HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON DEEP-SET BUOY GEAR AUTHORIZATION – RANGE OF ALTERNATIVES AND LIMITED ENTRY CRITERIA

At the September 2018 meeting, the Council adopted a schedule to be considered when planning future Highly Migratory Species (HMS) agenda items under the Swordfish Management and Monitoring Plan and Workload and Agenda Planning discussions (F.7 Supplemental Attachment 5). On this schedule, the Highly Migratory Species Management Team (HMSMT) was to provide updates on the analyses for the range of alternatives (ROA) for authorization of deep-set buoy gear (DSBG), including qualifying criteria alternatives for the issuance of limited entry (LE) permits.

Qualifying criteria alternatives and updated analyses are provided in this report, along with suggestions for revisions to the proposed action, purpose and need, and gear definitions. Additionally, this report includes discussion of other pertinent topics, such as the swordfish stock and DSBG logbooks. Proposed changes to the proposed action and purpose and need are shown in underline/strikeout format. The revised gear definition below more clearly describes the actual configuration of the gear than the previous description in Agenda Item J.4.a, HMSMT Report 1.

The HMSMT suggests these revisions to clarify that the purpose of the action is specific to DSBG gear while acknowledging that DSBG gear is part of a broader regional swordfish fishery. Recent exempted fishing permit (EFP) experience has provided new information on economic and bycatch performance, which also warrants revision of the purpose and need statement.

Proposed Action

The proposed action is to authorize a DSBG ~~fishery~~ gear-type targeting swordfish and other highly migratory species under the Fishery Management Plan for West Coast Fisheries for Highly Migratory Species (FMP). DSBG would be identified as a legal commercial fishing gear in the FMP and pursuant regulations. Management measures for the fishery could be established in the FMP or in federal regulations under the FMP's management framework.

Purpose and Need

Research and exempted fishing trials with DSBG have thus far indicated that this innovative gear-type has infrequent protected species interactions and finfish bycatch. The purpose of the proposed action is to authorize ~~encourage~~ the use of DSBG as an additional fishing gear in the West Coast commercial swordfish fishery that minimizes bycatch and bycatch mortality of finfish and protected species (including sea turtles, marine mammals, and seabirds) to the extent practicable while ~~allowing for~~ maximizing the potential for an economically viable ~~the~~ fishery ~~to remain economically viable~~. ~~Research and exempted fishing trials with DSBG have demonstrated that this innovative gear type has minimal protected species interactions and finfish bycatch.~~ If future experience demonstrates that DSBG is economically viable, it could help ~~Economic viability encompasses~~ support ~~for~~ a swordfish fishery conducted by vessels with West Coast home ports, and increase~~d~~ the availability of locally-caught swordfish in the market.

The proposed action is needed to authorize DSBG as a new gear type as a component of a West Coast swordfish fishery that effectively addresses the 10 National Standards for Cconservation and Management included ~~enumerated~~ in the Magnuson Stevens Act, Section 301, in particular National Standards (NS) 1 (optimum yield) and 9 (minimize bycatch). DSBG may ~~is~~ also help satisfy the need~~ed as a~~ for commercially viable additions to the suite of legal swordfish gear types, to support ~~provide~~ sustained participation in the swordfish fishery by West Coast fishing communities. In doing so, authorization of the fishery would also address NS 8.

Gear Definition

Standard Buoy Gear (SBG) - An individual piece of SBG consists of a vertical monofilament mainline suspended from a buoy-array with a terminal weight. Up to three gangions with hooks may be attached to the mainline at a minimum depth of 90 meters.

Linked Buoy Gear (LBG): An individual piece (section) of LBG consists of a monofilament mainline which extends vertically from a buoy-array (either directly or from a minimum 50 foot poly-line extender) to a weight; then horizontally to a second weight; then vertically to a minimum 50 foot poly-line extender attached to a second buoy-array. Up to three gangions with hooks may be connected to each horizontal section of the mainline, all of which must be fished below 90 meters. The pieces may be linked together by the mainline, which is serviceable between each piece of LBG and must be suspended between links below a depth of 50 feet. No more than 10 sections of LBG may be deployed at any one time, with no more than 3 hooks per section.

