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U.S. WEST COAST HIGHLY MIGRATORY SPECIES FISHERY MANAGEMENT PLAN

PART B

INITIAL REGULATORY MEASURES

Pacific Fishery Management Council

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Part B
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1.0 INITIAL REGULATORY MEASURES

1.1 Introduction

This section of the FMP identifies and analyzes options for the initial regulatory measures that will be implemented when the FMP is approved. This has grown out of the immediate need to manage HMS fisheries in compliance with the Magnuson-Stevens Act and other applicable law against a background of continually changing provisions affecting the fisheries on the west coast that have been beyond the control of the Pacific Council. The species managed by this FMP are highly migratory and fall under multiple jurisdictions, and the fleets that pursue them are under the control of multiple jurisdictions as well. For example, longline vessels in the central and western Pacific with limited entry permits issued in Hawaii are under rigorous restrictions because specific fishing techniques are likely to have a significant effect on endangered or threatened turtles and seabirds. Longline vessels managed under the jurisdiction of this FMP fishing in the western Pacific must operate under the same restrictions as longline vessels fishing under the western Pacific Fishery Management Plan in Hawaii, and vessels fishing in the eastern Pacific out of west coast ports must not produce similar negative impacts in the eastern Pacific as has occurred in the western Pacific. Similarly, the impacts of drift gillnet gear on turtles and marine mammals in the eastern Pacific have resulted in regulations implemented under the authority of the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). The public needs to be informed of these regulations and why they have been implemented, and options are presented by which the drift gilnet could be managed under the authority of the Magnuson-Stevens Act. With a permit system for identifying the vessels participating in the various fisheries and some other provisions, Part B would establishe, based on the options chosen by the Council, the initial regulatory measures needed upon approval of the FMP.

1.2 Permits

Various permits and licenses are already required in California, Oregon, and Washington for commercial fishing and recreational fishing. State laws regarding this subject can be found in Appendix B of Part A of the FMP. Requiring a Federal permit of some kind was examined as a way of identifying individuals involved in HMS fisheries. The HMS fisheries are diverse with highly variable participation (Part A, Section 2.3.1). A Federal permit of some kind would establish the groundwork for monitoring the fishery, communicating with the constituents, and evaluating the potential need for management changes to respond to new problems or opportunities.

1.2.1 Commercial Options

Option 1-Commercial Fishing Permit

Require a federal permit for all vessels engaged in commercial HMS fisheries within and outside the EEZ. One permit would cover all HMS fisheries for a given vessel.

Option 2 (Team preferred option)-Commercial Permit with Gear Endorsement

Require a federal permit for all vessels engaged in commercial HMS fisheries within and outside the EEZ with endorsements for individual fisheries.

Option 3 - Commercial Permit for Selected Fisheries

Require a federal permit for all vessels engaged in selected fisheries. Initial candidates for permits would be vessels engaged in drift gillnet and longline fisheries.

Analysis

Virtually all commercial fisheries covered by FMPs under the Magnuson-Stevens Act are subject to permit requirements. A Federal permit for commercial HMS fisheries would provide a unified data base containing all the HMS commercial vessels, which in turn facilitates monitoring of the fisheries, research on the fisheries, and design of appropriate conservation and management measures through improved sampling, because the population is identified clearly from which the sample is taken. A permit increases compliance and allows better communication with the industry. Identifying participants allows better assessment of the changes in net national benefits, profitability, employment, incomes, and distributive effects of actions and alternatives.

A Federal permit for commercial HMS fisheries with endorsements for individual fisheries would specify which fisheries in which each vessel is engaged. The benefits of this option would be the same as option 1 except that the data base would be better defined by knowing the participants in each fishery.

A federal permit for selected fisheries would allow an initial focus on high priority fisheries without burdening all fishery participants with the need to obtain permits.

The administrative costs of implementing the first two options are virtually the same, although option 2 would be a much more effective and efficient way of achieving the purposes of implementing a permit system. Option 3 would have slightly less administrative costs. Under the Magnuson-Stevens Act, a fee equal to the cost of issuing a permit may be charged. The administrative cost would probably be less than $30.00 per permit for a total cost of approximately $30,420 for options I and 2 (Part A, table 2-65) and about $4,500 for option 3, based on the number of vessels in different commercial fisheries landing at Pacific coast ports (Part A. table 2-67). The per permit cost estimate is based on administrative costs calculated for this FMP and the costs associated with tissuing High Seas Fishing Compliance Act permits and coastal pelagic species limited entry permits. In this circumstance, however, there would be no qualifying criteria and permit issuance is essentially a simple administrative function; therefore, no time needs to be allocated to evaluate whether or not a vessel should be issued a permit. Although many vessels may already have one or more permits and may be readily identified in existing data bases, the actual cost to issue the permits would be approximately the same.

1.2.2 Recreational Options

Option I (Team preferred option)-Federal Recreational Permit.

Require a Federal permit for all recreational vessels to fish for HMS within and outside the EEZ.

Option 2 - Federal Recreational Permit for Charter Vessels Only

Require a Federal permit for all vessels~that carry recreational fishing participants for a fee.

Option 3-Federal/State Recreational Permit

Require a Federal or state permit for all recreational vessels to fish for HMS. An existing state permit or license for recreational vessels could meet this requirement. Federal permits would only be required for those that do not have a state permit program.

Analysis

A Federal license for all vessels used to fish recreationally for HMS would provide a unified data base containing the names of all HMS angling vessel owners, which would facilitate monitoring of the fishery, research, and design of appropriate conservation and management measures through improved sampling, because the population is known from which any sample is taken. A permit would increase compliance and foster better communication with the fishery participants. knowledge of who the participants are allows better

assessment of the changes in net national benefits, profitability, employment, incomes and distributive effects of actions and alternatives. In short, policy formation and research can be enhanced with a sound knowledge of the participants. A Federal permit program for recreational vessels is likely to cost approximately $30.00 per permit for the reasons stated above. A system to notify the potential applicants would be necessary, and a system of distinguishing other recreational fishing from HMS recreational fishing would be needed. HMS anglers could complain that they are subjected to greater permit burdens than other anglers pursuing other species. The charter/party boat fleet consists of approximately 300 vessels (Part A, Section 2.2.8.1). The estimated number of private boats in southern California fishing large pelagic fish is 4,000 to 6,000 (Part A, Section 2.2.8.2). Thus the total cost would be about $120,000 to $180,000 for each period for which permits would be issued. Recreational permits would not have the same degree of compliance benefit as commercial permits.

Limiting Federal permit requirements to charter vessels would greatly reduce the overall burden (about $9,000 for 300 vessels). It would not be necessary to enforce a recreational permit across the whole range of HMS fishermen. However, there would not be a "universe" of interested vessel owners who NMFS and the Council could approach for information about the effects and effectiveness of management, and NMFS would not be as assured of being able to identify participants to query about catch and effort or expenditures in the fishery as under option 1. The ability to perform sound research and economic analysis of the recreational fisheries would be reduced somewhat or would become more expensive as different sampling designs would be needed to identify recreational fishers within a survey or study program rather than have them identified through the permit requirement. This would to a degree duplicate state systems that require charter vessels to be licensed but the degree of duplication is not known. There may be some charter vessels that do not at any time pursue HMS.

A system requiring Federal permits for all HMS fishing vessels but allowing the Federal requirement to be met by state licenses or permits could provide the full universe of recreational vessels but reduce duplication or facilitate the permitting program by using existing state licensing procedures. For example, it might be reasonable to use state fishing license sales outlets as a mechanism for issuance of HMS fishing vessel permits or annual vessel registration renewals. This would reduce the overall burden and might reduce the cost of administration of the permit system. The administrative cost would likely be lower than option 1 but greater than option 2. It also might have greater public acceptance, as most anglers already accept permit requirements at the state level. The states would have to find some way to distinguish HMS recreational fishing from other recreational fishing. This is done for salmon so may not be a major problem.

1.3.Far Offshore Fisheries Declarations

All three states have far offshore fishery regulations that require fishermen to declare when they plan to fish on the high seas. These fishermen are then allowed to fish outside the EEZ, but cannot fish inside the EEZ during the same trip. Oregon and Washington have exceptions for albacore troll vessels, but California does not.

Option 1- No Action

This option would let the states continue requiring far offshore fishery declarations.

Option 2 - Explicitly Indicate that Far Offshore Fishery Declarations are Not Required

This option would recognize the importance of the ability of fishermen to fish inside and outside the EEZ on the same trip.

Option 3 - Explicitly Exempt Trollers from California Declaration Requirement

This option would provide to troll vessels the same exemption from the offshore declaration requirement as is available in Washington and Oregon.

Analysis

The various states implemented requirements for far offshore fishery declarations as a way to track fishing location in an efficient manner from an enforcement point of view. However, the effectiveness of this requirement is not known and the justification is not clear. A blanket provision to prevent fishermen from fishing inside and outside the EEZ on the same trip imposes an inefficiency that may not be justified on biological or ecological grounds. The inability to move into and out of the EEZ during a trip when the fish are migrating near the edge of the EEZ could mean a significant decrease in the ability to catch the fish when they are available or a substantial increase in the costs of fishing due to the need to make a port call before resuming fishing in the EEZ after being outside the EEZ. It is not clear that there are substantial gains in fishery monitoring or enforcement and compliance from the offshore declaration requirement.

Eliminating the offshore declaration for all vessels would remove the inefficiency but could somewhat reduce the ability to monitor the fleets' movements, although little such monitoring appears necessary in most cases. Providing an explicit exemption for California trollers (as Washington and Oregon do) would greatly simplify matters for those vessels with little apparent risk of management problems due to lack of the declarations.

1.4 Commercial Fishery Management Measures

This section will discuss the alternative fishery management measures that the Council is considering for proposals for immediate implementation in selected fisheries as the Framework FMP is approved and implemented. It presumes that the Council agrees that drift gillnets and longlines are legal commercial gear under the FMP. Therefore, the options are oriented to (1) the process by which management measures should be implemented and (2) the specific measures to be implemented.

1.4.1 Drift Gillnet Fishery

The history of the drift gillnet fishery and the description of the gear is contained in Section 2.2.4.1. Three general fishing areas for swordfish are identified along the California coast, which are segregated by latitude and occupy areas of similar bottom depths. The southern area is centered off San Diego and is characterized by relatively shallow water in depths of less than 1,000 fathoms. This area is within the Southern California Bight and fairly close to the coast. The central area off San Francisco is in deep waters in depths of 1,500 to 2,000 fathoms, with a more northern area off the California/Oregon border in depths of 1,600 fathoms. The effects of cyclic warming and cooling periods have an important effect on swordfish catch distribution. During El Niño periods, swordfish are captured farther north than during colder La Niña periods. For example, during the 1995 La Niña, no catches of swordfish were observed north of Cape Mendocino at 41° N. latitude. The moderately strong El Niño of 1992 resulted in catches as far north as 46° N latitude.

Effort is initially concentrated in the southern portion of the fishing grounds, expanding to its full range by October before retreating back to the south because of the dissipation of oceanographic water temperature breaks caused by storm systems moving down from the north. The highest catch of swordfish occurs 15 to 150 kilometers off the California coast. Fishing effort within 15 kilometers of the coast or near the Channel Islands usually targets pelagic sharks. In higher latitudes, swordfish catch and effort tend to be farther offshore.

Drift gillnet landings for swordfish, common thresher shark, and mako shark vary from season to season. Swordfish comprise the majority of the catch in the fishery and demand the highest price per pound. In the past five years, drift gillnet landings of swordfish have ranged from 684 to 880 metric tons, at an average of 703 metric tons (mt) per year. Landings of common thresher shark have averaged 218 mt, while mako shark have averaged 78 mt. While swordfish, common thresher shark, and mako shark annually represent over 90 percent of the total landings by the California drift gillnet fishery, other species commonly sold include opah, bigeye thresher shark, louvar, and tunas (Hanan *et al.*, 1993). Over the past five years, the drift gillnet fishery has averaged $4.2 million in ex-vessel gross revenues from landings of swordfish, common thresher shark and mako shark (excluding the other species). The fishery accounts for about 10 percent of the total swordfish

landings in the United States by domestic vessels. About half of the swordfish landed commercially in California ports are landed by drift gillnet vessels (average landings for 1995-1999). Longline and harpoon vessels land a smaller percentage of the total swordfish landed in California ports, 42 and 6 percent, respectively (PFMC 2001). The number of longline vessels making swordfish landings in California has increased significantly in the past two years. The exvessel revenue of drift gillnet landings in Oregon has averaged about $111,000 in recent years.

