I. Introduction

During this agenda item, the Pacific Fishery Management Council (Council) will discuss the future direction of the U.S. West Coast swordfish fishery and the Council's *draft* Pacific Coast Swordfish Fishery Management and Monitoring Plan (SMMP)[1]. The discussion is planned to result in a pathway forward for guiding Council actions and planning. The SMMP contains three goals:

SMMP Goals

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 mitigation, gear innovation, and individual accountability.
3. Support the economic viability of the swordfish fishery so that it can meet demand for a fresh, high quality, locally-caught product.

The National Marine Fisheries Service (NMFS) provides the following material as supplementary information that supports the Council's draft SMMP and as a reference for the discussion.

II. Stakeholder Perspectives from NMFS' Swordfish Workshops

In 2011 and 2015, NMFS coordinated workshops bringing together various stakeholders[2] to share information, perspectives, and thoughts on the long-term sustainability of the U.S. West Coast swordfish fishery. NMFS compared discussion outcomes from these workshops with the Council's SMMP goals.

The 2011 workshop[3] focused on identifying the current state of knowledge on biological, ecological, and socioeconomic factors of the fishery. The 2015 workshop[4] also focused on the fishery while exploring complementary strategies for optimizing fishing for highly migratory species (HMS), taking into consideration the need to balance sustainable fisheries and reduced bycatch. Relevant key outcomes from the workshops for this discussion are copied below, with additional outcomes listed in the Appendix.

The draft SMMP goals, which are focused on reduced bycatch and economic viability, incorporate the themes and key discussion points raised by workshop participants. In addition, three of the potential actions listed in the draft SMMP align with workshop discussion points: allowing access in the Pacific Leatherback Conservation Area (PLCA), developing longline fisheries, and developing deep-set buoy gear.

[1] PFMC September briefing book: http://www.pcouncil.org/wp-content/uploads/2015/08/G2_Att1_SwordfishPlan1509_SEPT2015BB.pdf
[2] Stakeholders included representatives from the commercial and recreational swordfish fisheries; NGOs; state and federal managers; and scientists and researchers.
[3] 2011 Workshop proceedings and presentations: http://www.westcoast.fisheries.noaa.gov/fisheries/migratory_species/2011_swordfish_wksp.html
[4] 2015 Workshop key outcomes memo and presentations: http://www.westcoast.fisheries.noaa.gov/fisheries/migratory_species/2015_swordfish_mtg.html

2011 Workshop

Cross-Cutting Themes and Ideas*

- All groups agreed that the U.S. fishery is not economically sustainable. The PLCA time and area DGN closure was cited as being particularly damaging because it reduces access to some of the most productive swordfish fishing grounds during times when swordfish are most abundant off the California coast. Other reasons:
  - increased fuel costs; safety at sea issues associated with fishing farther offshore; compounding regulatory burdens; and no succession plan for the next generation of fishermen.
- Fishery participants agreed that the fishery is environmentally sustainable as it relates to the swordfish stock with minimal impact to non-target species, such as sea turtles and marine mammals. However, some participants voiced concerns over discard mortality rates for blue sharks and ocean sunfish (*Mola mola*).
- Participants identified a range of possible gear and operational changes to improve the viability of the fishery:
  - Re-examine dimensions of the PLCA with current information.
  - Pursue exempted fishing permits in the PLCA to test DGN, longline, and buoy gear using updated conservation measures successfully applied in other U.S. fisheries.
  - Conduct more research to better understand the temporal-spatial overlap between sea turtles and swordfish and the possible implications for new practices and management approaches (e.g., dynamic area management).
- Revamp the fisheries permit system and explore incentives to facilitate the recruitment of new fishermen.

Future Actions*

- Pursue exempted fishing permits within the PLCA.
- Undertake collaborative research efforts to better understand the overlap between swordfish and protected species and apply those findings to the management of the fishery.
- Examine equity issues within the swordfish fishery along the U.S. West Coast and Pacific Islands.