Both DSBG configurations (SBG and LBG) must meet the following specifications:

1) Buoy-array: The surface buoy flotation and strike detection array consists of a minimum of three buoys (a minimum 45 lbs buoyancy non-compressible hard ball, a minimum 6 lbs buoyancy buoy, and a strike detection buoy) with no more than 6 feet of line between adjacent buoys all connected in-line by a minimum of 3/8 inch diameter line. Use of buoy tether attachments (e.g., non-streamlined gear with loops and/or dangling components) is prohibited. SBG and terminal LBG buoy-arrays must include a locator flag, a radar reflector, and vessel/fisher identification compliant with all current state requirements and regulations.
2) Weights must be a minimum of 3.6 kg.
3) Lines connecting surface buoys must be at least ⅜" diameter.
4) Minimum size 16/0 circle hooks with not more than 10^{o} offset
5) No more than ten pieces of SBG or LBG may be deployed at one time, with no more than three hooks per piece.

Limited Entry Permit Alternatives

The HMSMT recommends that the Council refine the LE Permit Alternative range adopted at the June 2018 meeting to specify an alternative for "not more than 25 permits per year, not to exceed 300 total." Adding this alternative would allow the Council to consider permit issuance at a more gradual rate in consideration of spatial, biological and economic effects. This more cautionary

approach will allow for markets to develop, for additional data on potential crowding and protected species interactions to be collected, and for management to respond appropriately.

Limited Entry Qualifying Criteria

In its June 2017 H.3.a HMSMT Supplemental Report 2, the HMSMT provided a preliminary summary of criteria that could be used to issue permits for DSBG under a LE scenario as outlined in the HMSMT's first H.3.a report. Table 1 included rough estimates of the maximum numbers of permits each criterion could allocate and also provided estimates for scenarios outlined in public comment submitted by Pew and Oceana at the June 2017 meeting.

In September 2017, the HMSMT provided three alternatives for LE permit qualifying criteria (J.6.a HMSMT Supplemental Report 2). Under each criterion, both the stand-alone number of individuals who would qualify, as well as cumulative totals of individuals who would qualify, are provided. Options were included for issuing multiple permits to an individual or limiting each individual to a single permit. The tables below provide an updated version of some of these numbers from Table 1 from the HMSMT's June 2017 report, and are restructured to provide two potential options for each of the three alternatives.

The HMSMT's proposed alternatives also cover HMSAS suggestions outlined in their September 2017 report (J.6.a Supplemental HMSAS Report 1), with the exception that additional consideration is not given to the original exempted fishing permit (EFP) participants "that have significantly contributed to the advancement of DSBG." Should a tier category include more qualifying individuals than the number of permits that would be issued in a single year, the HMSMT recommends that the Council use landings to determine the order in which applicants are considered for a DSBG permit, giving highest priority within a tier to those individuals with the highest landings. This would address the HMSAS' recommendation, as mentioned above.

Should the Council adopt an LE permit alternative under which the number of permits to be issued is greater than the number that would be issued if all the qualifying/ranking criteria have been met, the HMSMT recommends that the remaining permits be issued on a first-come, first-serve basis.

Alternative 1: Tiered Criteria

Alternative one provides an ordered list of qualifying criteria to be used to determine the order of applicants to whom a LE DSBG permit would be issued. First come, first serve applicants would only be eligible for one LE DSBG permit. Individuals who receive one or more permits by qualifying under other tiers would not be eligible. Two options for tiered LE criteria are presented in the tables below. For each option, there are two permit issuance and possession approaches: 1) Allow an individual to hold multiple permits (Column 3), and 2) Do not allow an individual to hold multiple permits (Column 4). The number of permits shown in option one was based on a one DGN-to-one DSBG permit trade-in ratio. The Council could consider a one DGN-to-multiple

DSBG permit trade-in ratio, such as the options provided for alternative 3.The Council may want to consider issuing multiple DSBG permits for active fishermen who surrender their DGN permits.