1.4.1.1 Need for Management

The drift gillnet fishery is currently managed through a variety of state and federal regulations under state law, the Marine Mammal Protection Act (MMPA) and the Endangered Species Act (ESA). In general, the state regulations are intended to manage the fishery itself for optimum economic benefits while the MMPA and ESA regulations are intended to impose limits necessary to reduce marine mammal takes and to protect listed sea turtles respectively. There is no question about whether the fishery needs to be managed for these varied purposes but there are questions about how best to achieve management goals.

1.4.1.2. Options for Management Authority

Option I - Retain Regulations under Current Authorities

Under this option, Federal regulations (see section)would remain in place and future regulations would be issued under the MMPA and ESA, while state regulations (see section) would remain in place and future state regulations would be issued under state authority.

Option 2 - Incorporate Existing Federal Regulations into FMP under Magnuson-Stevens Act Authority

Under this option, Federal regulations governing the drift gillnet fishery under the MMPA and ESA would remain in effect but the authority for those regulations would be shifted to 50 CFR part 660, where other Federal Magnuson-Stevens Act regulations governing West Coast fisheries are found. Future changes in these regulations would be made under the Council FMP process.

Option 3 - Incorporate Existing Federal Regulations into FMP and Federalize Selected State Regulations

Under this option, the Federal MMPA and ESA regulations would be incorporated into 50 CFR part 660 as above, but selected state regulations or regulatory proposals also would be incorporated into the regulations implementing the FMP. There are several suboptions in this case, which are not necessarily exclusive of each other, as follows:

a) Incorporate the California limited entry program - In this instance, persons holding California drift gillnet permits would be permitted to obtain Federal limited entry permits to participate in the drift gillnet fishery under the FMP regulations.

b) Incorporate state regulations control the conduct of the fishery - There are a number of state restrictions that govern mesh size, time/area closures, net length, and other fishing gear or practices. These would explicitly be included in the measures implemented under the FMP.

c) Implement additional area closures off Oregon and Washington - In this instance, additional closures could be implemented under the FMP. For example, waters within 75 miles of the Oregon shoreline are closed from May I through August 14 and waters less than 1000 fm (approximately 125° 10' to 125° 30' W) are closed year-round. The closure from May through mid August is intended to discourage targeting on thresher sharks, which are found off Oregon earlier in the year than swordfish. Waters north of 45° N. latitude also could be closed to drift gillnet fishing.

Analysis

These options are essentially administrative in nature. They do not affect the substance of the management measures in place but they do affect the manner in which the measures are developed, implemented and evaluated for future changes. The impact on fish stocks and on incidentally taken non-fish species generally is minimal as the fisheries will continue under regulations in all cases. There are no substantial costs imposed on industry in terms of reduced effort and catches, higher fishing costs, or other factors.

There should be administrative benefits from incorporating the variety of Federal regulations into a single part of the Code of Federal Regulations and from using the established Council process to monitor the fishery, develop and implement management measures, and assess the fishery and the effectiveness of the FMP in meeting overall objectives. The Council process is open and deliberative and the incorporation of the MMPA and ESA regulations into the FMP would be consistent with the Magnuson-Stevens Act mandate that fishery management be consistent with that Act "and other applicable law." The Highly Migratory Species Advisory Subpanel has membership including the groups that have a direct interest in the fishery. The framework process of the FMP would provide a vehicle for reasonably quick adjustments to new information or conditions and would probably be faster than using regulatory procedures under the MMPA or ESA; although all the same types of evaluations presumably would be needed in any event, the Council process is geared to continuing management analysis while the other Federal statutes are not. Fishermen should benefit by knowing that all the regulations would emanate from one process and not two or three, especially if state regulations were generally incorporated into the FMP management program.

On the other hand, there is nothing inherently inappropriate about the use of two or three different regulatory authorities to carry out management of the fishery to meet different objectives. Some participants in existing regulatory processes would possibly be uncomfortable, at least initially, in learning how best to collaborate in a new regulatory process.

1.4.1.3 Options for Management Measures

To authorize issuance of permits that allow the incidental take of marine mammals by the drift gillnet fishery off the Pacific coast, NMFS completed a section 7 consultation under the authority of the Endangered Species Act. During that consultation, NMFS concluded that the fishery would likely jeopardize the continued existence of leatherback and loggerhead sea turtles and developed a reasonable and prudent alternative to avoid the likelihood of jeopardy to the continued existence of these species. On August 24, 2001 (66 FR 44549), NMFS published an interim final rule that implemented measures determined to be at least as effective as the reasonable and prudent alternative with regard to protecting leatherback turtles while minimizing economic and environmental impacts. The measure necessary to address the incidental take of loggerhead sea turtles will be implemented in a subsequent rulemaking, but the issues and measures needed to protect loggerhead turtles are discussed below.

When this FMP is implemented, the drift gillnet fishery may be managed under the authority of the Magnuson-Stevens Act. Regulations governing this fishery at 50 Code of Federal Regulations (CFR) part 223 and 224 will be redesignated to the appropriate part of the CFR implementing the FMP. The purpose of this section is to inform the public of the actions that have been necessary to manage the fishery, which will become part of the implementing rule, and to form a foundation for actions that might be necessary by the Pacific Council in the future.

The alternatives presented in this section were offered for public review in the environmental Assessment for the August 24, 2001, rules and will not be decided by the Council. The third alternative, the measure developed by the Take Reduction Team (TRT) and modified by NMFS constitutes the "no action" alternative in section 1.4.1.2, that is, Retain Regulations under Current Authorities.

1.4.1.4 Gear and Other Restrictions

There are a number of state and federal restrictions currently in place that will continue to remain in effect. They are listed below with the reasons for their existence. The federal restrictions will be incorporated into the implementing rule under the FMP. State rules will remain in effect and will not be included in the implementing rule.

Federal Restrictions to Protect Marine Mammals and Sea Turtles

- Acoustic deterrent devices (pingers) are required on drift gillnets to deter entanglement of marine mammals.
- All nets must be fished at minimum depth below the surface of 6 fathoms (10.9 meters)
- Skipper workshops are required
- Observers are required.

State Restrictions for Administration of the Fishery and Prevention of Fishing Conflicts

- The State of California has implemented a limited entry program for the drift gillnet fishery.
- The State of California restricts the length of a net to 6,000 feet measured at the float line, and prohibits the use of quick disconnect devices to attach net panels. Drift gillnets must be at least 14 inch stretch mesh. The unattached portion of a net must be marked by a pole with a radar reflector.
- The State of California fishery is closed from February 1 to April 30, and from December 15 through January 31, in ocean waters within 25 nm of the mainland coastline. The fishery is closed within 75 nm miles from the mainland coastline from the Oregon border to the Mexican border from May 1 to August 14.
- The State of Oregon has a limited entry fishery.
- Nets in the Oregon fishery must conform to California regulations.
- Nets cannot be used in waters less than 1,000 fathoms

The fishery is closed off Oregon within 75 nm miles from the mainland coastline from May 1 to August 14 (the same as California).

1.4.1.5 Alternatives Reviewed in the NMFS Environmental Assessment

On February 16, 2000, NMFS reinitiated formal section 7 consultation under the authority of the ESA on the California/Oregon drift gillnet fishery. Reinitiation was required because the incidental take of loggerhead sea turtles anticipated in 1997 had been exceeded, and 1999 observer data indicated that three listed sea turtle species previously thought unaffected by the fishery, had interacted with the fishery. A biological opinion was issued on October 23, 2000. The conclusions of the opinion were:

1. The fishery is not likely to jeopardize the continued existence of fin whales, sperm whales, humpback whales, and Steller's sea lion;
2. The fishery is not likely to jeopardize the continued existence of olive ridley and green sea turtles;
3. The fishery is likely to jeopardize the continued existence of Pacific leatherback and loggerhead sea turtles.

The cumulative human-caused mortality of leatherbacks known or reasonably surmised to occur appears to be more than the populations can sustain; therefore, unless the cumulative human-caused mortality is reduced, the populations probably will continue to decline. Status of the loggerhead population is unknown; however, without knowledge of recent nesting levels or current mortality caused by other human activities there is uncertainty about whether current mortality rates are sustainable.

To avoid jeopardizing the continued existence of sea turtles, the opinion identified the following reasonable and prudent alternatives (RPA) for the conduct of the fishery:

1. Close an area to drift gillnets from Point Conception, California (34° 27' N latitude) north to 45° N latitude, and west to 129° W longitude from August 15 to October 31 for a period of three years. Based on observer data from July 1990 through January 2000, 78 percent of the leatherback entanglements occurred in this area and during this time period.

2. Close an area to drift gillnets south of Point Conception, California (34° 27' N latitude) and west to 120° W longitude from August 15 to August 31 and again from January 1 through January 31 during a forecasted or occurring *El Niño* event. Based on observer data from July 1990 through January 2000, 92 percent of the loggerhead entanglement occurred in this area during this time period.

To implement the RPA, an environmental assessment was prepared, and an interim final rule with a request for comments was published in the *Federal Register* (66 FR 44549, August 24, 2001). Information in the environmental assessment is used here to inform the public of the options examined to prevent or minimize the take of sea turtles. There were three alternatives: 1. A status quo alternative, 2. The RPA listed in the biological opinion as described above, which consists of two area closures, and 3. An alternative modified from one recommended by the TRT. The TRT alternative was designed to provide an alternative to the option in the biological opinion while providing the same level of protection to sea turtles. The Modified TRT Alternative was implemented and will be in effect for three years because that is the effective period of the permit issued under the authority of the Marine Mammal Act. A review of the performance of the fishery will be conducted by the end of the three-year period.

Assuming that drift gillnet gear will be authorized fishing gear off the Pacific coast, the following options address how the gear could be limited to reduce the take of endangered or threatened species and to ensure that the conduct of the fishery meets the requirements of the Magnuson-Stevens Act. The following three options are not for Council decision. They are presented to provide background on how the decision was made to publish the interim final rule on August 24, 2001.

1. No Action

No regulations would be issued to implement the reasonable and prudent alternative in the biological opinion prepared for the drift gillnet fishery. If this alternative were adopted, no take of listed marine mammals or sea turtles would be authorized.

Analysis

This option would prohibit issuing an exemption from the incidental take of endangered species under section 9 of the ESA. The gear is likely to take endangered turtles; therefore, the fishery would not be able to operate. The average annual real ex-vessel revenue (GDP, 1999) of the drift gillnet fleet from 1995 through 1999 was $4,675,586 (Part A, Table 2-43). About 139 permits (section 2.2.4.1) issued by the State of California exist, although effort varies from year to year. No highly migratory species taken by the drift gillnet fleet are overfished; therefore, the elimination of drift gillnet induced fishing mortality would not likely improve the status of the stocks harvested. Interactions of the drift gillnet fishery with birds is low (Section 6.2.1.3). Over the years, efforts have been made to reduce interactions with marine mammals. Catches of most marine mammals is at or below 4% of the potential biological removal (PBR), although there has been concern that the take of sperm and fin whales is approaching PBR for these species (Section 6.2.1.1).

2. Implement Time/Area Closures of The Biological Opinion

This option would close an area to drift gillnets from Point Conception, California (34° 27' N latitude) north to 45° N latitude, and west to 129° W longitude from August 15 to October 31 for a period of three years, and close an area to drift gillnets south of Point Conception, California (34° 27' N latitude) and west to 120° W longitude from August 15 to August 31 and again from January 1 through January 31 during a forecasted or occurring *El Niño* event for a period of three years.

