

## HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM REPORT ON HIGH SEAS SHALLOW-SET LONGLINE (SSLL) AMENDMENT

### Goals and Objectives of the Management Framework

The goal of this management framework is to provide high seas shallow-set longline (SSLL) fishing opportunity for historic and/or current west coast based fishermen who participated in fisheries targeting swordfish and landed in west coast ports. This may include west coast fishers who used SSLL gear prior to implementation of the HMS FMP and those using other gear types (such as drift gillnet) to target swordfish. This fishery should be managed by the Pacific Fishery Management Council (PFMC) under the Fishery Management Plan for U.S. West Coast Fisheries for Highly Migratory Species (HMS FMP) so that west coast fishermen have a forum to provide input on the design, development, and ongoing refinement of the management framework. However, recognizing the interconnections between any west coast fishery and the current Western Pacific Fishery Management Council (WPFMC) managed Hawaii-based SSLL fishery, the management framework should parallel as closely as possible the key elements and specific regulations applicable to the Hawaii fishery. These interconnections include not only fishers, but also the North Pacific swordfish stock being targeted and many of the same species affected by fishing. According to many stakeholders, an important reason for their support of the HMS FMP was the belief that it would result in a common set of management measures for fishers operating out of the west coast and Hawaii with regard to the SSLL fishery. Thus far, this has not born out; but any west coast management framework should strive to align regulations with those applicable to the Hawaii fishery, to the degree possible. This would ease compliance for anyone who might fish under both regimes.

The management framework for such a fishery must sufficiently minimize impacts to species protected by the Endangered Species Act (ESA), principally the take and mortality of sea turtles. A key issue in this regard is the ability to forecast and appropriately limit the amount of SSLL fishing effort to levels determined not to appreciably reduce the survival and recovery of (i.e., cause jeopardy to) ESA-listed loggerhead and leatherback turtles. Although effort controls could be imposed through seasons or overall limits on the amount of fishing (e.g., set or trip limits), such controls could promote economically inefficient behavior (e.g., derby-style fisheries) that can also complicate management and exacerbate conservation-related problems (due to the possible concentration of fishing effort in time and space when adverse environmental impacts are more likely, for example). Therefore, establishing a license limitation ("limited entry" or LE) program, where a fixed number of permits are distributed and any vessel engaged in the fishery must be registered to such a permit, has been suggested as a prerequisite for establishing a PFMC-managed west coast SSLL fishery. An LE program defines the universe of participants and facilitates the application of other conservation and management measures, such as additional effort limitations and protected species conservation measures.

### Background

Prior to implementation of the HMS FMP, a fleet of west coast-based shallow set longline vessels operated in the high seas outside of the U.S. EEZ, landing on average per year over 1,000 metric tons of swordfish to west coast processors and generating an ex-vessel revenue of approximately \$4.5 million per year for the period 1994 to 2003. The Pacific Council included this fishery as part of the HMS FMP; however, on February 4, 2004, NMFS informed the Council that it had approved the HMS FMP with the exception of the provision that would have allowed SSLL fishing by west-coast based vessels targeting swordfish east of 150° W longitude. The disapproval was based on NMFS' determination that the fishery would violate the ESA's jeopardy prohibition with respect to loggerheads.

The MSA requires NMFS, if an FMP is disapproved in part or in whole, to advise the Council of actions it can take to address the disapproved FMP provisions. In a letter dated March 31, 2004, NMFS indicated to the Council that alternative gear and bait options (circle hooks and mackerel bait) being tested in the U.S. Atlantic SSSL swordfish fishery had proven successful in significantly reducing sea turtle interactions and consequent injury to or mortality of sea turtles. NMFS advised the Council that possible use of the alternative gear and bait options by any future west coast-based SSSL fishery might provide the necessary conservation and management measures to prosecute a fishery without jeopardizing the continued existence of ESA listed sea turtles. Since that time, the alternate gear and bait options have also proven to be successful in the Hawaii-based SSSL swordfish fishery resulting in significant reductions in sea turtle interactions while maintaining an economically viable fishery.