2015 Workshop

Cross-Cutting Themes and Ideas*

- Participants had mixed views on the sustainability of the DGN fishery due to bycatch concerns. Yet, it was widely recognized that the swordfish stock is sustainable at current and higher potential levels of effort.
- Major challenges include the aging fishing cohort in the U.S. fleet, inconsistency of a local supply of swordfish, consumer misconceptions and misinformation, and growing competition with lower-priced, imported fish. Some noted that gaining access to the PLCA and removing threats of closures could increase economic viability and fleet sustainability.
- Regulatory and fishery management and operational challenges were widely noted; e.g., increasing costs of observer coverage, gear, and fuel, and difficulty to balance economically sustainable catch with low bycatch.
- Deploying new gear types is a potential avenue to reopen the PLCA with an acceptable level of bycatch.
- Dynamic ocean management and predictive mapping tools show promise to advance ecological and economic characteristics of the fishery.
- Gear and technologies that could increase fishing opportunities and minimize environmental impacts are:
  - smart deployment of vessels and gear using predictive mapping and pooled electronic information,
  - faster development of more selective gear types (deep set buoy gear, daytime DGN with shorter set times, actively tended longlines),
  - deterrent devices (illuminated nets, pingers), and
  - advancement of avoidance research.

Future Actions*

- There was broad support for investment in:
  - new gear research and development with low bycatch rates;
  - existing gear modification to decrease bycatch;
  - observer coverage and electronic monitoring; and
  - trainings, positive marketing, and public education.

**** Discussion points most relevant to Council actions***

III. Supplementary Reference Information

a) Finfish Bycatch

NMFS provides Table 1 below as a reference on finfish catch, composition, and species currently marketed in the drift gillnet (DGN) fishery should this information be helpful as the Council considers actions in support of Goal 2 (*Reduce unmarketable finfish catch in the swordfish fishery through mitigation, gear innovation, and individual accountability*). The finfish bycatch performance metrics adopted by the Council for the DGN fishery at its September 2015 meeting were intended to address Goal 2.

Table 1. DGN Fishery Observed Catch and Disposition 2010/11 through 2014/15

West Coast Large-Mesh Drift Gillnet Fishery
Observed Catch and Disposition
2010/2011 through 2014/2015 Fishing Seasons
23.7% Observer Coverage (537 of 2267 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	2914	0	2856	56	2	2914	100%
	Blue Shark	343	0	103	233	7	343	100%
	Smooth Hammerhead Shark	28	0	4	24	0	28	100%
	Pelagic Stingray	11	0	10	1	0	11	100%
	Striped Marlin	6	0	0	6	0	6	100%
	Jumbo (Humboldt) Squid	4	0	2	2	0	4	100%
	Megamouth Shark	4	0	4	0	0	4	100%
	Pacific Electric Ray	4	0	3	0	1	4	100%
	Remora	4	0	4	0	0	4	100%
	Bay Pipefish	1	0	1	0	0	1	100%
	Oarfish	1	0	0	1	0	1	100%
	Oilfish	1	0	0	1	0	1	100%
	Sevengill Shark	1	0	0	1	0	1	100%
	Unidentified Invertebrate	1	0	0	0	1	1	100%
	Unidentified Rockfish	1	0	1	0	0	1	100%
Sometimes Marketed / Sometimes Discarded	Salmon Shark	30	1	2	27	0	29	97%
	Pacific Mackerel	93	19	9	65	0	74	80%
	Bigeye Thresher Shark	11	3	0	7	1	8	73%
	Bullet Mackerel	203	78	0	125	0	125	62%
	Pelagic Thresher Shark	2	1	0	1	0	1	50%
	Skipjack Tuna	145	77	0	68	0	68	47%
	Unidentified Tuna	26	17	0	9	0	9	35%
	Pacific Pomfret	125	95	0	30	0	30	24%
	Jack Mackerel	9	7	0	2	0	2	22%
Mostly Marketed / Rarely Discarded	Common Thresher Shark	492	452	10	30	0	40	8%
	Bluefin Tuna	542	505	0	37	0	37	7%
	Albacore	681	652	0	29	0	29	4%
	Shortfin Mako Shark	745	714	18	13	0	31	4%
	Pacific Bonito	26	25	0	1	0	1	4%
	Louvar	67	65	1	1	0	2	3%
	Swordfish	955	947	1	7	0	8	1%
	Opah	563	560	2	1	0	3	1%
	Soupfin Shark	1	1	0	0	0	0	0%
	Spiny Dogfish	1	1	0	0	0	0	0%
	Yellowfin Tuna	1	1	0	0	0	0	0%