Analysis

Effects of this option were determined by assuming that all of the fishing effort made north of 34°27' N latitude during the closure would shift south of Point Conception during August 15 - October 31. Fish catch rates north of 34°27' N latitude were compared to those south of of this area during the months of August, September, and October, for the years 1990 through 2000 (NMFS unpublished data). NMFS has observed 1,859 sets north of this latitude and 825 sets south of this latitude during these months.

The observed swordfish catch rate north of 34° 27' N latitude during August through October is 2.95 fish per set. South of 34° 27' N, the catch rate is 0.99 fish per set. Therefore, fewer swordfish would be caught by the drift gillnet fishery during the closed months.

Striped marlin catch rates are higher in the south (0.14) than to the north (0.01 fish per set). Blue marlin catch is 0.02 fish per set in the south, and <0.01 fish per set in the north (1 blue marlin in 1,859 sets). Therefore, Option 2 to close the fishery north of Point Conception from August 15 through October 31would be expected to increase the catch of billfish.

Blue sharks are caught at a rate of 5.31 fish per set north of Point Conception and 2.7 fish per set south of Point Conception during the proposed closed months. Blue shark catch would likely increase under this alternative.

Drift gillnet vessels catch common thresher shark at a higher rate in the south (0.9 fish per set) than in the north (0.51 fish per set). Redistribution of fishing effort to south of 34°27' N latitude during August, September, and October is expected to increase common thresher shark catches by the fishery during those months. The catch of bigeye thresher shark may also increase, as the catch rate in the south (0.16 fish per set) is higher than that to the north (0.08 fish per set), although observed bigeye thresher shark catch has been lower than average in the past several years (9-15 sharks per year with approximately 20 percent observer coverage).

Drift gillnet catch rates for shortfin mako shark are 0.46 fish per set north of Point Conception and 1.97 fish per set south. Therefore, this alternative is expected to produce higher shortfin mako shark catches during the closed months as fishing effort is shifted to south of Point Conception

A summary of the above information is included in Table 1 below.

Table-1. Estimated harvest in number of fish resulting from closing the area north of Point Conception to 45° N latitude (Option 2).

Species	Without closure, fishing unchanged (Number of fish)	With closure, fishing moves south (Number of fish
Swordfish	6,301	2,657
Common thresher	1,691	2,416
Shortfin mako	2,480	5,287
Bigeye thresher	281	429
Blue marlin	35	54
Striped marlin	134	376
Blue shark	12,099	7,247

The above describes the effects expected from closing the northern portion under Option 2. This option would also lead to a reduction of fishing effort days south of Point Conception during *El Niño* years. Vessels that usually begin fishing south of Point Conception on August 15 will have the option of fishing west of 120° W

longitude or delaying fishing operations until after August 31. Some drift gillnet vessels, especially the San Diego and Los Angeles small boat fleets, are not capable of fishing in the sea conditions encountered west of 120° W longitude. Therefore, the owners of these vessels are expected to wait until after August 31, when fishing east of 120° W longitude can begin. Those vessel owners that are able to fish west of 120° W longitude may find it more economical to wait two more weeks and begin fishing east of 120° W longitude after August 31 rather than pay the additional fuel costs necessary to reach the fishing grounds west. Some effort may shift north of Point Conception during January, but the amount is expected to be minimal because weather conditions north of Point Conception preclude most drift gillnet fishing during this month.

Green Turtles

Only one green turtle has been observed in the drift gillnet fishery, which occurred in 1999. This animal was taken in the month of November and was released dead. The entanglement, which occurred south of Point Conception, is considered a rare event (1 turtle in 6,025 observed sets). NMFS does not expect an increase in the number of vessels that typically fish in the area where the green turtle was taken because vessels are able to choose whether to fish north of Point Conception or south of Point Conception during the month of November. NMFS believes that the observed take of the green turtle was likely the result of a rare overlap between the drift gillnet fishery and the oceanographic conditions occurring during the time period of the entanglement rather than a likely occurrence.

The time and area closure south of Point Conception is not expected to increase the likelihood of an interaction with a green turtle because the closure does not include the month of November.

Leatherback Turtles

There have been significant encounters with Leatherback turtles, and the time and area closure north of Point Conception was developed to minimize the likelihood of leatherback takes. Since NMFS began observing the fishery, there have been 23 observed entanglements, of which 91 percent have been taken north of Point Conception. Two turtles have been observed taken south of Point Conception, but the most substantial increase in entanglement rates occurs north of 36° 30' N latitude. Based on the observer data, leatherback entanglement rates clearly change as a function of latitude.

This entanglement rate increase north of 36°30' N latitude appears to correspond to the number of leatherback turtles in the area. Leatherback turtles are known to aggregate in the Monterey Bay area with the highest density of sightings on the U.S. West Coast in August (Starbird, *et al.* 1993). In this area, north of Point Conception, a major upwelling begins in the spring, when the inverted bottom water is often 3° to 5° C colder than the sun-warmed surface water it replaces. By summertime, seawater temperatures are relatively cold compared to other areas in the same latitude, and coastal upwelling generates high productivity, attracting species such as the leatherback, which can tolerate and may favor the highly productive cool coastal waters. Leatherbacks caught in the drift gillnet fishery off central and northern California most probably originated from offshore portions of 13-15° centigrade (C) isotherms pushed in-shore in the late summer (Stinson, 1984, *in* Eckert, 1993). All of the observed leatherback takes occurred from September to January, with approximately 60 percent of the captures occurring in October. The leatherbacks were found in waters with an average monthly sea surface temperature of between 10 to 17.5° C. The majority of the animals were found in areas of coastal upwelling and some were found on distinct temperature breaks. Only five of the turtles were measured, all between 132 to 160 centimeters (cm), which are sub-adults and adults. The rest were most likely too large to be brought on board and measured; therefore, they were probably adults.

Samples from two of the 23 leatherbacks taken in the drift gillnet fishery were genetically analyzed and found to be representative of nesting turtles from western Pacific beaches (i.e. Malaysia, Indonesia, Solomon Islands). Similarly, all samples taken from stranded leatherbacks on the California coast have indicated representation from western Pacific nesting beaches (Dutton, *et al.*, in press, personal communication, March, 2000). Moreover, two leatherbacks tagged off Monterey, California in early September 2000 may have been

heading toward western Pacific nesting beaches. One of the historically observed leatherback turtles taken far offshore of California had been tagged off Monterey.

The RPA is expected to reduce the likelihood of the drift gillnet fishery causing a serious injury or mortality to leatherback turtles. This is based on data that indicate 78 percent of the leatherbacks observed taken in the past occurred in the area and during the time of the closure. Based on the information in the biological opinion, NMFS expects that the likelihood of the drift gillnet fishery taking a leatherback is significantly reduced to where the continued operation of the fishery will not jeopardize the continued existence of the species. This time and area closure is expected to provide protection to leatherbacks that aggregate in Monterey Bay during the summer and then depart in early fall to possibly migrate to western pacific nesting beaches.

The time and area closure south of Point Conception during August 15 through 31 and January 1 through 31 during *El Niño* events is not expected to increase the likelihood of a leatherback interaction because there have been no observed leatherbacks taken during this time period south of Point Conception. The two turtles that have occurred south of Point Conception occurred in December 1999, during an unusual oceanographic upwelling event near Santa Catalina Island, and the other occurred in January, more than 200 nm miles from shore at 34° 18.9' N latitude, 121° 47' W longitude, which is almost 8 nautical miles (nm) south of the closure line. Therefore, the implementation of the measure to close fishing operations south of Point Conception out to the 120° W longitude will not increase the likelihood of an interaction.

Loggerhead Turtles

Loggerhead sea turtles have been taken by the drift gillnet fishery only south of Point Conception during *El Niño* events. Therefore, the implementation of Option 2 to close the ocean waters north of Point Conception is not likely to have an effect on loggerhead sea turtle interactions.

The RPA to close the fishery south of Point Conception out to 120° W longitude was developed to avoid the likelihood of the drift gillnet fishery jeopardizing the continued existence of the loggerhead sea turtle populations. The drift gillnet fishery is not anticipated to take any loggerheads during non-*El Niño* years because loggerheads have not been observed taken in non-*El Niño* years (based on observer data from 1990-2000). The observed incidental take of loggerhead turtles by the drift gillnet fishery is infrequent, although they were the second most common sea turtle species caught since the fishery has been observed by NMFS. This may be due in part because loggerheads are rarely seen in the eastern Pacific north of Baja California, Mexico. Loggerhead occurrence in the drift gillnet fishery is probably associated with the northward extension of Transition Zone waters along the North American coast during *El Niño* events. The large aggregations of juveniles off Baja California have been observed foraging on dense concentrations of the pelagic red crab, *Pleuronocodes planipes* (Pitman, 1990).

Three unidentified turtles were observed taken in 1993 off southern California, all on the same trip, but in different sets. Only one of these sea turtles was measured, and was 43 cm in length, the average length of measured loggerheads captured incidentally in the fishery during 1990-2001. This turtle was most likely a loggerhead. In addition, all three turtles were caught in the same concentrated area that all loggerheads in the past 11 years have been caught by this fishery. They were also caught during an *El Niño*, which is the only time that loggerheads have been caught in this fishery since July 1990, when the fishery was first observed by NMFS. Assuming these three unidentified turtles were loggerhead turtles, there have been a total of 17 loggerhead turtles observed during the past 11 years. Four of these events took place during the month of July, three of which occurred when the fishery was allowed to fish inside 75 nm during this time period. Another turtle was observed taken during the month of June. However, because the fishery is now closed inside 75 nm until August 15 under state law, and there is minimal fishing effort during the months of June, July, and the first part of August, there are not expected to be many loggerhead turtles taken outside of the August and January closure. The closure south of Point Conception in August and January is expected to reduce the incidental mortality and serious injury to a level that will avoid the likelihood of jeopardizing the continued existence of the loggerhead sea turtle populations.

Olive Ridley Turtles

Olive Ridley sea turtles are rarely caught in the drift gillnet fishery, although the olive ridley is widely regarded as the most abundant sea turtle in the world. The olive ridley prefers tropical and warm temperate waters. Of all sea turtle strandings in California from 1990-99, the olive ridley was the sea turtle most rarely found (J. Cordaro, NMFS, personal communication, May, 2000). The first olive ridley turtle observed taken by the drift gillnet fishery occurred in November 1999, north of Point Conception. The animal was released alive with no injuries. This entanglement is considered rare (1 turtle in 6,025 observed sets), and the likelihood of such an event is not expected to increase with the RPA.

Compared to other sea turtles, olive ridleys are the second deepest divers, after leatherbacks, and have been found captured in bottom trawls 80 to 110 meters (m) deep (Plotkin, 1994 *in* Lutcavage and Lutz, 1997), and at 300 m deep, feeding on crabs (Landis, 1965 in NMFS and USFWS, 1998). Utilizing a wide range of foraging habitats, they are known to feed in deep water, pelagic habitats and in relatively shallow benthic waters, on a variety of crabs, jellyfish, tunicates, etc. They are also known to associate with flotsam in the water, perhaps feeding on associated fish and invertebrates (Pitman, 1992 *in* NMFS and USFWS, 1998). With such a wide variety of foraging and behavioral habits, evaluating whether there is a specific cause for the interaction to occur is difficult. Therefore, the observed take of the olive ridley was likely the result of unusual oceanographic conditions and a rare co-occurrence with the fishery and will not be affected by the implementation of the RPA.

Restricting fishing south of Point Conception during August 15 through 31 and January 1 through 31 is not expected affect the likelihood of an interaction with a olive ridley sea turtle. Since the time and area closure does not include the month of the observed olive ridley take, and the take did not occur during an *El Niño* event, a change in the take rate is not expected. With only one interaction in 6,025 sets, interaction is a rare event.