Hawaii-permitted vessels currently may fish seaward of 200 nm and east of 150° W longitude and land on the west coast but they have not done so since 2004. Fishers report that the turtle take cap is a disincentive to doing so. They do not want to the risk having the fishery close when they're off the west coast because they've incurred considerable expense to get there and wouldn't be able to recoup it. Effort expansion of the Hawaii-permitted fleet is being considered by the WPFMC. If approved, Hawaii-permitted fishers may reconsider fishing and landing on the west coast because the risk of closure may be sufficiently diminished.

As a result of the successful gear innovations discussed above, NMFS recommended at the April 2007 meeting that the Council re-visit the disapproved portion of the HMS FMP. On September 11 2007, the Council directed the HMSMT to develop the following alternatives for public review to establish a west coast-based SSSL Fishery on the high seas:

1. Status quo – Shallow-set longline fishing seaward of 200 nm and east of 150° W longitude allowed by Hawaii-permitted vessels only; landings can occur on the west coast by Hawaii-permitted vessels.
2. Implement a west coast limited entry program for shallow-set longline fishery seaward of 200 nm.
3. Implement a west coast limited entry program for shallow-set longline fishery seaward of 200 nm; require a drift gillnet permit to participate.

The HMSMT met jointly with the HMS Advisory Subpanel (HMSAS) on November 15-16, 2007, at which time industry representatives recommended moving forward with the establishment of a small and tightly controlled longline fleet, suggesting 10 vessels as a tentative fleet size.

Based on input from the November joint meeting, the HMSMT met again on January 15-16, 2008, and developed the enclosed suite of draft alternatives. These alternatives will be further refined at the March 8-9, 2008, joint HMSMT-HMSAS meeting in Sacramento before being submitted to the Council on March 10 for consideration of adoption for public review. Once adopted, the alternatives are made available to the public for review and comment.

#### Draft Alternatives

##### **Status Quo Options**

1. **Status Quo:** SSSL prohibited west of 150° by FMP, prohibited east of 150° by ESA; can land, fish from west coast if possessing both a Pelagics LE permit and an HMS FMP permit.

2. **Full deferral to WPFMC:** SSSL removed as a legal gear from FMP and prohibited except if possessing a Pelagics LE permit (as under status quo, can land, fish from west coast with Pelagics LE permit). This would include amending the FMP and regulations to remove provisions related to SSSL fishing.

## Limited Entry Options

### *Options for Program Objective*

1. Transition willing drift gillnet (DGN) permit holders to shallow-set longline gear. Only those owning a valid California DGN permit qualify. Most, if not all those who fished under an Oregon Developmental Fisheries permit for the DGN fishery may qualify because they also hold a valid California DGN permit.
  - a. Focus on fishery participants adversely affected by the establishment of the Pacific Leatherback Conservation Area (preference given to permit holders with landings made prior to 2001-02 season).
  - b. Focus on current fishery participants (preference given to permit holders with landings made during 2002-03 season to present).

Because this objective is to encourage a transition of willing permit holders from DGN to SSSL gear, one of the following requirements would be applied: (1) surrender of DGN permit to obtain an HMS LE permit, (2) cannot fish both permits in any one year, or (3) combination (e.g., annual restriction for a few years, then surrender requirement kicks in), (4) other option based on industry input.

2. Recognize historic participation in the west coast based SSSL fishery, which operated during the period 1992-2003 before closing with implementation of the HMS FMP in 2004.

The treatment of those currently possessing a WPFMC Pelagics limited entry (Pelagics LE ) permit would need to be considered. Under current regulations Pelagics LE permit holders can fish SSSL out of the west coast if they want to, although no such landings have been made since 2004. Allowing someone with a Pelagics LE permit to obtain a new HMS LE permit could give someone who already has the opportunity to land SSSL swordfish on the west coast a second permit for that activity. On the other hand, many of the most active historic west coast participants already possess a Pelagics LE permit. Three options are considered for this issue:

- a. Allow Pelagics LE permit holders to qualify.
- b. Prohibit Pelagics LE permit holders from qualifying.
- c. Allow Pelagics LE permit holders to qualify but prohibit them from fishing the same permit in any one quarter or other yet to be determined time frame.

Options b and c could be hard to implement if there are many cases of partial ownership of Pelagics LE permits (through corporations, partnerships, and the like). Then additional complicated and difficult to enforce rules about partial ownership would have to be developed.

3. A combination of the first two objectives with both DGN permit holders and participants in the historic SSSL fishery qualifying.