Option 1: Tiered Criteria

Ranking Category	Potential Permits	Multiple Permits Issued Per Individual: Cumulative Total	One Permit Issued Per Individual: Cumulative Total
1. "Active" EFP Recipients*	up to 68	68	68
2. "Active" DGN Permit - Trade-in	up to 34	102	93
3. "Active" Swordfish (harpoon) Permit	15 + 10 DGN	127	101
4. "Active" DGN Permit - No Trade-In	34 - trade in	127	101
5. "Inactive" DGN Permit - Trade-in	up to 30	157	126
6. "Inactive" DGN Permit - No Trade-In	30 - trade in	157	126
7. "Inactive" EFP Recipients*	68 - active	157	126
8. "Active" Expired DGN & Swordfish Permits	1 DGN + 7 HPN	165	130
9. "Inactive" Expired DGN & Swordfish Permits	9 DGN + 66 HPN	240	198
10. Other West Coast Swordfish Landings	35	275	233
11. First-come, first-serve	300 minus Cumulative Total	300	300

Option 2: Tiered Criteria

Ranking Category	Potential Permits	Multiple Permits Issued Per Individual: Cumulative Total	One Permit Issued Per Individual: Cumulative Total
1. "Active" EFP Recipients*	up to 68	68	68
2. "Active" DGN Permit	34	102	93
3. "Active" Swordfish (harpoon) Permit	15 + 10 DGN	127	101
4. "Inactive" DGN Permit	30	157	126
5. "Inactive" EFP Reciptients*	68 - active	157	126
6. "Active" Expired DGN & Swordfish Permits	1 DGN + 7 HPN	165	130
7. "Inactive" Expired DGN & Swordfish Permits	9 DGN + 66 HPN	240	198
8. Other West Coast Swordfish Landings	35	275	233
9. First-come, first-serve	300 minus Cumulative Total	300	300

Season is April 1 - March 31 of the following year.

Active drift gillnet permits are preliminarily defined as a minimum of one landing with DGN gear during the 2013/14-2017/18 seasons.

Active EFPs (to be specified at a later date) are preliminarily defined as a minimum of ten observed DSBG gear fishing days by the *specified date

Inactive drift gillnet permits are preliminarily defined as having no landings with DGN gear since 03/31/2013

Inactive EFP recipients must have an issued EFP from NMFS and have at least one observed DSBG fishing day, but less than ten.

Current drift gillnet and harpoon permits are those which are renewed and valid for the 2018/19 season

Expired drift gillnet and harpoon permits are those which were transferred or not renewed for the 2018/19 season

Data Source: Permit data - CDFW Automated Data Licensing System (ALDS), extracted 10/23/2018; Landings data - CFIS, extracted 11/2/2018

The HMSMT recommends the Council adopt option 1 as its tiered LE qualifying criteria alternative as it retains the DGN permit trade-in option. This would enable DGN fishermen who trade in their permits an opportunity to substitute effort in the DSBG fishery for their lost DGN fishing opportunity.

The HMSMT further recommends to allow for more than one DSBG permit to be issued to an individual who qualifies under multiple criteria as it would prioritize permit issuance to those with the most experience with a range of swordfish gear types. The multiple permit approach would also potentially concentrate more permits in the hands of these experienced swordfish fishermen, reducing the risk of unintentional harmful conservation impacts by less experienced fishermen.

Alternative 2: Permit Possession

Alternative two is based on the possession of a current California permit authorizing landings of swordfish, and has two options. For this report, the HMSMT provides the number of permits that could be issued under these criteria as of October 23, 2018 as an example. The Council would need to specify a control date as a definitive cut off for determining the number of permits that could be issued under this alternative.

