters. Instead, the SWFSC trials sought to shift longline gear to deeper water and fish during the daytime, as swordfish normally spend the daylight hours below 200 meters (m) whereas leatherbacks remain above 120 m. These trials attempted to exploit the diurnal movements of swordfish and test whether fishing operations could take advantage of the vertical habitat separation between swordfish and protected turtle species during the daytime. The study found that the trial approach was viable, but the timing of research did not coincide with optimal swordfish catch. Thus, the SWFSC concluded that more research was warranted on the subject.

In July 2014, the Council solicited EFP proposals to test alternative gears and/or new approaches or methods for the DGN fishery to target swordfish and other HMS. In March 2015, the Council recommended that NMFS issue an EFP to test both DSLL and SSLL gear within the West Coast EEZ, with the same mitigation measures employed in the Hawaii longline fisheries. In September 2016, NMFS published a draft Environmental Assessment (EA) to analyze the effects of allowing two fishing vessels to fish with longline gear in the West Coast EEZ. In the draft EA, impacts to the natural and socioeconomic environments of issuing this longline EFP were found not significant. NMFS collected public comment on this analysis, and expects to issue a final NEPA analysis following completion of ESA consultation in the near future. Issuance of this EFP would allow limited exempted fishing for swordfish in the West Coast EEZ using SSLL and DSLL gear. This information may inform Council reconsideration of the prohibition on longline gear within the U.S. West Coast EEZ under the HMS FMP. Most recently, another longline EFP application was submitted to NMFS and the Council for the June 2018 meeting (June 2018 G.6 Attachment 2).

- *MEASURE: Consider qualification criteria for a federal limited entry permit in the context of federal permitting for other swordfish gear types.*

This Measure should be considered during discussions on the authorization of longline gear. A potential idea for consideration is to develop a swordfish permit program, with endorsements for different gear types. A potential benefit of this type of approach is the need to administer only one permit program for the U.S. West Coast swordfish fishery, under which different gear types (DGN, Harpoon, DSBG, etc.) could be authorized through endorsements.

ACTION 5: Develop deep-set buoy gear (DSBG)

Each year, NMFS develops annual implementation plans for carrying out its multi-year strategic plan. Issuing EFPs to develop and test DSBG is a top priority for the Region and has been highlighted as a Region priority in each annual implementation plan since 2016.

- *MEASURE: Evaluate the results of fishing under exempted fishing permits recommended by the Council.*

In 2015, NMFS issued five EFPs to the Pfleger Institute of Environmental Science (PIER) to conduct experimental fishing operations to assess the potential of DSBG fishing in the Southern California Bight. Preliminary results of the PIER EFPs showed that DSBG is an effective gear type for catching swordfish, with minimal bycatch and protected species interactions.

Over the course of the past four years, NMFS received applications for DSBG EFP's from 51 fishermen, which were reviewed by the Council. The terms of these EFPs require standardized gear, 100 percent observer coverage for the first ten trips, and a minimum of 30 percent observer coverage thereafter. NMFS reviewed EFP proposals for consistency with federal laws. Pending applicants' participation in a protected species workshop, and completion of vessel inspection by the Observer Program, NMFS plans to issue EFPs to up to 60 vessels for standard DSBG in late May or early June 2018 (see NMFS Report G4 for additional details).

In addition to applications for standard DSBG, the Council and NMFS also received EFP applications requesting to fish with deep-set linked buoy gear (DSLBG) within the U.S. West Coast EEZ. DSLBG has been proposed as an extension to the standard DSBG. PIER conducted preliminary research trials with DSLBG (40 sets). NMFS recently completed ESA consultation for these activities, and intends to issue EFPs to up to 12 vessels for the 2018/2019 fishing season, so that data collected can inform decisions regarding federal authorization of this gear type.

To check on the current status of EFPs, please visit this NMFS website.