Marine Mammals

The RPA is expected to result in a reduction in the number of marine mammal interactions. According to observer data (July 1990 through December 2000), the cetacean entanglement rates south of Point Conception have been lower than the entanglement rates north of Point Conception during those months that the northern area will be closed. The entanglement rate south of Point Conception during the months of the closure in the RPA is 0.038 (30 sets with entanglements and 758 sets without an entanglement), and the cetacean entanglement rate north of Point Conception during the months of the closure is 0.083 (156 sets with entanglements and 1,708 sets without an entanglement). Since the implementation of the take reduction plan, the cetacean entanglement rate south of Point Conception during the months of the closure is 0.007 (2 sets with entanglements and 284 sets without an entanglement), and the cetacean entanglement rate north of Point Conception during the months of the closure in the RPA is 0.032 (13 sets with entanglements and 395 sets without an entanglement). If all fishing effort shifted south of Point Conception, a reduction in marine mammal entanglements would be expected.

There may also be a reduction in fishing effort because vessels trolling for albacore may continue targeting albacore into the month of October until drift gillnets can be set to target swordfish in November. Some participants may choose not to fish until sets can be made north of Point Conception.

There have been eight observed sperm whale interactions since the inception of the observer program in July 1990 through January 31, 2001. During this time period, 7 of the 8 sperm whale entanglements occurred outside of the time closure (November and December). There has been only one sperm whale observed taken inside the closed time and area closure and that was during an *El Niño* event in 1993. Therefore, implementation of the RPA to close the fishery north of Point Conception from August 15 through October 31 may slightly decrease the likelihood of an interaction with a sperm whale.

There have been only two humpback whales observed taken by the fishery and both of these interactions occurred outside of the time and area closure (south of Point Conception during the months of August and November). Both of these observed takes were released alive without injury. In 1999, NMFS observed the

first fin whale interaction with the drift gillnet fishery in more than 6,000 sets. This also occurred south of Point Conception and during the month of November. Therefore, implementation of the closure north of Point Conception is not expected to increase or decrease the likelihood of interactions with humpback whales or fin whales.

NMFS has observed only two Steller sea lions entangled. One of these animals was observed south of Point Conception during the month of June and the other occurred during the month of September north of Point Conception in ocean waters included in the time and area closure. Therefore, implementation of the closure north of Point Conception from August 15 through October 31 may decrease the likelihood of an interaction with Steller sea lions, recognizing that the chances of an interaction are less than 1 in 3,000 sets.

NMFS has observed 39 northern right-whale dolphins taken in 1,859 sets north of Point Conception during the proposed closed period, for a catch rate of 0.021 animals per set. South of Point Conception, the catch rate is 0.0 animals per set (0 animals in 825 observed sets). The RPA is expected to decrease the likelihood of an interaction with northern right-whale dolphins if fishing effort north of Point Conception shifts to south of Point Conception during the closure.

Short-finned pilot whales are taken at a rate of 0.006 animals per set (11 animals in 1,859 observed sets) north of Point Conception during the closed period. There has not been a short-finned pilot whale observed taken south of Point Conception during the closed period (0 animals in 825 sets). The RPA is expected to decrease the likelihood of an interaction with short-finned pilot whales if fishing effort that was previously made north of Point Conception shifts to south of Point Conception during the closure.

As stated above in the north of Point Conception closure, observer data (July 1990 through December 2000), indicate that the cetacean entanglement rates south of Point Conception are lower than the entanglement rates north of Point Conception during those months that the northern area would be closed. During the months of the southern closure during *El Niño* events, the entanglement rate is approximately 0.029 cetaceans per set (8 sets with entanglements and 263 sets without an entanglement).

During the August closure, implementation of the southern closure is expected to cause a reduction in the number of marine mammals taken because there will be a reduction in the number of sets made by the fishery. The south of Point Conception closure in combination with the north of Point Conception closure will effectively eliminate fishing effort from August 15 to August 31, which is likely to cause a reduction in the number of cetacean entanglements. There have not been observed entanglements of the listed sperm whale, fin whale, or Steller sea lion south of Point Conception during the month of August or January; therefore, implementation of the closure south of Point Conception during an *El Niño* event is not expected to affect the take of these species. There may be a slight reduction in the likelihood of taking a humpback whale because there was one humpback whale observed taken and released alive south of Point Conception in August 1994.

There has been 1 northern right-whale dolphin observed entangled south of Point Conception during the closed period. If fishing effort historically made during this period is eliminated, NMFS expects the southern closure in August and January during *El Niño* years may slightly decrease the likelihood of entangling northern right-whale dolphins.

No short-finned pilot whale has been observed taken south of Point Conception during the closed period, so the southern closure from August 15 through August 31, and January 1 through January 31 is expected to have no effect on the take of this species.

Other marine mammals are encountered by the drift gillnet fishery, but all interactions have been a small percentage of what is defined in the Marine Mammal Act as the proposed biological removal, which is based on the status of the individual populations.

Seabirds

The closure north of Point Conception in the RPA is expected to slightly reduce the likelihood of northern fulmars being taken incidental to the drift gillnet fishery. In 2000, NMFS observed for the first time northern fulmars entangled while picking at the net webbing during net retrieval in waters north of Point Conception. From August 15 through October 31, there were 4 northern fulmars observed caught in the gear. One of these was released alive, 2 were released dead and 1 was released injured. NMFS has not observed this type of behavior during previous years. The entanglement rate for northern fulmars north of Point Conception during the time period of the closure (August 15 through October 31) is 0.002 northern fulmars per set (4 northern fulmars in 1,859 observed sets). If all the fishing effort that has occurred north of Point Conception moves south to ocean waters south of Point Conception, the likelihood of an interaction with northern fulmars would be reduced.

In addition to the northern fulmars, there have been four unidentified birds recorded by onboard observers. Two of these occurred in the closed area north of Point Conception, giving an entanglement rate of 0.001 unidentified birds per set (2 unidentified bird in 1,859 observed sets), and none occurred south of 34° 27' N latitude during this time period. Based on this information, an interaction with an unidentified seabird if the fishing effort is shifted to south of Point conception is not expected.

The vessels that typically fish south of Point Conception in August are not expected to venture north of Point Conception because the vessels are not equipped to handle the heavy northwesterly gales that are encountered off Point Conception or the change of climatic and meteorological conditions. In January, vessels fish in southern California because there are no longer sufficient oceanic water temperature breaks north of Point Conception that provide suitable fishing conditions for catching swordfish, and the weather conditions are usually poor. NMFS does not expect vessels to fish north of Point Conception during the month of January. Therefore, the closure south of Point Conception is not expected to increase or decrease the likelihood of an interaction with seabirds.

Socio-Economic Impacts

Based on landing receipt information, if all the fishing effort that typically occurs north of Point Conception between August 15 through October 31 did not relocate, the north of Point conception closure could cause a loss of $712,000 annually in ex-vessel gross revenue. This is a worst case scenario because many of the vessels will decide to fish in areas that are still open to drift gillnet fishing under the RPA. Table 2 provides estimates of the average ex-vessel gross revenue and pounds landed, by species, generated during the time and area closure (August 15 through October 31), using the past four years of landing receipt data from 1997-2000 (CDFG unpublished data).

Table-2. Ex-vessel gross revenue based on fishing area recorded on landing receipts for the period between August 15 through October 31, 1997-2000, in ocean waters north of Point Conception[1]

	Blue	Louvar	Mako	Opah	Swordfish	Thresher
Pounds (1997-2000) [2]	81.50	6,477.10	64,049.00	83,536.20	906,682.30	133,658.50
Annual Average (lbs)	20.38	1,619.28	16,012.25	20,884.05	226,670.58	33,414.63
Average Price	$ 2.00	$ 3.18	$ 1.06	$ 0.41	$ 2.84	$ 1.13
Value (1997-2000)	$ 163.00	$20,577.75	$ 67,868.18	$34,466.90	$2,574,167.73	$150,824.44
Annual Average	$ 40.75	$ 5,144.44	$ 16,967.04	$ 8,616.73	$ 643,541.93	$ 37,706.11
Total Gross revenues	$2,848,068.00					
Annual Revenues (Avg)	$712,017.00					

[1] California Department of Fish and Game unpublished data.
[2] Pounds are dressed weight.

For purposes of analyzing the range of impacts of the different alternatives, it is also possible to analyze the change in gross revenues by assuming that all of the fishing effort that historically occurred north of Point Conception will shift south of Point Conception. However, if the catch rates remain profitable, many of the vessels that typically troll for albacore may extend their albacore fishing season later into the year (September/October) in an effort to avoid drift gillnet fishing south of Point Conception. 0ther vessels may choose not to fish during the closed months. If all vessels were to fish south of Point Conception, a reduction in overall fishing revenues would be expected because the catch rates for many of the target species are lower south of Point Conception (See Table 1).

Based on the landing receipt data, swordfish accounts for 90 percent of the ex-vessel gross revenues during this time period. For purposes of determining the impacts of this alternative, swordfish is used as an indicator. The catch rate for swordfish for this time period north of Point Conception is 2.945 fish per set compared to 0.999 south of Point Conception. Therefore, vessels that normally fish north of Point Conception during this time period would experience a reduction in the catch of swordfish with the implementation of the RPA. However, this estimate is based on the swordfish catch rates remaining constant even with an increase in the number of vessels fishing south of Point Conception. There is the possibility that the catch rate will decrease because of the increase in fishing effort in the Southern California Bight. Assuming that the catch rate south of Point Conception remains the same, the ex-vessel gross revenues for swordfish for the vessels that normally fish north of Point Conception will be approximately $215,000, which would be a 66 percent reduction in ex-vessel gross revenue for fishing vessels that historically fish north of Point Conception during this time period. If the fleet chooses to target thresher shark in addition to swordfish south of Point Conception, the total gross revenue loss may be slightly less because the catch rate for thresher shark is higher south of Point Conception, although the price per pound is lower than for swordfish.

In addition to the reduction in swordfish gross revenue caused by the decrease in the swordfish catch rate south of Point Conception, there may be additional operating costs for vessels that historically fish north of Point Conception during this time period. Many of the vessel owners who fish north of Point Conception live in coastal communities near where they home port their vessel. These vessel operators may incur additional fuel costs to travel to and from their home port to the open ocean waters south of Point Conception. This cost would vary depending on the distance vessels would need to travel. In addition, there may be higher operating costs for these vessels when fishing south of Point Conception because there are more fair weather days to fish. Typically, weather conditions north of Point Conception may prevent vessels from leaving port for several days at a time. South of Point Conception, these vessels are more likely to be able to fish more days since there are more fair weather days. Conversely, because vessels have the potential to fish more days south of Point Conception, the lower catch rate and reduction in ex-vessel gross revenues may be offset by the increase in the number of fishing days compared to north of Point Conception.

Increasing the number of drift gillnet vessels fishing south of Point Conception is likely to cause an increase in direct competition for areas of desirable oceanographic conditions (water temperature breaks) and for the fishery resources associated with these conditions. This may cause a decrease in the observed catch rate because there would likely be more fishing vessels in the area. NMFS and the State of California also have received letters and telephone calls from various recreational fishery organizations expressing concern about increasing the number of commercial drift gillnet vessels operating in ocean waters south of Point Conception because of the potential increase of striped marlin bycatch. Although the larger drift gillnet vessels that typically fish north of Point Conception are more likely to fish farther offshore and in areas that recreational vessels do not normally fish, the concern is that these vessels will intercept the striped marlin as they move inshore. There also could be concern about an increased harvest of shortfin mako shark, which supports a recreational fishery.

Another indirect effect of restricting fishing activity by drift gillnet vessels to south of Point Conception from August 15 through October 31 is that the vessels that typically fish north of Point Conception may choose to fish in more adverse weather conditions because they may try to fish near the closed area at Point Conception. This area marks an abrupt change in climatic and meteorological conditions and is often subjected to heavy northwesterly gales and strong offshore gusts. Vessels fishing in this area must fish farther offshore in open water conditions in which there is not a port nearby to seek shelter if weather conditions should change quickly.