Option 1: Permit Possession

		Multiple Permits Issued Per Individual	One Permit Issued Per Individual
Category	**Potential Permits**	**Total**	**Total**
DGN or Swordfish Permit (as of 10/23/2018)	64 DGN + 53 harpoon	117	117

Option 2: Permit Possession

DGN, Swordfish or DSBG (as of 10/23/2018)	64 DGN + 53 harpoon + 68 EFP	185	154

The HMSMT recommends the Council adopt option 2 as its permit possession alternative as it would allow all those who have participated in a swordfish fishery as well as those who have participated in the DSBG EFP process to obtain a permit. Stakeholders have repeatedly expressed the importance of allowing those who have vested interests in the swordfish fishery to be given an opportunity to utilize DSBG.

Alternative 3: Drift Gillnet Permit Trade-In

Alternative three is based on a DGN permit holder's voluntary surrender of their DGN permit in exchange for a DSBG permit. This can be done as a stand-alone option, or in conjunction with other state or federal DGN permit buyback or trade-in programs. This alternative would currently include up to 64 current DGN permit holders, with an additional five remaining permits which could be renewed up until March 31, 2019. The Council may wish to consider issuance of more than one DSBG permit for each active DGN permit in light of the possibility that one DSBG permit may not be able to replace the landings and revenues production of a single active DGN permit. The HMSMT provides the following two options (3 for 1, 2 for 1) and recommends that the

Council select Option 2 for its DGN permit trade-in alternative. It is unlikely that one non-transferable DSBG permit would provide comparable economic benefit as one DGN permit. However, issuing three permits in addition to other financial gains received through a trade-in option may be excessive, as two permits may be sufficient to incentivise trade-in.

Option 1: 3 for 1

Issuance of three DSBG permits for the surrender of an active DGN permit and one DSBG permit for the surrender of an inactive DGN. This option would allocate up to 132 DSBG permits (102 active + 30 inactive).

Option 2: 2 for 1

Issuance of two DSBG permits for the surrender of an active DGN permit and one DSBG permit for the surrender of an inactive DGN. This would allocate up to 94 DSBG permits (64 active + 30 inactive).

Updated ROA Analyses

Spatial Analyses

The HMSMT heard a presentation at their November 2018 meeting by SWFSC scientist Dr. Stephanie Brodie on an EcoCast analysis of historic large-mesh DGN fishing experience in the Southern California Bight. The analysis uses DGN catch and effort information in the California Gillnet Observer Database to infer spatially explicit DGN CPUEs, contingent on the historical levels of environmental variables included in the model, then hindcasts the spatial availability of swordfish in the Southern California Bight based on historical environment. The number of cells (which roughly translates to the number of DSBG footprints) with a DGN swordfish CPUE of >0.5, >1.0, and >1.5 swordfish per fishing set, and the minimum, maximum, mean and median swordfish CPUE in any cell, respectively, were presented. The foundation of this work has been recently published (Brodie et al. 2018).

The HMSMT discussed the applicability of the model's DGN CPUE hindcast for informing the DSBG ROA. While this tool may be useful in predicting the spatial-temporal presence or absence of swordfish, it may not be applicable to DSBG catch rates, due to (1) different swordfish catchability for DSBG versus DGN; (2) differences in areas where DSBG vessels can fish relative to historic DGN fishing patterns; and (3) seasonal factors which affect the ability to use DSBG versus DGN.

The HMSMT offered to work with Dr. Brodie to develop a finalized version of the report for the March 2019 Council briefing book which addresses the issues raised during the presentation to the HMSMT.

Biological Analyses

The HMS updated the potential annual catch in its June 2018 report (Agenda Item G.5.a, HMSMT Report 1) according to the number of permits from the Council's June 2018 motion to revise the ROA in Table 1. Observer, logbook, and landings data for 2018 are not yet available for inclusion in the biological analysis. Therefore, the HMSMT used the same data set that was used for its June 2018 analysis.

There was one observed DSBG interaction with a loggerhead turtle in August 2018. The interaction involved a turtle entangled in buoy gear and the animal was released unharmed. To date, this represents the only observed sea turtle interaction with this gear. Due to small sample-size biases (Carretta and Moore 2014), it is important to note that a single interaction cannot be used to predict the future endangered species impacts of a fully-authorized DSBG fishery.