- *MEASURE: Consider amending the HMS FMP to make DSBG an authorized gear.*

Concurrent with the DSBG EFP process, the Council has been considering the authorization of DSBG as a legal gear type under the HMS FMP. Data from the EFPs informed Council discussions regarding authorization of DSBG gear. At its March 2018 meeting, the Council approved a range of alternatives (ROA) for authorizing DSBG, including alternatives for a limited entry or open access system. Based on a motion during the March 2018 Council meeting, the Council is scheduled to receive analyses from the HMSMT regarding expected economic,

biological, and spatial (e.g., potential for gear conflicts) impacts of the ROA. The Council tentatively plans to select a final preferred alternative for authorizing DSBG at its March 2019 meeting.

- *MEASURE: Consider a federal limited entry program for DSBG including qualification criteria, taking into account current participation in the West Coast swordfish fishery.*

The Council plans to gather input from its advisory bodies on qualifying criteria for a potential LE permit system during its September 2018 meeting. At such time, or during its November meeting, the Council may elect to revise the ROA to include specification of qualifying criteria for limited entry permit alternatives. Because the specification of qualifying criteria influence expected impacts of the action, the Council should review and analyze these criteria prior to its selection of a final preferred alternative.

APPENDIX 1

Tables below include information from PacFIN regarding swordfish landings to the U.S. West Coast over the period 2008-2017.

Table 1. Landings of swordfish by fishery.

	Metric Tons						Percent					
Year	**DGN**	**Harp.**	**LL**	**DSBG**	**Other**	**Total**	**DGN**	**Harp.**	**LL**	**DSBG**	**Other**	**Total**
2008	406.1	48.0	59.1		17.9	531.1	76.5%	9.0%	11.1%	0.0%	3.4%	100%
2009	252.6	49.8	106.0		0.2	408.6	61.8%	12.2%	25.9%	0.0%	0.0%	100%
2010	61.6	37.4	270.7		*	369.8	16.7%	10.1%	73.2%	0.0%	*	100%
2011	119.0	24.3	476.2		*	619.5	19.2%	3.9%	76.9%	0.0%	*	100%
2012	118.2	5.4	279.2			402.7	29.4%	1.3%	69.3%	0.0%	0.0%	100%
2013	101.8	6.4	424.5		0.2	533.0	19.1%	1.2%	79.6%	0.0%	0.0%	100%
2014	126.5	5.0	436.3	*	*	567.9	22.3%	0.9%	76.8%	*	*	100%
2015	96.2	5.3	506.3	14.1	2.4	624.4	15.4%	0.9%	81.1%	2.3%	0.4%	100%
2016	192.6	25.5	377.3	32.5	1.3	629.1	30.6%	4.0%	60.0%	5.2%	0.2%	100%
2017	175.7	24.5	433.2	41.1	6.1	680.5	25.8%	3.6%	63.7%	6.0%	0.9%	100%

*Confidential data (less than 3 vessels or dealers) suppressed. Totals for non-confidential data only.

- LL (pelagic longline) includes both Hawaii and HMS FMP permitted vessels. (Note that only Hawaii permitted vessels may target swordfish but HMS permitted vessels may land swordfish incidentally.)

Table 2. Number of vessels landing swordfish by fishery, 2008-2017 (PacFIN).

Year	DGN	Harpoon	Pelagic Longline	DSBG	Other fisheries
2008	37	31	4		3
2009	34	27	3		3
2010	25	25	7		1
2011	20	17	10		2
2012	17	10	8		
2013	16	13	8		3
2014	21	10	15	2	2
2015	19	12	18	4	6
2016	23	19	18	6	4
2017	17	21	13	5	12

Table 3. Inflation-adjusted ex-vessel revenue by fishery, 2008-2017 (PacFIN).