Looking only at restricting vessels from fishing in ocean waters south of Point conception during an *El Niño* event, vessels are not likely to fish south of Point Conception and then travel north to Morro Bay to land fish. This situation is caused by the prevailing northwesterly winds, large swells, and choppy conditions persisting at Point Conception, which discourage and inhibit vessels from routinely traveling north around the point. The likelihood of a vessel fishing west of 120° W longitude would depend on the size of the vessel and the weather conditions. Typically, during the month of January, strong low pressure systems move into the Southern California Bight from Alaska. These strong weather systems will discourage even larger vessels, such as longline vessels, from leaving port, especially if the fishing conditions offshore are marginal. U.S. vessels are not permitted to fish or land fish in Mexico

Based on landing receipt information, NMFS has estimated that if all the fishing effort that typically occurs south of Point Conception during *El Niño* events between August 15 through August 31 and January 1 through January 31 did not relocate, the closure south of Point Conception could cause a loss of approximately $438,688 in ex-vessel gross revenue during an *El Niño*. There have been two *El Niños* in the last ten years, so the loss indicated would not occur every year. This is a worst case scenario since some of the vessels will decide to fish in areas that are still open to drift gillnet fishing under the RPA. Table 3 provides estimates of the average ex-vessel gross revenue and pounds landed, by species, for the time and area closure, using California Department of Fish and Game landing receipt data from 1997-2000.

Table-3. Ex-vessel gross revenues based on fishing area recorded on landing receipts for the period between August 15 through August 31, and January 1 through January 31, 1997-2000, in ocean waters south of Point Conception east of 120°W[1].

	Blue	Louvar	Mako	Opah	Swordfish	Thresher
Pounds (1997-2000) [2]	-	6,214.50	66,102.39	193,708.80	379,174.50	142,936.50
Annual Average (lbs)	-	1,553.63	16,525.60	48,427.20	94,793.63	35,734.13
Average Price	$ -	$ 4.08	$ 1.07	$ 0.42	$ 3.64	$ 1.37
Value (1997-2000)	$ -	$25,324.09	$70,857.02	$80,981.94	$1,381,074.43	$196,437.96
Annual Average	$ -	$ 6,331.02	$17,714.25	$20,245.48	$ 345,268.61	$ 49,109.49
Total Gross revenues	$1,754,675.44					
Annual Revenues (Avg)	$ 438,668.86					

[1] California Department of Fish and Game unpublished data.
[2] Pounds are dressed weight.

For purposes of analyzing the impacts of this alternative, it is also possible to estimate the change in gross revenue by assuming that the vessels that typically fish north of Point Conception during August 15 through 31 will fish outside of 120°W longitude and, therefore, would not be affected by this closure during the month of August. However, during the month of January, there is uncertainty how many of these vessels would choose to fish outside because of the adverse weather conditions that typically occur during that time of year offshore. NMFS expects these larger vessels that historically fish off San Diego during January will choose to not fish in January.

The smaller vessels that typically fish off San Diego during August 15 through August 31 during an *El Niño* at 9-mile and 20-mile banks are not likely to fish beyond 120° W longitude because of the distance from shore and the offshore weather conditions. However, some of the small vessels that home port in Santa Barbara or Los Angeles may choose to fish outside of the 120°W longitude (this longitude intersects California just north of Santa Barbara). The Los Angeles boats could move up the coast and work out of Santa Barbara for convenience and may choose to target thresher shark inside the Santa Barbara Channel. Therefore, the

reduction in ex-vessel gross revenues may be lower than projected. In the month of January, however, these vessels are not as likely to fish in this area because historically swordfish catch tends to be greater in the warmer water off the coast of San Diego. Therefore, not much fishing effort is expected to occur south of Point Conception beyond 120° W longitude by these smaller vessels.

In addition to the reduction in swordfish revenue caused by the inability of vessels to fish inside 120° W longitude, there may be additional operating costs for vessels that choose to fish outside of the closed area during this time period because of the increased distance the vessels would need to travel.

3. Implement Modified TRT Time and Area Closures

This alternative closes an area to driftnet fishing for three years from August 15 to November 15 bounded by the coordinates 36° 18.5' N latitude (Point Sur) to; 34° 27' N latitude, 123° 35' W longitude; then to 129° W longitude; then north to 45° N latitude; then east to the point where 45° N latitude meets land (Figure A); and closes an area to drift gillnets for three years south of Point Conception, California (34° 27' N latitude) and west to 120 W longitude from August 15 to August 31 and again from January 1 through January 31 during a forecasted or occurring *El Niño.*

This alternative was based on the recommendation from the TRT and recent satellite telemetry tracking data obtained from two leatherback sea turtles that were tagged in Monterey Bay in September 2000. In an effort to minimize the economic impact of the time and area closures, the Modified TRT Alternative was developed to provide access to the productive fishing grounds north of Point Conception, which is consistent with the intent of the TRT proposal, and to provide at least an equal, if not greater, level of protection for leatherback and loggerhead sea turtles. In addition, the Modified TRT Alternative does not include the lowering of the net to at least 60 feet as recommended by the TRT because observer data (1990-2000) do not suggest that the lengthening of extenders to 60 feet would result in a definite decrease in leatherback interactions. The *trigger* language identified by the TRT to extend the area closure in a southerly direction to Point Conception if a leatherback was observed has also been removed because NMFS does not consider this extra precaution necessary with this alternative.

The recommendation from the TRT was modified to ensure that the measure would provide at least the same level of protection for leatherback sea turtles as the reasonable and prudent alternative in the biological opinion. Based on the available data, the time closure (October 15 through November 15) suggested by the TRT has been retained, but the closed area proposed by the TRT has been enlarged. Although the TRT recommended 36° 15' N latitude as the southern boundary of the closed area, Point Sur, which is the point included in the environmental assessment for this fishery, was proposed as the southern boundary because it is a prominent and recognizable landmark and only three miles north of 36° 15' N latitude.

The diagonal line from Point Sur to 34° 27' N latitude, 123° 35' W longitude was developed by plotting the leatherback satellite tracking data and keeping the southernmost turtle trajectory north of the diagonal line. The reason for this precautionary approach is to protect the potential migratory corridor of leatherbacks departing Monterey Bay to the western Pacific nesting beaches as suggested by these two satellite tracks. NMFS hopes to learn more about this migratory corridor through additional satellite tag attachments scheduled to take place in the summer and fall of 2001 in Monterey Bay. With additional data, NMFS is expected to better define the migratory corridor route and apply this knowledge to minimize the potential impact of commercial fisheries on leatherbacks.

The Modified TRT Alternative allows vessels to fish the southern edge of the Davidson Seamount which is a productive fishing area and allows these vessels to land fish in either Moss Landing, Monterey, or Morro Bay, California. The Modified TRT Alternative also enables vessels to fish for swordfish north of Point Conception.

The Modified TRT Alternative is expected to produce a reduction in fishing effort as larger vessels already trolling for albacore in northern waters are expected to continue targeting albacore to some extent into October and November, if possible. For purposes of evaluating the impacts of the alternative, the fishing effort that previously occurred in the closed area during this time period is assumed to shift south of the closed area, but

still remain north of Point Conception (34°27'N). Impacts of Option 3 on fish species were measured by determining whether the alternative would increase or decrease the likelihood of capturing each species. Fish catch rates in the northern closed area were compared to those in the open area north of Point Conception from August 15 through November 15, for the years 1990 through 2000 (NMFS unpublished data). NMFS has observed 1,825 sets in the proposed northern time/area closure, and 531 sets in the open area during this period.

Swordfish

Option 3 is expected to have an effect on the possibility of catching swordfish. The observed swordfish catch in the closed area from August 15 through November 15 is 3.07 fish per set. The catch rate is 3.12 swordfish per set in the open area

Billfish

Striped marlin catch rates are similar in the northern closed area (0.008) and in the open area (0.004 fish per set). Blue marlin catch is 0.001 fish per set in the closed area (1 blue marlin in 1,474 sets), and zero fish per set in the northern open area. This alternative is not expected to significantly change the catch of billfish by the drift gillnet fishery.

Blue Shark

This alternative is expected to increase the likelihood of catching blue sharks in the drift gillnet fishery. Blue sharks are caught at a rate of 4.64 fish per set in the proposed closed area and 6.09 fish per set in the open area.

Thresher Shark

Drift gillnet vessels catch common thresher shark at a higher rate in the open area (1.03 fish per set) than in the northern closed area (0.38 fish per set). Redistribution of fishing effort southward is expected to increase common thresher shark catches by the fishery. Some vessels may elect to directly target common thresher shark during this time period, producing even higher catch rates and landings for this species. The catch of bigeye thresher shark is expected to decrease, as the catch rate in the open area (0.02 fish per set) is lower than that to the north (approximately 0.10 fish per set), although observed bigeye thresher shark catch has been lower than average in the past several years (9-15 sharks per year with approximately 20 percent observer coverage).

Shortfin Mako Shark

Drift gillnet catch rates for shortfin mako shark are 0.42 fish per set in the closed area and 0.43 fish per set in the open area. This alternative is not expected to significantly affect shortfin mako shark catches during the closed period.

A summary of the above information is included in Table 4 below.

Table-4. Estimated harvest in number of fish resulting from closing the area closure in Option 3

Species	Without closure, fishing unchanged (number of fish)	With Closure, Fishing moves south (number of fish)
Swordfish	7,260	7,351
Common thresher	1,240	2,427
Shortfin mako	995	1,013
Bigeye thresher	193	47
Blue marlin	2	0
Striped marlin	17	9
Blue shark	11,702	14,348

Green Turtles

NMFS has observed only one green turtle taken in the drift gillnet fishery. The animal was released dead. This entanglement is considered a rare event (1 turtle in 6,025 observed sets). The animal was observed on November 3, 1999, at 34° 31' N latitude, 121° 45' W longitude. Assuming that the number of vessels that normally would be fishing north of Point Sur would fish south of Point Sur and north of Point Conception, there is a slightly greater chance that an interaction might occur. However, NMFS considers the likelihood of an interaction with a green turtle as remote based on historical observer data.

Leatherback Turtles

The modified TRT time and area closure north of the diagonal line defined by Point Sur to 34° 27' N latitude, 123° 35' W longitude is expected to reduce the likelihood of leatherback interactions. This alternative provides additional protection to the potential leatherback turtle migratory corridor from Monterey Bay, California to western Pacific nesting beaches. The closed area is based on observer data that indicate there is not a large increase in leatherback turtle entanglement rates at Point Conception. The most substantial increase in entanglement rates occurs north of 36° 30' N latitude (NMFS unpublished data). Extending the time of the closure from October 31 to November 15 is expected to compensate for moving the boundary farther north because the leatherback entanglement rate north of 36°30'N latitude is significantly higher. Leatherback entanglement rates clearly change as a function of latitude.

Using observer data (July 1990 through January 2001), the time and area closure identified in this alternative includes 18 of the 23 leatherbacks, which is the same level of protection provided by the RPA. By comparing the number of leatherback turtles entangled during this time period, the Modified TRT Alternative would provide the same level of protection for leatherback turtles as the alternative identified in the biological opinion. This conclusion is based on observer data that indicate the calculated entanglement rate from 32° N latitude through 33° 30' N latitude (Mexico border to Santa Catalina Island) is 0.0004 leatherbacks per set (1 observed leatherback in 2,717 observed sets), and that the entanglement rate from 33° 30' N latitude to 35° N latitude (approximately Santa Catalina Island to Point Conception) is 0.003 leatherbacks per set (2 observed leatherbacks in 647 observed sets). From 35° N latitude to 36° 30' N latitude (approximately Point Conception to Point Piños) the entanglement rate is 0.004 leatherbacks per set (4 observed leatherbacks in 919 observed sets). For comparison purposes, the entanglement rate from 36° 30' N latitude (Point Piños) to 38°N latitude (Point Reyes) is 0.018 leatherback turtles per set (8 observed leatherbacks in 434 observed sets). Therefore, allowing vessels to fish north of Point Conception in the area south of the diagonal line described above is not expected to significantly increase the likelihood of an interaction with a leatherback because the entanglement rate from approximately Santa Catalina Island to Point Conception is relatively low at 0.003 leatherbacks per set, and 0.004 leatherbacks per set north of Point Conception. For this reason, the likelihood of an

entanglement is almost the same whether vessels are fishing in the area north of Point Conception, south of the diagonal line, or fishing south of Point Conception, between Point Conception and Santa Catalina Island.