Each of these objectives establishes an initial pool of qualifiers. Additional criteria or methods would be applied to match with a specified number of permits (see below).

#### *Options for Number of Permits Issued*

1. Small program: 1–25 permits issued
2. Intermediate program: 25–50 permits issued
3. Large program: >50 permits issued

The number of permits that would be issued for a limited entry program would primarily depend on estimated impacts to sea turtles, and secondarily to the available funding for at-sea observers. There is a tradeoff between the number of permits and the maximum amount of fishing effort that could be permitted under the ESA. Issuing a greater number of permits could require imposing an additional effort limit (e.g., maximum number of sets or hooks per year) to prevent jeopardy to sea turtles. As a result, there would be relatively fewer sets available per license holder (vessel). Since total fishing effort would be constrained to limit the takes of sea turtles, the number of vessels allowed to fish should be such that each vessel has enough fishing opportunity to make the activity economically viable. This calculation should be based on the minimum number of trips or sets per year per vessel that is economically viable. In addition, the cost of funding additional observer coverage is likely to be binding constraint that should be factored into the calculation. Given these potential ESA, observer, and fishery economic constraints, the large program (> 50 permits) and even the intermediate program (25-50 permits) may not be realistic options.

#### *Options for Additional Qualification Criteria*

##### **DGN Landings History**

- Landings history associated with the DGN permit would be used because permits have been registered to more than one vessel over time so permit ownership is easier to track.
- The window period for landings would be 1996–2006, which gives an equal number of years before and after 2001, when the Pacific Leatherback Conservation Area (PLCA) was implemented.
- Total landings of swordfish and thresher shark during the window period would constitute the DGN permit landings history.
- This landings history would be used to rank-order DGN permits. Depending on whether the program objective is to favor those adversely affected by the PLCA or recent participants, each year's landings during the window period could be weighted differently, giving greater weight to either earlier or later years. Once DGN permits are ranked, permits would be issued in rank order up to the total number of permits determined for the program.
- The new SSSL limited entry permit would be issued to the current DGN permit owner.
- A right of first refusal provision would allow issuance to skip over potential qualifiers who do not wish to receive the new SSSL limited entry permit. This could be an important factor if mandatory DGN permit surrender (or simultaneous use of both permits) was a feature of the program.

##### **Historic West Coast SSSL History**

- Landings history associated with the vessel that made the landings using SSSL gear from outside the EEZ would be the basis for the qualification since there is no single, stable permit covering all those who made such landings.

- The window period for such landings would be 1993–2003. The landings history would be based on total landings of swordfish during the window period. The beginning of this window period represents the inception of the Hawaii pelagics FMP limited entry program. The west coast fishery was closed in April 2004 so 2003 represents the last full year when landings could be made.
- Vessel landings history would be rank ordered to prioritize issuing permits up to the number of permits authorized under the program, as described above for DGN permits.
- The new SSSL limited entry permit would be issued to the current vessel owner.

### Combined History

If the objective is to consider both participants in the DGN fishery and those who historically participated in the west coast SSSL fishery, then landings history in both fisheries would be considered, recognizing that there may be individuals who have histories in both fisheries due to DGN permit and vessel ownership. For the DGN fishery some consideration would have to be given for latent permits; that is, permits that have been renewed but not fished. The simplest approach would be to use the landings histories as described above and:

- Compute a normalized landings history for each fishery. This is done by dividing the landings history for each DGN permit or vessel by the sum of all the landings history in the relevant fishery. In other words, we are simply computing what fraction of the total landings history is attributable to a given DGN permit or historic SSSL vessel. We will call this  $L_{DGN}$  or  $L_{SSLL}$ .
- Optionally, we could assign a weighting factor to each fishery-specific normalized landings history. We will call this  $W_{DGN}$  or  $W_{SSLL}$ .
- Each potential qualifying person is scored as  $(L_{SSLL} * W_{SSLL}) + (L_{DGN} * W_{DGN})$ . The scores are used to rank order potential qualifiers based on current ownership of the DGN permit and/or historic SSSL vessel.
- As described above, permits are issued up to whatever number of permits is determined for the program.