Year	DGN	Harpoon	Pelagic Longline	DSBG	Other fisheries	Grand Total
2008	$1,959,165	$524,045	$164,303		$64,555	$2,712,068
2009	$1,228,880	$529,175	$437,733		$788	$2,196,576
2010	$456,737	$411,032	$1,604,166		*	$2,473,392
2011	$852,251	$277,031	$2,553,351		*	$3,684,842
2012	$871,791	$68,415	$1,316,904			$2,257,110
2013	$723,160	$89,718	$2,051,958		$1,684	$2,866,520
2014	$862,968	$67,891	$2,211,401	*	*	$3,214,774
2015	$600,013	$75,002	$2,954,194	$122,931	$20,501	$3,772,641
2016	$1,255,430	$296,380	$1,908,433	$359,918	$10,561	$3,830,722

2017	$890,443	$265,990	$2,271,864	$408,874	$50,280	$3,887,451

*Confidential data (less than 3 vessels or dealers) suppressed. Totals for non-confidential data only.
- LL (pelagic longline) includes both Hawaii and HMS FMP permitted vessels. (Note that only Hawaii permitted vessels may target swordfish but HMS permitted vessels may landing swordfish incidentally.)

Table 4. Average price per pound by fishery, 2008-2017 (PacFIN).

Year	DGN	Harpoon	Pelagic Longline	DSBG	Other fisheries
2008	$3.01	$6.71	$2.68		$4.08
2009	$2.95	$6.47	$3.44		**
2010	$4.47	$6.99	$3.55		*
2011	$4.54	$7.57	$3.58		*
2012	$4.89	$7.44	$3.26		
2013	$4.63	$8.68	$2.99		**
2014	$4.52	$9.14	$3.17	*	*
2015	$4.22	$8.76	$2.79	$6.39	**
2016	$4.16	$8.29	$2.47	$7.15	**
2017	$3.37	$7.78	$2.59	$6.06	$5.79

*Confidential data (less than 3 vessels or dealers) suppressed. Totals for non-confidential data only.
**Average price per pound for landings less than 5 mt excluded.
- LL (pelagic longline) includes both Hawaii and HMS FMP permitted vessels. (Note that only Hawaii permitted vessels may target swordfish but HMS permitted vessels may landing swordfish incidentally.)

APPENDIX 2

Table 5. Observed finfish caught in the DGN fishery, 2013-2017 (California/Oregon Drift Gillnet Fishery Catch Summaries)

West Coast Large-Mesh Drift Gillnet Fishery Observed Catch and Disposition 2013/2014 through 2017/2018 23.4% Observer Coverage (619 of 2648 total sets observed)								
	Species	Total Caught	Number Kept	Number Returned Alive	Number Returned Dead	Number Returned Unknown	Total Returned	Percent Returned
Not Marketed / Always Discarded	Common Mola	2654	0	2592	59	3	2654	100%
	Pelagic Stingray	41	0	39	1	1	41	100%
	Salmon Shark	13	0	0	13	0	13	100%
	Striped Marlin	12	0	0	12	0	12	100%
	Bat Ray	8	0	7	1	0	8	100%
	Slender Mola	5	0	5	0	0	5	100%
	Remora	3	0	3	0	0	3	100%
	Megamouth Shark	2	0	2	0	0	2	100%
	Unidentified Shark	2	0	1	0	1	2	100%
	Unidentified Ray	2	0	2	0	0	2	100%
	Blue Marlin	1	0	0	1	0	1	100%
	Unidentified Mackerel	1	0	0	1	0	1	100%
	Sevengill Shark	1	0	0	1	0	1	100%
	Jack Mackerel	1	0	0	1	0	1	100%
Sometimes Marketed / Sometimes Discarded	Blue Shark	511	10	259	214	28	501	98%
	Smooth Hammerhead Shark	32	1	4	27	0	31	97%
	Bigeye Thresher Shark	25	2	0	23	0	23	92%
	Pacific Mackerel	87	21	0	66	0	66	76%
	Bullet Mackerel	200	79	0	121	0	121	61%
	Pacific Pomfret	53	23	0	30	0	30	57%
	Pelagic Thresher Shark	2	1	0	1	0	1	50%
	Oilfish	2	1	0	1	0	1	50%
	Skipjack Tuna	183	109	0	74	0	74	40%
	Unidentified Tuna	26	17	0	9	0	9	35%
	Bluefin Tuna	609	542	0	67	0	67	11%
	Pacific Bonito	192	171	0	21	0	21	11%
Mostly Marketed / Rarely Discarded	Shortfin Mako Shark	652	616	20	16	0	36	6%
	Albacore	405	383	0	22	0	22	5%
	Louvar	61	60	0	1	0	1	2%
	Common Thresher Shark	306	302	1	3	0	4	1%
	Opah	452	447	0	5	0	5	1%
	Swordfish	1815	1808	0	7	0	7	0%
	Yellowfin Tuna	26	26	0	0	0	0	0%
	Yellowtail	6	6	0	0	0	0	0%
	Pacific Hake	1	1	0	0	0	0	0%
	Escolar	1	1	0	0	0	0	0%