More importantly, the Modified TRT Alternative provides additional protection to leatherback turtles that may be departing Monterey Bay, California to migrate to their nesting beaches in the western Pacific. This assumption is based on two leatherback turtles that were tagged by NMFS with satellite transmitters in Monterey Bay during September 2000. Shortly after these turtles were tagged, they moved away from the coast of California in a southwesterly direction. This alternative potentially provides additional protection to migrating leatherback turtles that are moving out of the area. This potential migratory corridor is based on only two leatherback turtles; however, NMFS intends to attach additional satellite tags to leatherbacks when they are found in the Monterey Bay area (July through September). With additional information, NMFS hopes to better define the migratory route that leatherbacks use to travel from the west coast of North America to the western Pacific nesting beaches.

Loggerhead Turtles

The time and area closure of the Modified TRT Alternative is not expected to affect the likelihood of an interaction with loggerhead turtles because there have been no loggerhead turtles observed taken by the drift gillnet fishery north of Point Conception. Vessels that normally fish north of Point Conception during this time of year are expected to continue to fish in the open area near Point Conception when the area closure is in effect; therefore, an increase in vessel activity south of Point Conception is not expected. For these reasons, the implementation of the northern closure of the Modified TRT Alternative is not expected to affect the number of loggerhead sea turtle interactions.

Olive Ridley Turtles

The only olive ridley sea turtle that NMFS has observed taken by the drift gillnet fishery occurred south of Point Conception on November 25, 1999. NMFS considers this a rare event (1 olive ridley in 6,025 observed sets), and the entanglement occurred during a time in which the northern area time and area closure would not be in effect. The vessels that normally fish north of Point Conception are expected to continue to fish near Point Conception in the open area when the northern area is closed; therefore, an increase in fishing activity south of Point Conception is not expected, and the implementation of the northern closure of the Modified TRT Alternative is not expected to increase or decrease the likelihood of an olive ridley interaction.

Marine mammals

In general, the entanglement rate for cetaceans is higher in the northern open area. Using observer data from July 1990 through January 2001, the entanglement rate in the closed area between August 15 and November 15 for cetaceans is 0.083 animals per set (151 observed cetaceans/1,825 observed sets). Conversely, the entanglement rate south of the area during this time period for cetaceans is 0.192 animals per set (102 observed cetaceans/531 sets). Based on this information, there could be a higher cetacean entanglement rate during this time period if fishing effort shifted to the open area. However, since the implementation of the take reduction plan, the entanglement rates have decreased to 0.055 animals per set (25 animals/456 observed sets) in the closed area, and 0.10 (27 animals/270 observed sets) in the open area.

The affect of the northern area closure of Option 3 is expected to have a beneficial effect on listed marine mammal species because some of the interactions between listed species occurred inside the time and area closure. Specifically, there have been eight observed sperm whale interactions since the inception of the observer program (July 1990 through January 2001). Four of those interactions occurred inside the time and area closure of Option 3 and none of them occurred within the open area. Therefore, there could be a 50 percent reduction in the number of sperm whale interactions with the implementation of Option 3 based on this data. Since the implementation of the take reduction plan, there has been only one observed sperm whale interaction. This entanglement occurred outside of the time and area closure. In addition, this interaction occurred in a set that was not in full compliance with the take reduction plan. Therefore, it is uncertain whether the entanglement resulted from chance or because the net was not in full compliance.

The northern closure is not expected to have an affect on the interaction rate of humpback whales because both humpback whales that were observed taken by the drift gillnet fishery occurred south of Point Conception. The northern closure is not expected to have an effect on the entanglement rate of fin whales for the same reason because there has been only one fin whale interaction and that occurred south of Point Conception during the month of November. These determinations are based on the assumption that there will not be an increase in the number of vessels fishing south of Point Conception because the vessels that have historically fished north of Point Conception will fish in the open area. Therefore, the northern closure of Option 3 is not expected to increase or decrease the likelihood of interactions with humpback whales or fin whales.

For Steller sea lions, NMFS has observed only two animals taken. One of these animals was observed south of Point Conception during the month of June and the other occurred during the month of September in the closed area. Therefore, this northern area closure from August 15 through November 15 may decrease the likelihood of an interaction with a Steller sea lion, recognizing that the chances of an interaction are already low (less than 1 in 3,000 sets). There have been no Steller sea lions observed since the implementation of the take reduction plan.

NMFS has observed 28 northern right whale dolphins taken in 1,825 sets in the northern closed area from August 15 through November 15, for a catch rate of 0.015 animals per set. The catch rate is 0.034 animals per set (18 animals in 531 observed sets) in the open area north of Point Conception. This Option is expected to increase the likelihood of an interaction with northern right whale dolphins if fishing effort that was previously made in the closed area from August 15 through November 15 shifts to the open area north of Point Conception and south of Point Sur during the closure.

Short-finned pilot whale are taken at a rate of 0.004 animals per set (8 animals in 1,825 observed sets) in the northern closed area. There have been 3 short-finned pilot whales observed taken in 531 sets in the open area north of Point Conception (0.006 animals per set). This alternative is expected to slightly increase the likelihood of an interaction with short-finned pilot whales if fishing effort that was previously made in the northern closed area shifts to the open area north of Point Conception and below Point Sur during the closure. However, since implementation of the TRP, there has not been a short-finned pilot whale observed taken by the fishery.

Seabirds

The northern closure may slightly increase the likelihood of northern fulmars being taken incidental to the drift gillnet fishery. However, in general, the drift gillnet fishery does not incidentally take seabirds. In 2000, NMFS observed northern fulmars picking at the net webbing during net retrieval. From August 15 through November 15, there were 11 northern fulmars observed caught in the gear. Eight of these were released alive, 2 were released dead and 1 was released injured. NMFS has not observed this type of behavior during previous years. The entanglement rate for northern fulmars inside the open area is 0.021 northern fulmars per set, and the entanglement rate in the closed area is zero northern fulmars per set. If all the fishing effort that has occurred north of the line moves south, there is a likelihood that there will be a slight increase in the number of northern fulmars caught incidentally to the fishery.

In addition to the northern fulmars, there have been a couple of unidentified birds recorded by onboard observers. Two of these occurred in the closed area for an entanglement rate of 0.001 unidentified birds per set (1 unidentified bird in 1,825 observed sets), and 1 occurred in the open area north of Point Conception, for an entanglement rate of 0.002 unidentified seabird per set (1 unidentified bird in 531 observed sets). Based on this information, the likelihood of a seabird interaction might increase slightly if the fishing effort north of the diagonal line extending from Point Sur moved into this area off central California.

Socio-Economic Impact

Based on landing receipt information, NMFS has estimated that if all the fishing effort that typically occurs north of the line extending from Point Sur (36° 18.5 N latitude) during the time period between August 15 through November 15 did not relocate, the closure under this alternative could cause a loss of $640,818 in ex-vessel gross revenues. This is a worst case scenario because many vessels are likely to fish in areas that are still

open to drift gillnet fishing under this alternative. Table 5 provides estimates of the average ex-vessel gross revenues and pounds landed, by species, during the time and area closure using the past four years of California Department of Fish and Game landing receipt data from 1997-2000.

Table 5. Ex-vessel gross revenue and pounds based on fishing area recorded on landing receipts[1] for the time period between August 15th and November 15th, 1997-2000, in ocean waters north of the line extending from Point Sur (36°18.5'N) to the point 34°27'N, 123°35'W

	Blue	Louvar	Mako	Opah	Swordfish	Thresher
Pounds (1997-2000)[2]	81.50	4,745.60	55,453.70	68,159.20	884,184.40	140,303.50
Annual Average (lbs)	20.38	1,186.40	13,863.43	17,039.80	221,046.10	35,075.88
Average Price	$ 2.00	$ 2.90	$ 0.98	$ 0.38	$ 2.63	$ 1.02
Value (1997-2000)	$163.00	$13,773.36	$54,131.76	$26,033.49	$2,326,156.40	$143,015.59
Annual Average	$ 40.75	$ 3,443.34	$13,532.94	$ 6,508.37	$ 581,539.10	$ 35,753.90
Total Gross revenues	$ 2,563,273.60					
Annual Revenues (Avg)	$ 640,818.40					

[1] California Department of Fish and Game unpublished data.
[2] Pounds are dressed weight.

For purposes of analyzing the impacts of this alternative, it is also possible to analyze the change in gross revenues assuming that all of the fishing effort that historically occurred north of the line extending from Point Sur will shift south or east of the line, but still remain above Point Conception. In response to the closure, some larger vessels may choose to troll for albacore later into the season (September/October) if the catch rates of albacore remain profitable before shifting to drift gillnet gear

Based on the landing receipt data, swordfish accounts for 90 percent of the ex-vessel gross revenues during this time period; therefore, for purposes of determining the impacts of this alternative, swordfish is used as an indicator. The catch rate for swordfish for this time period north of line extending from Point Sur is 3.068 fish per set compared to 3.117 swordfish per set south of the line. The swordfish catch rate south of line is slightly higher than in the northern closed area; therefore, a reduction in the catch of swordfish with the implementation of Option 3 during this time period is not expected. However, this conclusion is based on the assumption that the swordfish catch rates remain constant even with a potential increase in the number of vessels fishing in the open area between Point Conception and the line extending from Point Sir. There is the possibility that the catch rate will decrease because of the increase in fishing effort in the open area. Assuming the catch rate remains the same, NMFS estimates that the ex-vessel gross revenues for swordfish catch will not change under this alternative.

Substantial additional operating costs for vessels that historically fish north of the line extending from Point Sur are not expected because many of the vessels typically fish in this area south of the line during the season. However, there are a few boats that generally fish out of Oregon ports or northern California ports such as Crescent City, Fort Bragg, and Bodega Bay that may have to change their operating procedures and travel south earlier in the season. Some of the larger vessels that troll for albacore may also have to move down the coast earlier in the season. Typically, these vessels will finish their last albacore trip in Oregon and Washington and then begin targeting swordfish in the northern waters using drift gillnet, then begin moving down the coast in November. The vessels that home port in Santa Cruz, Moss Landing, Monterey, or Morro Bay typically operate near these ports during this time of year and will not be affected as much by the proposed closure under this alternative.

The closure during *El Niño* years in Option 3 is the same as in Option 2, and the impacts are the same in both options.

Fishing Conflicts

Increasing the number of drift gillnet vessels fishing south of the line extending from Point Sur is expected to potentially increase slightly the direct competition for setting gear on desirable oceanographic conditions (water temperature breaks) and possibly for the available swordfish stocks. This direct competition may cause a slight decrease in the observed catch rate since there would likely be more fishing vessels in the area. Under this alternative, allowing the vessels to fish north of Point Conception and south of the line should eliminate the concern expressed by various recreational fishery organizations about the potential increase in the number of commercial drift gillnet vessels operating in ocean waters south of Point Conception and the potential increase in striped marlin bycatch.

Weather conditions

Under this alternative, drift gillnet fishing vessels are less likely to fish in potentially more adverse weather conditions because there are more opportunities to fish productive areas than are contained in Option 2.

1.4.2 Pelagic Longline Fisheries

1.4.2.1 Background

High seas longliners based at west coast ports target swordfish and tunas. Currently, there is little or no pelagic longlining within the EEZ, but the fleet of high seas longliners fishing outside the EEZ is growing.

Inside the EEZ, longlining is prohibited by California out to the EEZ boundary. Oregon has provisions for developmental longline fisheries for swordfish and for blue shark outside 25 miles. Their licenced fishers could fish beyond 3 miles off California and Washington as well, but would have to land their catches in Oregon. Currently, this Oregon-permitted fishery is inactive. Longline gear is not legal in Washington. There is a proposal for a limited-entry longline fishery for tuna and swordfish in certain specified EEZ waters as an alternative to drift gillnet fishing.