### Auction or Lottery

Another way of distributing LE permits once a pool of potential qualifiers (e.g., DGN permits, SSSL vessels, or both) is determined is by holding an auction or lottery. From an administrative standpoint this would be simpler because it is not necessary to develop any additional qualifying criteria to distribute permits, assuming that the number of permits available is less than the number of people interested in obtaining one. An auction or lottery could be appropriate in this situation because there is no existing fishery. Unlike a typical limited entry program where there is an active fleet and the program objective is to limit further growth or reduce fleet size, a SSSL LE program seems like it would be more “demand driven.” The HMSMT has found it difficult to determine how many people would be interested in obtaining an SSSL permit. Members of industry might be unsure as well because interest could be determined in part by the particular conditions that would be place on use of such permit. Since the pool of potential applicants is not clearly defined, an auction or lottery would be an easy way to distribute permits based on an applicant’s interest in obtaining a permit.

Auctions are usually unpopular with fishers because they give advantage to those with the deepest pockets instead of rewarding historical participation in a fishery. But from an economic perspective, an auction will distribute permits to those that value the fishing opportunity the most. Rather than rely on imperfect qualifying criteria to select who gets a permit, an auction allows fishers to in effect self-select

who participates. And by using broad qualifying criteria to control access to the auction, the Council could protect against the deep pocket problem.

A lottery is more neutral than an auction in the sense that it favors neither social objectives (e.g., historic participation) nor those with the financial resources to successfully bid in an auction. However, it means that permits could be a windfall to those that receive them but do not have the interest or means to use them (yet this is also a problem with allocating by qualifying criteria). They would be likely to sell the permits on, resulting in an outcome similar to an auction. This could be addressed by requiring lottery winners to give up the DGN permits in order to receive a SSSL permit. In addition, the Council could also target a set of individuals (e.g., DGN permit holders) using qualification criteria and a point system or other means to give better odds to the targeted individuals. For example, the number of entries in the lottery could be related to landings history.

### **Harvest of Non-Target Species**

To address potential resource concerns or fishery conflicts for species not designated and managed as protected species, additional management measures may need to be considered. These measures could address bycatch of non-targeted species or undesirable targeting on species other than swordfish, if the need arises. This may include, but is not limited to, striped marlin, and commercially important tuna species that are part of RFMO conservation measures and/or have over-exploitation concerns.

### **Protected Species Mitigation Measures**

#### *Gear Requirements*

The SSSL fishery would be subject to the same gear restrictions applicable to the Hawaii fishery, including the use of circle hooks and mackerel-type bait. As much as possible gear-related regulations would be harmonized with the Hawaii regulations to ease compliance and minimize impacts to protected sea turtles.

#### *Observer Coverage Requirements*

Any future west coast-based SSSL fishery would almost certainly be required to have 100 percent observer coverage given protected species interactions. Unlike Hawaii, which has a substantial and permanent longline observer budget in excess of four million dollars per year, no permanent observer budget currently exists for west coast-based longline trips. Limited funds, allocated on an annual basis through National Observer Program competitive review of proposals, have sustained observer coverage for the west coast-based deep-set longline (DSSL) fishery to this point. Additional funds will need to be secured to cover any future west coast-based SSSL fishery. The availability of funds will most likely act as a constraining factor, in conjunction with any ESA-related effort limitations, on the annual number of trips that can be prosecuted in this fishery.

#### *Sea Turtle Take Caps*

Establish take caps for loggerhead and leatherback sea turtles, similar to the caps currently in place for the Hawaii fishery. The HMSMT is not recommending take caps for other protected species at this time, based on the scope of the proposed action area and the assumed species interactions, but a final decision will hinge on the level of modification to the draft alternatives. The Council could recommend specific take caps as part of their preferred alternative, based on preliminary estimates of take provided by NMFS Protected Resources Division or use the numbers in the incidental take statement that would be part of the Biological opinion produced as part of the formal section 7 consultation process.