Table 6. Observed protected species caught in the DGN fishery, 2013-2017 (California/Oregon Drift Gillnet Fishery Catch Summaries)

West Coast Large-Mesh Drift Gillnet Fishery
Observed Protected Species Interactions
2013/2014 through 2017/2018
23.4% Observer Coverage (619 of 2648 total sets observed)

Species	Total Caught	Number Kept	Number Returned			Total Returned
			Alive	Dead	Unknown	
Short-Beaked Common Dolphin	33	0	0	33	0	33
Northern Right Whale Dolphin	10	0	0	10	0	10
California Sea Lion	8	0	0	8	0	8
Northern Elephant Seal	4	0	0	3	1	4
Gray Whale	2	0	0	2	0	2
Short-Finned Pilot Whale	2	0	0	2	0	2
Dall's Porpoise	1	0	0	1	0	1
Long-Beaked Common Dolphin	1	0	0	1	0	1
Unidentified Common Dolphin	1	0	0	1	0	1

APPENDIX 3

Table 7. Summary of estimated total fishing effort (in sets), total number of observed sets, and percent observer coverage for the California/Oregon large-mesh DGN Observer Program from 2013 through 2017 (calendar year January through December).

Calendar Year	Estimated Total Fishing Effort (Sets)	Total Number of Observed Sets	Percent Observer Coverage
2013	470	176	37.4%
2014	409	97	23.7%
2015	361	74	20.5%
2016	737	132	18.2%
2017	598	111	18.6%

Table 8. Estimated observable and unobservable effort (in sets) for the drift gillnet fishery from 2013 through 2017.

Calendar Year	Total sets	Observable Sets	Unobservable Sets	Percent Unobservable
2013	470	421	49	10.4%
2014	409	264	145	35.5%
2015	361	216	145	40.2%
2016	737	490	247	33.5%
2017	598	354	244	40.8%

APPENDIX 4

Table 9. Annual number of issued permits, and active 2011 DGN permits, 1996-2017.

Year	No. Issued Permits[15]	No. Active Permits[16]	No. Latent Permits[16]
1996	167	191	0
1997	120	176	0
1998	148	160	0
1999	136	99	37
2000	126	119	7
2001	113	109	4
2002	104	90	14
2003	99	74	25
2004	95	58	37
2005	91	49	42
2006	88	54	34
2007	86	59	27
2008	84	60	24
2009	83	59	24
2010	78	47	31
2011	82	43	39
2012	78	32	46
2013	74	19	54
2014	74	22	52
2015	73	21	52
2016	70	25	45
2017*	69	22	47

* 2017 data are preliminary and subject to change.
Data Source: CDFW California Fisheries Information System (CFIS), 2013-17 data extracted 05/29/2018

[15] Permits are issued based on an April 1 to March 31 fishing season as opposed to a calendar year. Numbers represented here indicate the number of permits for the fishing season beginning April 1 of the year listed.
[16] Active and latent permit counts are summarized by calendar year (Jan 1 - Dec 31) for the year listed.