The Council's actions to minimize finfish bycatch are guided by MSA National Standard 9, which states:

> "*Conservation and management measures shall, to the extent practicable, (a) minimize bycatch and (b) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.*"

New fishing gears to harvest swordfish that the Council may consider authorizing have some level of bycatch, though different from DGN gear. Except for harpoon gear, some level of bycatch may be unavoidable with new gear types as the Council aims to support the economic viability of the swordfish fishery (Goal #3). In these cases, the amount of bycatch *mortality,* in particular (i.e., NS9 (b)), should be considered rather than solely the total amount of bycatch.

For future gear types under consideration (e.g., buoy and longline gear), the discarded / unmarketable species composition and mortality rates will differ compared to DGN. For example:

- Shallow-set longline (SSLL)
  - Common mola bycatch in longline fisheries is very rare.
  - A SSLL fishery may catch and discard more blue sharks than the DGN fishery; however, the mortality rate of blue sharks is likely to be lower. Total bycatch and mortality can be anticipated based on allowable fleet size.
  - Striped marlin cannot be landed to the West Coast per the HMS fishery management plan (FMP) regulation;[5] they are returned as bycatch. Striped marlin may have higher survivability on SSLL gear than in DGN since they are able to continue swimming when hooked. Total bycatch and mortality can be anticipated based on allowable fleet size.
- Deep-set Buoy Gear
  - This gear is set deep, below the preferred habitat of most of the finfish species caught in DGN and SSLL gear. This gear will catch a smaller variety of species than DGN or SSLL.
  - This gear can be actively tended when a strike indicator shows an animal is on the line. This gear will have low bycatch mortality.

b) Protected Species

The Council may consider this information as it considers actions in support of Goal 1 (*Reduce protected species bycatch in the swordfish fishery through mitigation, gear innovation, and individual accountability*). The DGN hard caps that the Council recommended for the DGN fishery at its September 2015 meeting were intended to address Goal 1. For future gear types under consideration, the species composition and mortality rates of protected species may be different from DGN, in a manner similar to the finfish bycatch differences described above. For example:

- Shallow-set longline (SSLL)
  - A SSLL fishery would likely have less marine mammal interactions than the DGN fishery.
  - A SSLL fishery may encounter more sea turtles than the DGN fishery; however, the mortality rate of sea turtles is likely to be lower since the gear is set shallow and

[5] 50CFR 660.711(b): *Marlin prohibition.* The sale of striped marlin by a vessel with a permit under this subpart is prohibited.

captured animals are able to reach the surface to breathe before release. Total bycatch and mortality can be anticipated based on allowable fleet size.