Guidance has been provided on the level of takes that would likely be allowed (i.e., determined not to cause jeopardy). In the February 4, 2004, letter partially approving the HMS FMP, Rodney McInnis noted the results of those studies and the pending regulatory amendment opening the Hawaii fishery and stated:

I recommend that the Council direct its management team to review this information and to begin developing and analyzing alternative sets of comparable conservation measures under which a longline fishery off the west coast might be able to target swordfish with low levels of marine turtle takes. This could include consideration of limited longline fishing for swordfish with effort limits, gear and bait requirements, time/area limits, turtle take limits, or other measures **that would limit sea turtle mortality to low levels approximating those that had previously been found in the drift gillnet fishery not to result in jeopardy to any listed sea turtles.** (Emphasis added)

The current ITS for the DGN fishery is annually 3 takes with 2 mortalities for leatherbacks, 5 takes with 2 mortalities for loggerhead, and 4 takes with 1 mortality for olive ridley and green turtles during certain oceanographic conditions. This provides some broad guidance on the level of sea turtle takes that would be determined not to cause jeopardy. However, there have been various developments—in terms of knowledge about the behavior, distribution, and status of sea turtle stocks—since 2004. Therefore, consultation with NMFS PRD on any likely jeopardy thresholds will be important in fully developing the alternatives and choosing a preferred alternative.

#### *Effort Limit*

The Council should consider a precautionary overall effort limit for the fishery. The purpose of such an effort limit would be to prevent rapid expansion of the fishery due to technological change and/or capacity increases. For example, some fishers have talked about switching from a fresh fish / ice fishery to equipping their vessels with blast freeze capability. This can significantly increase the duration of trips and thus also vessel range. An effort limit might prove helpful in regards to constraints on the days at sea any one vessel could operate with an observer onboard.

#### *Area Closures*

The following area closure options have been identified based in part on historic protected species interactions with SSSL fisheries and as well as the economic constraints of delivering fresh product to market.

Prohibit the fishery from operating on the high seas west of:

- a. 140° W longitude
- b. 145° W longitude
- c. 150° W longitude
- d. No area restriction

Analyses developed in conjunction with the HMS FMP suggested that loggerhead incidental takes were lower the farther east fishing occurred. At the time of FMP development NMFS recommended restricting SSSL east of 140° W longitude. This range covers the closure line proposed by the Council (150° W longitude) and the one recommended by NMFS. Figure 1 shows the location of these closure lines in relation to historical west coast SSSL fishing.

### *Seasonal Restrictions*

The following seasonal closure options have been identified based in part on historic SSLL interactions with protected species and on target swordfish availability tied to market constraints:

- a. Close 2<sup>nd</sup> – 3<sup>rd</sup> quarter
- b. Close 1<sup>st</sup> – 2<sup>nd</sup> quarter
- c. No season closure

The 2nd and 3rd quarters historically comprised a period when little SSLL fishing occurred from the west coast. Closing that time period could concentrate fishing in a time period with higher swordfish CPUE while lessening effects on other species. The first half of the year (1st and 2nd quarters) is also a time period when less SSLL fishing occurred out of the west coast.

### *Participate in the PIFSC Turtle Watch Program*

The HMSMT heard a presentation on the NMFS Pacific Island Science Center's (PIFSC) Turtle Watch Program at its January 15–16, 2008, meeting. Based on information from the Hawaii fishery and satellite tagging of loggerhead sea turtles, scientists have identified a band of sea surface temperatures where they believe loggerhead sea turtles are more likely to occur. They have been providing real time plots of this temperature band to Hawaii SSLL fishers to give them the opportunity of avoiding these areas and thereby reducing sea turtle takes. However, currently they are not providing plots for the area east of 150° W longitude, where a west coast fishery would likely operate. Furthermore, the HMSMT received additional information at their meeting that the temperature band that seems to work in the central Pacific around Hawaii may not work further east where the California Current affects oceanographic conditions. The Council, NMFS Southwest Region and Southwest Fisheries Science Center would work with PIFSC to extend the Turtle Watch Program to the areas where a west coast SSLL fishery would occur, taking into account information on the relationship between sea surface temperature and sea turtle occurrence in the area.