Outside the EEZ, state authority ends, and high seas longlining is allowed. California and Oregon fishers can land their catches in their respective states with the proper permits. There is a growing fleet of high seas longliners operating from southern California ports. In recent years (1994-1999) 28 vessels, on average, landed swordfish in west coast ports. Some of these longliners enter the fishing areas used by the Hawaiian longline fishery. They are not subject to the stringent regulations protecting sea turtles and seabirds that are applicable there to Hawaii-licensed longliners.

Since 1999, vessels fishing under a Hawaii longline, limited-access permit have been restricted through a series of emergency interim rules by area-season closures and other regulations to protect sea turtles and seabirds. As of June 12, 2001, NMFS's emergency interim rule, effective for 180 days (66 FR 31561), prohibits targeting swordfish north of the equator and prohibits longline fishing in the block area 0°-15°N, 145°-180°W during April and May to protect sea turtles, and also requires specific turtle handling and resuscitation measures. Additionally, to protect albatrosses if longlining for tunas north of 23°N, thawed blue-dyed bait, strategic offal discharge, line-setting equipment (to place baited hooks below the surface quickly), and specific bird handling and rescue techniques are required. Furthermore, the longline vessels must take observers at a fleet coverage rate of at least 20%.

Vojkovich and Barsky (1998) provide information on the first half-decade of the California-based high seas longline fishery for swordfish and tunas (1991 and 1994). In the early years, only 3 high seas vessels fished beyond the EEZ and landed in West Coast ports. Because there was no formal reporting requirement prior to 1994, it was difficult to gather information on the location of longline fishing areas of the small fleet, but from discussions with vessel captains, they reportedly fished either the same central Pacific areas as the Hawaii-based longline fleet, or farther east, nearer the EEZ boundary from 42°N south to 21°N and west to 135°W. In late August 1993, the fleet expanded when longline vessels from the Gulf of Mexico began arriving in southern California. By 1994, the fleet had expanded to 31 vessels. In 1995, 5 vessels from the Hawaiian fleet

began operations in California due to the higher price realized from the sale of their fish. Some of these vessels later dropped out of the fishery, but in 1999, a large group of Hawaiian-based longliners established operations in California. There remain about 4 long-term California-based high seas longliners in the fishery off the Pacific coast, in addition to about 31-32 vessels that relocated from Hawaii, with a total of 37 vessels having made landings in west coast ports in 1999 (average fleet size, 1994-1999=28). As mentioned above these vessels, which have at least temporarily removed their Hawaii longline permits from their vessels, are currently not subject to the stringent regulations protecting sea turtles and seabirds that are applicable to Hawaii-licensed longliners, and some of these longliners have relocated from Hawaii to the west coast for that reason. Areas fished by longliners who filled out California logbooks 1994-2000 are described in Fig 1.

1.4.2.2 Longline Options

In the discussion below, it is assumed that the Council adopts longline gear as legal gear. This allows consideration of the options for longline fishing outside and inside the EEZ. In the analyses of those options below, there will be references to Tables 1-4. Those tables represent nominal reports of species taken by longline gear that have not been corrected for possible biases, especially differences (spatially and temporally) in non-reporting on skipper logbooks. These data are used here to indicate possible large-scale differences in the distribution patterns of protected species, and **not** to estimate take rates or population densities.

1.4.2.3 Options for Management Authority

As with drift gillnet fishing, there are two types of decisions to be made by the Council. First, the Council must decide whether to actively manage the longline fishery through regulations under the FMP. Second, assuming the affirmative, the Council must decide what conservation and management measures to impose within the EEZ and on the high seas.

1.4.2.4 Management Process

The following options describe three basic approaches the Council could use to address the issues involved in longline fishing under the Council's jurisdiction.

Option 1 - Leave Management of the Fishery to NMFS and the states

Under this option, NMFS would use the authority of the Secretary under the Magnuson-Stevens Act, ESA and MMPA to develop and administer management controls over the longline fishery, and state regulations would be promulgated as the states deem necessary.

Option 2 - Include Longline as Actively Managed Gear but Explicitly Defer Regulation to the States

Under this option, the Council would affirm that current state regulations are appropriate to manage the longline fishery, and statew would promulgate regulations as they deem necessary. The Council would have the authority to use the framework procedures to adopt Federal management measures in the future. The Council presumably would review any future changes in state regulations to determine whether these would be appropriate given the objectives of the FMP. Under this alternative, NMFS could use the authority of the Secretary to address related management concerns (such as seabird and sea turtle protection) to the extent necessary.

Option 3 - Include Longline as Actively Managed and Propose Initial Regulations

Under this alternative, the Council would agree that immediate Federal regulations are appropriate, evaluate regulatory alternatives described in the following section and decide on initial regulations for the longline fishery.

Analysis

These alternatives are essentially administrative in nature and would probably not have substantially different impacts on the stocks, fisheries, or related resources. The principal differences are in (a) what entities make decisions in what manner; (b) the manner by which fishery and public inputs are made in the process; and (c) the speed with which decisions would be implemented.

Under option 1, existing state regulations would remain in place and could be amended from time to time, although some might be superseded by independent action by NMFS. It is assumed that NMFS would take regulatory action to deal with sea turtle and seabird protection issues, giving due consideration to such other issues as bycatch and community impacts but not bound to the objectives of the Council FMP. NMFS could use the Council as a means to obtain fishery and public input but also could use other mechanisms. The NMFS process is not as structured for open and deliberative decision making as the Council process. There would be little direct cost for the Council in this process. The cost to NMFS would be higher than for other alternatives. Given the head start that the Council has in the decision process, it is likely that independent NMFS action would be slower than Council action to effect management controls, especially on high seas fishing. Option 1 and 2 could allow rapid state action, but NMFS would likely still have to take independent action to protect sea turtles and seabirds, at least on the high seas. State action may be hampered by lack of agency authority because regulatory authority over longline fishing may still be in the hands of legislators rather than fish and game agencies. However, to the extent fishers have established working relations with state agencies, this approach could be more comfortable to the fishery participants. These processes are not as open as the Council process. This alternative would have moderate cost impacts on the Council as a fishery management team would probably still have to be in place to provide a technical basis for Council consideration of whether to develop future regulations if it is found that relying on states or NMFS for management is not having the desired effects. NMFS and states would also face moderate costs. Again, the likelihood of prompt action may be greater by relying on Council action under the FMP rather than by a delay associated with independent NMFS action.

The third option would build on the work done in the Council process to date and immediately implement conservation and management measures through the FMP and rely on the Council process for development of future regulations as more information or new conditions warrant. The open and deliberative management process of the Council ensures a systematic method for obtaining fishery and public inputs into decision making. This has the highest cost for the Council and somewhat lower costs for states and NMFS.

1.4.2.5 Longline Fishery Management on the High Seas

Option 1 - Adopt Minimum Seaturtle and Seabird Measures Protective Measures

Allow high seas longlining outside the EEZ subject to selected WPRFMC regulations, initiating review and consultation processes to develop more specific regulations for the protection of turtles and seabirds in areas fished by the West Coast-based high seas longline fleet in the eastern Pacific. This option would allow swordfish fishing; therefore, restrictions 2, 5, and 7 of the measures listed below would not be required. Swordfish may be targeted. Light sticks could b used. There would be no restrictions on the depth longline gear is set.

At the outset, minimum mitigation measures should prohibit longline fishing by US West Coast-based vessels in waters south of the Hawaiian Islands (from 15°N. lat. to the equator, and from 145° E W. long. to 180° E long.) during the months of April and May as required of the Hawaii fleet; impose the same sea turtle handling and resuscitation measures as required by the Hawaii fleet; and require all longline vessel operators to attend annual protected species workshops. To protect albatrosses, thawed, blue-dyed bait and practicing strategic discard of offal would be required in all areas, as well as adequate observer coverage. VMS would be required to enforce area closures.

Issues

- Mitigation procedures for protected species (primarily turtles and seabirds) used aboard vessels would be consistent with rules for the Hawaii longline fishery.

- Future protective measures should be based on analysis of species risks in the main swordfishing areas of the west-coast based fleet, which fishes predominately closer to the U.S. mainland in a different area from that of the Hawaiian fleet (which fishes predominately in the central Pacific north of Hawaii). These two fleets may have a different set of risks.

- As a custom set of regulations for the west coast-based fleet is developed, catches, bycatch, and protected species mitigation measures might differ from that of the Hawaii longline fishery, although the stocks fished may be the same.

- Requires VMS or other monitoring devices to enforce specific area closures under both Council jurisdictions on the high seas and increased mandatory observer coverage, possibly up to 100%.

Western Pacific Protected Species Regulations and Implementation

Because of the complexity of turtle and seabird rulings in the central Pacific, the following is a summary of actions taken to address the effects of longline fishing. The actions taken regarding seabirds have been in response to a November 28, 2000, Biological Opinion issued by the U.S. Fish and Wildlife Service on the potential effects of the Hawaii-based longline fishery on the endangered short-tailed albatross. The fishery is managed under the authority of the Fishery Management Plan for Pelagic Fisheries of the Western Pacific Region. Most of the actions taken involve longline fishing for swordfish because swordfish longline gear is deployed more shallow than longline gear used for tunas and has a greater impact on sea turtles.

On December 27,1999 (64 FR 72290), NMFS issued, under the authority of the Magnuson-Stevens Act, an emergency interim rule, effective for 180 days, closing certain waters to fishing by the Hawaii based longline fishery. The intent was to reduce adverse impacts to sea turtles resulting from the fishery while NMFS prepared a comprehensive EIS for the FMP. The objective was to have appropriate time and area closures based upon the greatest benefit to sea turtles while considering the costs to the longline fishery. Subsequently, NMFS issued a proposed rule (65 FR 8107, February 17, 2000) requiring possession and use of line clippers and dip nets aboard vessels registered for use under a Hawaii longline limited access permit. Line clippers and dip nets were to be used to disengage sea turtles hooked or entangled by longline fishing gear. The rule required specific methods for handling, resuscitating, and releasing sea turtles. The final rule was published on March 28, 2000 (65 FR 16346). The December 27, 1999, emergency interim rule was extended on June 19, 2000 (65 FR 37917). The temporary area closure was maintained until December 23, 2000, or until new time and area closures, as imposed by the Court, were implemented by NMFS.

On July 5, 2000 (65 FR 41424), NMFS issued a proposed rule to require Hawaii-permitted operators to use two or more of six specific bird mitigation techniques when fishing with pelagic longline gear north of 25° N. lat.; annually attend a protected species workshop conducted by NMFS; and release all hooked or entangled sea birds in a manner that maximizes their post-release survival. The rule was intended to reduce fishery impacts on black-footed and Laysan albatrosses that are accidentally hooked or entangled and killed by Hawaii pelagic longliners during the setting and hauling of longline gear. The rule was also expected to reduce the potential for interactions between pelagic longline fishing vessels and endangered short-tailed albatross, which are known to occasionally visit the Northwestern Hawaiian Islands.

On August 16, 2000 (65 FR 49968), NMFS published a notice of an August 4, 2000, order of the United States District Court for the District of Hawaii (65 FR 49968), which amended the Court's earlier Orders Of Injunction. The order would remain in effect until NMFS completed an EIS by April 1, 2001, analyzing the effect of fishing activities regulated under the western Pacific Pelagics FMP. Under the order, certain areas were closed year-round to fishing by vessels engaged in the Hawaii-based pelagic longline fishery and other areas are seasonally closed. In certain areas, limitations were placed on fishing effort and 100 percent observer

coverage was required. In the remaining area, fishing for swordfish was prohibited, observer coverage had to be increased to 10 percent by September 21, 2000, and to 20 percent by November 2, 2000, and vessel operators were required to submit written reports to NMFS within 5 days of returning to port of any swordfish taken during that trip. NMFS had to make observer reports available to the court by the first of each month, continue to require Hawaii longline vessels to carry and use NMFS-approved line clippers and dip nets, and continue its research into the effects of several different gear modifications to reduce or eliminate the incidental catch of sea turtles. On August 25, 2000 (65 FR 51992), NMFS published an emergency interim rule replacing the previous emergency rule and implemented the court's August 4th order. On November 3, 2000 (65 FR 66186), NMFS published changes to the emergency interim rule restricting fishing for swordfish in a specific area, established requirements for setting longline gear, and prohibited lightsticks. On February 22, 2001 (66 FR 11120), NMFS published an extension to the emergency rule. On March 19, 2001 (66 FR 15358), NMFS published an emergency interim rule that closed the longline fishery during a specific period and clarified closure requirements. On April 19, 2001 (66 FR 20134), NMFS published a notice that announced the terms of the March 30, 2001, order of the court, which modified the previous order of August 4, 2000. The order restricted the Hawaii-based longline fishery based on the preferred alternative of the Final FEIS, which had been completed according to the court's order.