Table 1. EFP Catch, CPUE, and Expanded Potential Annual Catch for Alternative Numbers of DSBG Permits.

	Swordfish	Bigeye Thresher Shark	Blue Shark	Shortfin Mako Shark	Pelagic Thresher Shark	Opah	Escolar	Yelloweye Rockfish	Giant Squid	Northern Elephant Seal	Unid. Misc
Total Caught	1171	161	9	1	1	3	10	1	1	1	1
757 Total Days Fished											
Catch per Day	1.547	0.213	0.012	0.001	0.001	0.004	0.013	0.001	0.001	0.001	0.001
45 Days per Year per Vessel											
Annual Catch per Vessel	69.6	9.6	0.5	0.1	0.1	0.2	0.6	0.1	0.1	0.1	0.1
50 Vessel Annual Catch	3,481	479	27	3	3	9	30	3	3	3	3
100 Vessel Annual Catch	6,961	957	54	6	6	18	59	6	6	6	6
150 Vessel Annual Catch	10,442	1,436	80	9	9	27	89	9	9	9	9
200 Vessel Annual Catch	13,922	1,914	107	12	12	36	119	12	12	12	12
250 Vessel Annual Catch	17,403	2,393	134	15	15	45	149	15	15	15	15
300 Vessel Annual Catch	20,883	2,871	161	18	18	54	178	18	18	18	18
500 Vessel Annual Catch	34,805	4,785	268	30	30	89	297	30	30	30	30

In G.5.a Supplemental HMSMT Report 2 in June 2018, Table 1 provided the estimated total dressed weight of expected swordfish catch under the different LE permit numbers and indicated that under none of these permitting scenarios would projected catch from a stand-alone DSBG fishery exceed the harvestable swordfish surplus.

Using the same average weight per swordfish (133.4 lbs) from the PIER EFP logbook data as used in June 2018, Table 2 below provides these same estimates for the additional LE permit numbers specified in the Council's June motion. These estimates are likely to be high and thus conservative regarding the level of expected swordfish catch, as they do not consider local depletion effects which may limit CPUE with higher numbers of active permits. If DSBG effort were to be additional to current swordfish fishing effort, there would still be considerable swordfish surplus available for harvest.

Table 2. Potential swordfish catch (dressed weight) under different limited entry permit numbers

Number of Permits	Projected Number of Swordfish	Projected Volume (MT)	Projection Exceeds Surplus?	Projection + West Coast Average Exceed Surplus?
50	3,481	210.63	NO	NO
100	6,962	421.26	NO	NO
150	10,442	631.82	NO	NO
200	13,924	842.51	NO	NO
250	17,403	1,053.02	NO	NO
300	20,883	1,263.59	NO	NO
500	34,806	2,106.04	NO	NO

Economic Analyses

The HMSMT included an economic analysis of the potential impact of increased DSBG landings on the price of DSBG-caught swordfish in its June 2018 briefing book report (Agenda Item G.5.a, HMSMT Report 1). Additional data on DSBG productivity and prices received for DSBG-caught swordfish have been generated through subsequent EFP fishing activity. Given the limited amount of DSBG EFP data available to support the analysis in the June 2018 briefing book HMSMT report, updating the analysis to include subsequent data collection would ensure the results reflect the best available information. Contingent on data availability, the HMSMT plans to provide an updated version of the economic analysis, which reflects the additional data for the March 2019 Council briefing book.

Other Considerations

1) *Permit Structure*

At the beginning of the scoping process, the HMSMT had recommended to the Council that both SBG and LBG configurations be authorized simultaneously under a DSBG designation. At the time, it was unclear as to the timeline for both the authorization process and the rate at which EFPs would collect new data to inform that process. The HMSMT made its recommendations under the assumption that sufficient data would be collected from both SBG and LBG EFPs before the Council chose to authorize the gear. Since only 11 LBG permits have recently been issued, there are no data available for the HMSMT to use in analyses to inform the ROA.