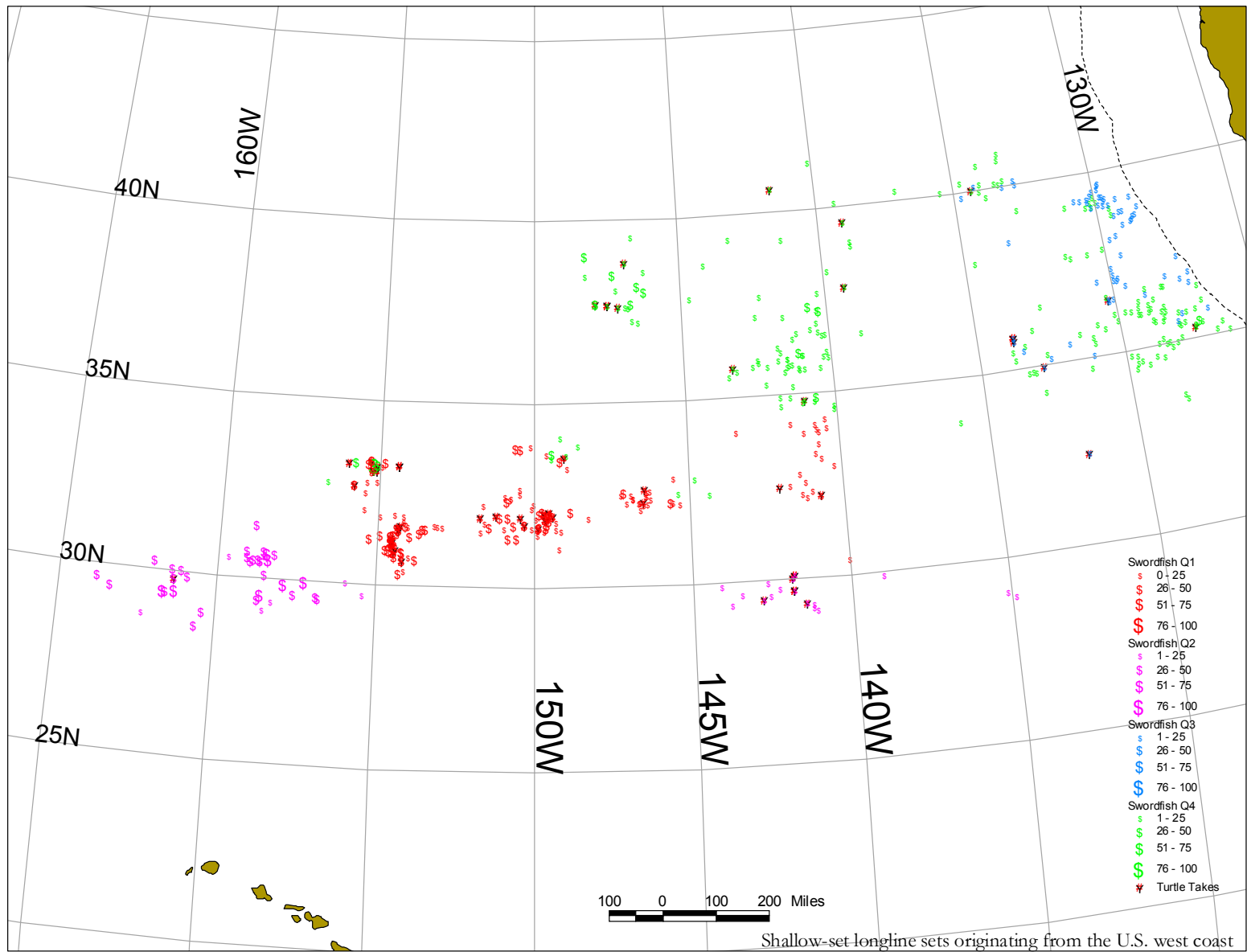


Figure 1. Observed shallow-set longline sets originating from the west coast, 2002-04.

**Attachment 1: Preliminary estimates of loggerhead and leatherback sea turtle takes in a high seas SLL fishery**

Scenario A

One million hooks, all set east of 150.

Quarter		Effort (hooks)	CC* CPUE	Adjusted CPUE	Est takes	DC* CPUE	Adjusted CPUE	Est takes
1st	n=320	208,211	0.25556	0.025556	5.32	0	0	0.00
2nd	n=61	49,853	0.24264	0.024264	1.21	0.04044	0.006066	0.30
3rd	n=100	187,683	0.11596	0.011596	2.18	0	0	0.00
4th	n=376	554,252	0.06096	0.006096	3.38	0.05379	0.008069	4.47
					<b>12.09</b>			<b>4.77</b>

**Mortalities**

17%	<b>2.06</b>	13.00%	<b>0.62</b>
9.30%	<b>1.12</b>	22.50%	<b>1.07</b>
20.50%	<b>2.48</b>		