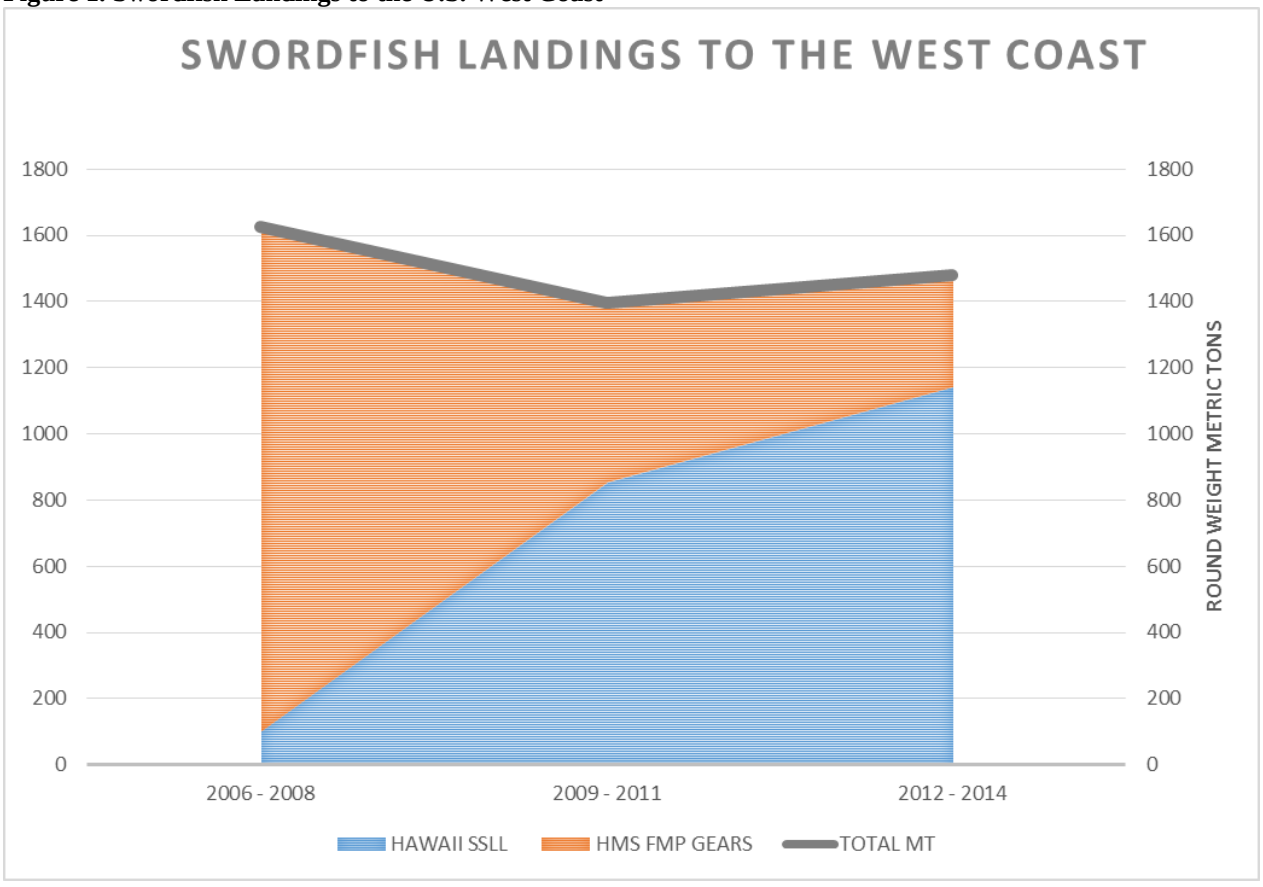
- Deep-set Buoy gear
  - This gear is set deep, below the zone where protected species are caught in DGN and SSLL fisheries, resulting in fewer protected species interactions.
  - Any protected species encountered is likely to have high survivability since this gear can be actively tended.

c) Economics

The Council may consider this information as it considers actions in support of Goal 3 (*Support the economic viability of the swordfish fishery so that it can meet demand for a fresh, high quality, locally-caught product*).

Page 4 of the Council's September 2015 draft SMMP states that *economic viability encompasses support for a swordfish fishery conducted by vessels with West Coast home ports*. Some Hawaii SSLL vessels land swordfish in West Coast ports under an HMS permit but the swordfish is caught with a Hawaii longline permit. Eight of fifteen Hawaii longline vessels that landed swordfish to the West Coast between 2006 and 2014 currently have a West Coast business address listed on their HMS permit. Figure 1 shows swordfish landings to the West Coast by Hawaii SSLL vessels and HMS FMP gears. Data are aggregated into three-year periods to preserve confidentiality. This information is presented to show the participation in the swordfish fishery currently operating from and landing to West Coast ports.