At this time, the specified number of permits might all be analyzed as LBG to assess the potential effects of a fully authorized fishery. The HMSMT does not believe that all permit holders would fish LBG; thus the results of such an analysis could unnecessarily limit the number of permits that could be issued, and limit opportunity for both participants and for

the economic benefits of high quality, locally caught seafood in Southern California, and the offset of imports.

Therefore, the Council could consider the following example approaches:

1) Postpone final action until sufficient baseline LBG data can be collected from EFPs to use in analysis.
2) Specify a portion of the LE permits to be issued as LBG at a later date, with the rest issued as SBG configuration (e.g., a maximum of 300 LE permits issued, 50 of which would be authorized to use LBG).
3) Separate the authorization of the two gear configurations into separate actions should it determine that LE in the SCB is necessary. The first action (currently scheduled for March 2019) would create a LE permit for DSBG and determine the number of SBG endorsements on that permit. The second action, at a future time, would be to determine a number of LBG endorsements for the SCB, once sufficient data have been collected for LBG. Should it be necessary to reduce the number of SBG endorsements at that time, a trade-in option could be made available, where one or more SBG endorsements could be traded for a LBG endorsement.

2) *EPO/WCPO stock status*

At the September 2018 meeting, the Council asked the HMSMT to evaluate the stock structure between the EPO and WCPO stocks based on recent tagging data which indicates that the boundary as defined in the 2014 ISC assessment may not be as representative of stock location as previously thought. However, these data are temporally limited to a period of higher than average temperatures and may not accurately represent stock structure, but more a spatial shift due to environmental conditions. Since the EPO stock is subject to overfishing, the harvesting of this stock by West Coast vessels may add additional fishing pressure, but as with other HMS, the West Coast fleet's impact on the stock is minimal when compared to international effort. While the HMSMT recognizes that this could be a concern, the team does not feel that it is the proper entity to provide such an analysis or determination, nor is there sufficient data for the HMSMT to do so. The EPO stock assessment was not updated in 2018 as anticipated, and the HMSMT believes that the Council should wait until the update has been completed to further consider stock structure and the minor fishing pressure West Coast swordfish fisheries may contribute.

3) *Logbooks:*

Throughout the process of scoping and development of the ROA to authorize DSBG on the West Coast, the HMSMT has been aware that at some point there would be a need for a DSBG logbook in order to continue collecting important fishing information from both EFPs and an authorized fishery. PIER initially developed a logbook for its EFP participants, and NMFS modified a logbook for use by observers. The Eastern Pacific Highly Migratory Species Professional Specialty Group has developed an EFP DSBG logbook, which was distributed to standard buoy gear fishermen in September 2018 (Agenda Item J.4.a, Supplemental NMFS Report 1). The draft version of this logbook was

shared so that the HMSMT could provide feedback on the design and information captured. It is the HMSMT's understanding that there are some additional changes to the logbook that will be implemented in subsequent versions, but these are minor and do not affect the logbook's ability to collect needed data.

The HMSMT recommends the Council:

1) Adopt the revised Proposed Action.
2) Adopt the revised Purpose and Need.
3) Adopt the revised gear configuration definition.
4) Allow an individual to receive multiple DSBG permits if they qualify under more than one LE permit qualification criterion.
5) Specify that the order of LE permit issuance within a criteria tier be ranked based on total swordfish landings for that tier's gear type, giving higher priority to those with higher landings during the 2013/14 to 2017/18 period for DGN and harpoon, and up until a Council specified date for DSBG EFPs.
6) Refine the LE alternatives adopted in June 2018, to specify an alternative for issuing not more than 25 permits per year, not to exceed 300 total.
7) Select, as the Range of Alternatives for LE qualifying criteria, Alternative 1, option 1 (includes DGN permit trade-in qualifying tiers); Alternative 2, option 2; and Alternative 3, option 2.

PFMC
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