East of 145

Quarter		Effort (hooks)	CC CPUE	Adjusted CPUE	Est takes	DC CPUE	Adjusted CPUE	Est takes
1st	n=320	208,211	0.24577	0.024577	5.12	0	0	
2nd	n=61	49,853	0.29422	0.029422	1.47	0	0	
3rd	n=100	187,683	0.11596	0.011596	2.18	0	0	
4th	n=376	554,252	0.0304	0.00304	1.68	0.05646	0.008469	4.69
					<b>10.45</b>			<b>4.69</b>

**Mortalities**

17%	<b>1.78</b>	13.00%	<b>0.61</b>
9.30%	<b>0.97</b>	22.50%	<b>1.06</b>
20.50%	<b>2.14</b>		

East of 140

Quarter		Effort (hooks)	CC CPUE	Adjusted CPUE	Est takes	DC CPUE	Adjusted CPUE	Est takes
1st	n=320	208,211	0.15114	0.015114	3.15	0	0	
2nd	n=61	49,853	0	0	0.00	0	0	
3rd	n=100	187,683	0.11596	0.011596	2.18	0	0	
4th	n=376	554,252	0.02652	0.002652	1.47	0.0464	0.00696	3.86
					<b>6.79</b>			<b>3.86</b>

**Mortalities**

17%	<b>1.15</b>	13.00%	<b>0.50</b>
9.30%	<b>0.63</b>	22.50%	<b>0.87</b>
20.50%	<b>1.39</b>		

\* CC = loggerhead; DC = leatherback

Scenario B

One million hooks, all set east of 150.

Quarter		Effort (hooks)	CC* CPUE	Adjusted CPUE	Est takes	DC* CPUE	Adjusted CPUE	Est takes
1st	n=320	322,511	0.25556	0.025556	8.24	0	0	0.00
2nd	n=61	121,212	0.24264	0.024264	2.94	0.04044	0.006066	0.74
3rd	n=100	138,528	0.11596	0.011596	1.61	0	0	0.00
4th	n=376	417,749	0.06096	0.006096	2.55	0.05379	0.008069	3.37
					<b>15.34</b>			<b>4.11</b>

**Mortalities**

17%	<b>2.59</b>	13.00%	<b>0.53</b>
9.30%	<b>1.42</b>	22.50%	<b>0.92</b>
20.50%	<b>3.12</b>		

East of 145

Quarter		Effort (hooks)	CC CPUE	Adjusted CPUE	Est takes	DC CPUE	Adjusted CPUE	Est takes
1st	n=320	322,511	0.24577	0.024577	7.93	0	0	
2nd	n=61	121,212	0.29422	0.029422	3.57	0	0	
3rd	n=100	138,528	0.11596	0.011596	1.61	0	0	
4th	n=376	417,749	0.0304	0.00304	1.27	0.05646	0.008469	3.54
					<b>14.37</b>			<b>3.54</b>

**Mortalities**

17%	<b>2.44</b>	13.00%	<b>0.46</b>
9.30%	<b>1.34</b>	22.50%	<b>0.80</b>
20.50%	<b>2.95</b>		

East of 140

Quarter		Effort (hooks)	CC CPUE	Adjusted CPUE	Est takes	DC CPUE	Adjusted CPUE	Est takes
1st	n=320	322,511	0.15114	0.015114	4.87	0	0	
2nd	n=61	121,212	0	0	0.00	0	0	
3rd	n=100	138,528	0.11596	0.011596	1.61	0	0	
4th	n=376	417,749	0.02652	0.002652	1.11	0.0464	0.00696	2.91
					<b>7.59</b>			<b>2.91</b>

**Mortalities**

17%	<b>1.29</b>	13.00%	<b>0.38</b>
9.30%	<b>0.71</b>	22.50%	<b>0.65</b>
20.50%	<b>1.56</b>		

\* CC = loggerhead; DC = leatherback

## Assumptions

- Ran numbers under scenario A and B
- Used the level of effort used in the 2004 biological opinion, one million hooks.
- Used the most recent CPUEs developed by Jim Carretta, based upon HI and CA based SSLL observer records
- Adjusted CPUE rates consistent with HI SSLL reductions, i.e., 90% reduction in loggerhead takes, 85% reduction in leatherback takes
- Post hooking mortality rates are currently being debated and all are included. Some recent papers suggest that rates may be as low as 9.5%. The SSLL EFP BO used 0.17 for loggerheads and 0.13 for leatherbacks, consistent with calculations used in the Atlantic HMS BiOp (2004), based on NED
- A recent review of post-hooking mortality in the HI SSLL suggests 20.5% for loggerhead, 22.3% for leatherbacks.