Figure 1. Swordfish Landings to the U.S. West Coast



Appendix

2011 WORKSHOP: PROCEEDINGS EXCERPTS

Cross-cutting themes (pg. 54)

- All groups agreed that the U.S. West Coast swordfish fishery is not economically sustainable. The PLCA time and area DGN closure was cited as being particularly damaging because it reduces access to some of the most productive swordfish fishing grounds during times when swordfish are most abundant off the California coast. Other reasons include:
    - increased fuel costs;
    - safety at sea issues associated with fishing farther offshore;
    - compounding regulatory burdens; and
    - no succession plan for the next generation of fishermen.

- Those involved in the fishery agreed that the U.S. West Coast swordfish fishery is environmentally sustainable as it relates to the target swordfish stock with minimal impact to non-target species, such as sea turtles and marine mammals. However, some workshop participants voiced ongoing concerns over discard mortality rates for blue sharks and ocean sunfish (*Mola mola*).

- Participants identified a range of possible gear and operational changes to improve the viability of the fishery. All groups put forward variations on the following three recommendations:

    a. Re-examine dimensions of the PLCA based on current information.

    b. Pursue exempted fishing permits in the PLCA to test DGN, longline, and buoy gear using updated conservation measures successfully applied in other U.S. fisheries.

    c. Conduct more research to better understand the temporal-spatial overlap between sea turtles and swordfish and the possible implications for new practices and management approaches (e.g., dynamic area management).

- Other suggestions included revamping the fisheries permit system and exploring other incentives to facilitate the recruitment of new fishermen. At least one group noted that nearly all the concepts identified have the potential for downsides, from increased cost and political battles to possible target and non-target catch per unit effort changes.

- All groups suggested strategies for increasing demand for locally caught swordfish and decreasing U.S. reliance on imports. Two common strategies centered on forming partnerships between industry, NMFS, NGOs, restaurateurs:

    1. Better educate consumers about the benefits of buying U.S. West Coast-caught swordfish (versus other less sustainably harvested swordfish) and about the story of the swordfish fishery.

    2. Press to implement federal MMPA provisions to identify and restrict the import of non-sustainably harvested seafood.

- Other ideas included involving fishermen in marketing campaigns, partnering with the California Sustainable Seafood Initiative, developing a turtle-safe brand or label for West Coast-caught swordfish, imposing an industry self-tax to fund restoration of sea turtle nesting beaches, supporting NOAA FishWatch as a reliable data source for sustainability information, and revitalizing the California Seafood Council.

Future actions mentioned by participants included (pg. 55)

- Establishing multi-stakeholder workgroups to target specific issues raised during the workshop, including:
    - identifying threats to Pacific Basin sea turtle nesting grounds;
    - pursuing exempted fishing permits within the PLCA; and
    - developing effective sustainable seafood and swordfish communication and marketing efforts.

- Launching a comprehensive public education and marketing effort with emphasis on the following themes:
    - the healthy status of the North Pacific swordfish stock; and
    - sustainable fishing practices of the U.S. West Coast swordfish fleet.

- Undertaking collaborative research efforts to better understand the overlap between swordfish and protected species and to apply those findings to the management of the fishery.

- Identifying the U.S. West Coast fishery as a pilot program for Ocean Protection Council's (OPC) California Sustainable Seafood Initiative.

- Examining equity issues within the swordfish fishery along the U.S. West Coast and Pacific Islands, as well as pressing for full enforcement of existing import provisions under the MMPA.

- Taking advantage of the full range of ongoing and future initiatives, such as the annual SeaWeb Seafood Summits, the Alliance for Sustainability of Fishing Communities, and the OPC funding for collaborative fisheries research.

- Collaborating on initiatives to preserve working waterfronts on the U.S. West Coast and the communities they support.

2015 WORKSHOP: KEY OUTCOMES MEMO EXCERPTS

Crosscutting themes and ideas (pgs. 11-13)

Participants noted significant value in having a local swordfish fishery, citing its contributions to the local economy, culture and history, its characteristic of lower-bycatch relative to both the historic DGB fishery in California and imports, its role in providing high nutrition food to the community, and its comparatively low carbon footprint relative to imported fish. Participants also affirmed the contributions of the fishery to fisheries science. Catch data, gear development and testing, and other data collected by active fishermen add to the data stream for scientific research and innovation for fisheries worldwide.