Scenario A: seasonal effort distribution east of 150° W

Scenario A calculates seasonal distribution by quarter corresponding to all fishing occurring east of 150° W, essentially the 2004 proposed action

Quarter	% of effort	Hooks
1st	0.21	208,211
2nd	0.05	49,853
3rd	0.19	187,683
4th	0.55	554,252
Total	1.00	1,000,000

Scenario B: east and west of 150° W

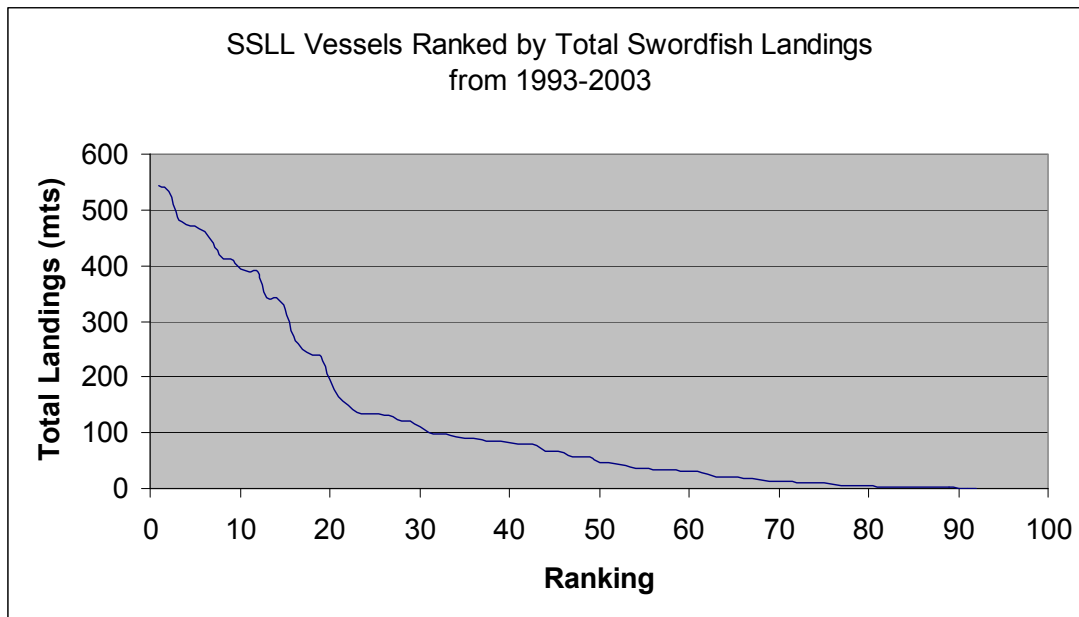
Scenario B assumes seasonal distribution of effort by quarter corresponds to distribution across entire area, historical fishery effort,

Quarter	% of effort	Hooks
1st	0.32	322,511
2nd	0.12	121,212
3rd	0.14	138,528
4th	0.42	417,749
Total	1.00	1,000,000

**Attachment 2: Number of vessels with landings of swordfish (mt) that fished with SLL from the west coast, 1993-2003, categorized by amount.**

- (1) Includes all PacFIN records with longline landings of swordfish from 1993-2003.
- (2) Landed weight is converted to round weight through multiplying by the conversion factor on each fish ticket then dividing by 2204.6.
- (3) Includes all swordfish landings per vessel without regard to gear or location where it was caught.

Cutoff (mt), landings ≥	Number of Vessels
450	5
425	7
400	10
375	10
350	12
325	13
300	13
275	14
250	17
225	17
200	18
175	20
150	25
125	28
100	41
75	47
50	60
25	90



**Attachment 3: landings of swordfish and thresher shark (mt), 1996-2006, by DGN permittees.**

Cutoff (mt), landings $\geq$	No. of Permittees
25	84
50	35
75	24
100	18
125	6
150	5
175	5