Mixed Views on Sustainability of the Fishery: Participants responded to the question of sustainability from the perspective of both biological sustainability and sustainability of the fleet. Participants conveyed and readily acknowledged mixed views on the sustainability of the DGN fishery due to bycatch concerns. Yet, it was widely recognized that the swordfish stock itself is sustainable at current and higher potential levels of effort.

Challenges in Recruitment to the Fishery: Given the very low rate of new entrants, the fishery is aging, which lead to concerns about the longevity of the fishery. Some speakers noted that gaining access to the PLCA and removing threats of closures could increase the economic viability and fleet sustainability.

Major challenges facing the fishery included concerns again over the aging fishing cohort in the U.S. fleet along with the inconsistency of a local supply of swordfish, consumer misconceptions and misinformation about food safety and fishing practices, and growing competition with lower-priced, imported fish.

Array of Cost Stresses and Sources of Uncertainty: Regulatory and fishery management and operational challenges were also widely noted. They include increasing costs of observer coverage, gear, and fuel, as well as the difficulty to balance economically sustainable catch with low bycatch. The PLCA closure was also cited as a major challenge to the fishery.

Diverse Organizational Missions Relative to the DGN: Another challenge noted is the high tension and low trust between the fishermen and some members of the NGO community. Importantly, NGOs have to date adopted a range of stances toward the DGN fishery.

New gear development to diversify gear portfolios among fishermen was considered a promising strategy to overcome some of the challenges in the fishery. As well, deploying new gear types was cited as a potential avenue to reopen the PLCA to swordfish fishing with an acceptable level of bycatch.

Additional strategies to address challenges in the fishery included increasing constructive dialog across stakeholder groups and maintaining full representation in management, developing relationships for a common understanding of ecological and economic issues to resolve, and working together to consider and develop import policies. Dynamic ocean management and predictive mapping are tools that show promise to advance both ecological and economic characteristics of the fishery. Another promising resource is funding available under new RFPs.

New Technologies and Methods Highlighted: Breakout groups widely cited smart deployment of vessels and gear using predictive mapping and pooled electronic information, faster development of more selective gear types (deep set buoy gear, daytime DGN with shorter set times, actively tended longlines), deterrent devices (illuminated nets, pingers), and advancement of avoidance research as the gear and technologies that could increase fishing opportunities and minimize environmental impacts. Advancing improved post-catch fish techniques to enhance product quality was also widely supported as a positive development.

Value of Positive Marketing: Participants maintained that public education and outreach through positive marketing and branding strategies, including "California-caught" labeling, and building relationships with NGOs for positive messaging and correlated funding opportunities are ways the supply chain could support the swordfish fishery. Participants also discussed contributions to conservation efforts and further management research into whether there is potential for modifying or reopening the PLCA as positive ways to support the fishery.

Naming Areas of Agreement is an Asset: Breakout groups offered that explicitly naming, confirming, and acknowledging areas of agreement could be an asset for the fishery. Participants noted that for organizations active in discussions on the future of the DGN fishery, a stance that involves active trust and respect for still-divergent opinions among stakeholders could help foster and grow partnerships.

Building on this Meeting Through Collaborative Work Teams: Collaborative work through work teams, task forces or commodity commissions to (1) develop marketing and branding strategies, (2) spread the burden of research and innovation, and (3) work toward common goals of responsible representation of scientific information were also supported as positive ways to shape working partnerships.

Future Actions and Commitments (pg. 13)

There was broad agreement that the fishery provides many benefits, from providing a healthy local food source to bolstering the domestic economy. There was also broad support for investment in trainings, positive marketing, and public education; new gear research and development with low bycatch rates; existing gear modification to decrease bycatch; observer coverage, and electronic monitoring. Additionally, there was broad support to build cross-interest relationships to work together to move the fishery forward to provide a local source of sustainable supply to meet demand.