On June 12, 2001 (50 CFR Part 660, 66 FR 31561), NMFS issued an emergency interim rule, effective for 180 days, applicable to vessels registered for use under a Hawaii longline limited access permit. The rule prohibits the targeting of swordfish north of the equator by Hawaii longline vessels; prohibits longline fishing by Hawaii longline vessels in waters south of the Hawaiian Islands (from 15°N. lat. to the equator, and from 145°W. long. to 180° long.) during the months of April and May; allows re-registration of vessels to Hawaii longline limited access permits only in October; imposes additional sea turtle handling and resuscitation measures; and requires all Hawaii longline vessel operators to attend an annual protected species workshop. This rule implements the order issued on March 30, 2001 by the court and supercedes the court's order of August 4, 2000, and the rule supercedes the emergency rules published on August 25, 2000; November 3, 2000; February 22, 2001; and March 19, 2001. Other parts of this emergency interim rule implement the terms and conditions contained in the November 28, 2000, Biological Opinion (BO) issued by the U.S. Fish and Wildlife Service on the effects of the Hawaii-based longline fishery on the endangered short-tailed albatross. To protect albatrosses, thawed, blue-dyed bait and practicing strategic discard of offal are required while fishing north of 23°N. A 20% observer coverage is also required. The rule is effective through December 10, 2001. Any future adjustments to this ruling will be incorporated through the FMP framework process as discussed in HMS FMP Framework document, Section ____. The Western Pacific Fishery Management Council is preparing a regulatory amendment to its FMP to permanently implement management measures to minimize the effects of longlining on sea turtles and birds.

Gear restrictions for the Hawaii-Based Fleet as of September 1, 2001

1. Line clippers, dip nets, and bolt cutters must be carried aboard each vessel for releasing turtles;
2. A vessel may not use longline gear to fish for or target swordfish (*Xiphias gladius)* north of the equator (0° latitude).
3. The length of each float line used to suspend the main longline beneath a float must be longer than 20 m (65.6 ft or 10.9 fm).
4. From April 1 through May 31, a vessel may not use longline gear in waters bounded by 0° latitude and 15°N latitude, and 145°W longitude and 180°W longitude;
5. No light stick may be possessed on board a vessel;
6. When a longline is deployed, no fewer than 15 branch lines may be set between any two floats;
7. Longline gear must be deployed such that the deepest point of the main longline between any two floats, i.e., the deepest point in each sag of the main line, is at a depth greater than 100 m (328.1 ft or 54.6 fm) below the sea surface;
8. While fishing for management unit species north of 23°N latitude., a vessel must:
    - Maintain a minimum of two cans (each sold as 0.45 kg or 1 lb size) containing blue dye on board the vessel during a fishing trip;
    - Use completely thawed bait to fish for Pacific pelagic management unit species;

- Use only bait that is dyed blue of an intensity level specified by a color quality control card issued by NMFS;
- Retain sufficient quantities of offal for the purpose of discharging the offal strategically in an appropriate manner;
- Remove all hooks from offal prior to discharging the offal;
- Discharge fish, fish parts (i.e., offal), or spent bait while setting or hauling longline gear on the opposite side of the vessel from where the longline is being set or hauled;
- Use a line-setting machine or line-shooter to set the main longline;
- Attach a weight of at least 45 g to each branch line within 1 m of the hook; and
- Remove the bill and liver of any swordfish that is incidentally caught, sever its head from the trunk and cut it in half vertically, and periodically discharge the butchered heads and livers overboard on the opposite side of the vessel from which the longline is being set or hauled.

There also are measures on the proper release and handling of turtles and seabirds, and the requirement for vessel operators to attend a protected species workshop each year.

To minimize the potential adverse impact of longline fishing on sea turtles and birds, measures must be devised that provide the same degree of protection as the measures applicable to Hawaii permitted longline vessels when fishing in the same North Pacific areas or in other waters. The emergency rule published for the Hawaii fishery on June 12, 2001, resulted from an environmental impact statement following a Biological Opinion, court action, and public comment. Eventually the emergency rule will be superceded by a regulatory amendment to the western Pacific FMP, which could result in changes to the existing rules. Measures for the west coast fleet must adhere to the principle that species that have been determined to be in need of protection are fully protected by all U.S. fishermen regardless of management jurisdiction.

The Team recommends that, at minimum, all bird and turtle mitigation measures described in the section above, except for measures 2, 5, and 7 be implemented to reduce the impact of fishing on sea turtles and birds. As for measures 2, 5, and 7 it is essential that these requirements, relating to the ban on targeting swordfish north of the equator and its applicability to the west coast based longline fleet, be addressed in any consultation on this FMP, along with any other area or season-specific restrictions resulting from future consultations or rulings, recognizing that fishing may have a different impact on turtles and birds in the eastern North Pacific than in the central and western North Pacific. Adequate observer coverage also needs to be applied to ensure monitoring of mitigation devices and practices and adequate monitoring of interaction levels of infrequently taken protected species, such as turtles, with consideration of fleet size for sampling.

Option 2- Adopt all Measures Applicable to Western Pacific Vessels

This option adopts the same regulations for west coast longline vessels as those required by Hawaii permitted longline vessels. More data on the west coast fleet would make the decision easier on exactly what provisions would be the most effective. This option takes the approach that adopting all the measures in effect in the western Pacific is the best place to begin assessing the impacts of the fishery.

Analysis

Adopting regulations/rules to protect turtles and albatrosses in longline fishing areas would prevent longline vessels based, or intending to base, on the west coast from fishing free of such regulations. West coast longliners that fish in areas of the Hawaii fishery should comply with the same species-protection standards as required of Hawaii longliners, especially when fishing in areas designated as high risk to protected species. However, the present Interim (180 days) Emergency Rule effective through December 10, 2001, completely prohibits targeting of swordfish north of the equator; therefore, adopting the large area ban of Option 2 in this FMP unmodified, would also close the west coast high seas swordfish fishery. This fishery, based on analyses of California skipper logbooks of California-based vessels that fished during 1994-2000, largely fishes closer to the U.S. mainland, especially east of 140°W longitude (Hawaii- and California-based longline logbook

unpubl. data, A. Coan and D. Prescott, NMFS/SWFSC La Jolla, CA 8/01). The fishery has not received large enough observer coverage to fully evaluate protected species risks to date, but analysis of more recently accumulated observer data, fishery dynamics, and known turtle dynamics may allow a determination to be made.

Option 1 would require west coast-based high seas longline fishers to adopt certain seabird and turtle vessel mitigation measures comparable to that of the Hawaii swordfish and tuna fleets, although the west coast-based fleet may also be subject to additional region-specific regulations resulting from consultations for this FMP (or any subsequent biological opinions or rulings stemming from such consultations). Option 1 and 2 would correct the inconsistency in mitigation regulations that now results from U.S. Pacific longliners from different management jurisdictions fishing in the central and eastern North Pacific. Option 1 and 2 also specifically call for the Council to initiate review and consultation processes with NMFS/USFWS, to develop area- and/or season-specific regulations that would be most suitable for the protection of turtles and seabirds in areas fished by the West Coast-based high seas longline fleet.

Protected Species Impacts

Implementation of measures to protect turtles and seabirds should significantly reduce protected species interactions and mortality, because west coast longliners would no longer be unregulated with respect to protected species. The emergency Interim rule currently in effect at least until December 10, 2001 is expected to be eventually superceded by a regulatory amendment to the western Pacific FMP. Therefore, specific action now by the Pacific Council to call for an examination of area-specific closures or mitigation measures suitable for the west coast-based fleet would ensure that our region's interests are represented in any future rulings, and would stress that a comparative analysis of the two fisheries needs to be conducted. The dynamics of the West Coast-based fleet and its distributional differences with the Hawaii fleet need to be considered in the pending FMP consultation process with regard to jeopardy to seabirds and turtles and reasonable and prudent measures to avoid such jeopardy. Findings may result in area-specific mitigation measures for the two fleets, while maintaining general regulatory consistency in areas where the fisheries overlap. However, both fisheries exploit areas utilized by leatherback turtles, and both overlap portions of the the 8,000 km long Transition Zone Chlorophyll front (TZCF), a known habitat of loggerhead sea turtles (Polovina et al. 2000). This habitat lies between 30° - 45°N (the subarctic-subtropical transition zone) in the central Pacific west of 130°. Additionally, there is a need to specifically examine the area bounded by 30°N - 35°N latitude and 125°W and 130°W longitude, where greater than 36,000 longline hooks have been set since 1994 (Hawaii- and California-based longline logbook unpubl. data, A. Coan and D. Prescott, NMFS/SWFSC La Jolla, CA, 9/01), because of recent evidence of a potential leatherback turtle migratory corridor there (NMFS 2001a). Certain time or area closures or gear modifications might be developed to avoid mortality to turtles during critical transit times through these areas.

Limited observer data indicate that turtle takes may be less frequent in the eastern North Pacific fishing area as compared with the central North Pacific, but that takes of albatross may be a potential problem. A small sample representing data from 6 observed longline trips originating from Hawaii and California that fished both east and west of 135°W (1994-2000 data, A. Coan, SWFSC, La Jolla) has indicated that catch rates of endangered leatherback and loggerhead turtles are lower east compared to west of 135°W longitude (0.05 vs. 0.07-0.10 turtles/1,000 hooks for 11 turtles). Seabird catch rates were, however, much higher east of 135°W longitude (0.25 vs 0.10 albatross/1,000 hooks for 15 albatross) (Table 3 and 4). Additionally, preliminary examination of the distribution of protected species takes (including live releases), as recorded in vessel logbooks of both the Hawaii-based and U.S. West Coast-based longline fleets combined, indicate that both albatross and turtle interactions in the eastern North Pacific may be as high or higher in certain areas than in the central and western Pacific (Hawaii- and California-based longline logbook unpubl. data, A. Coan and D. Prescott, NMFS/SWFSC La Jolla, CA 9/01). Additional observer data are needed to confirm this because of possible biases associated with logbook information, especially differences between the two fleets in the reporting of protected species interactions. These logbook data were examined only to determine broad east and central north Pacific differences in the distribution patterns of protected species, **not** to estimate levels of take representative of either of these fisheries.

Long term effects of implementing Option 1 or 2 cannot be fully evaluated until studies are completed and resulting mitigation measures or area closures are proposed.

Management Costs: Enforcement, Data Processing and Administration

There would be a substantial increase in management (especially enforcement) and data acquisition costs to monitor closed areas and to provide adequate observer coverage. Coverage of 100% may be needed initially to obtain reliable and statistically valid data and for adequate enforcement, especially if area-specific measures are required (unless alternate surveillance methods prove suitable).

Impact on Target and Incidental Fish Populations

The effect on HMS fish populations will likely not be significant because the fishery is a small portion of an international fishery, and any possible increase would not likely be enough to be measurable. Fish bycatch would decrease because of a possible reduction in swordfish target effort, and its effect on the catch of co-occurring species. Impact of any future measures would have to be evaluated when details are established concerning any recommended area-specific closures or mitigation measures specific to the west coast-based fishery.

Economic Impacts

Option 1 and 2 could be costly to longliners, depending upon the regulations adopted, thus reducing producer and consumer benefits. In 1999, the real ex-vessel revenue of swordfish landed by longline gear on the Pacific coast was $4,738,191, which was 80 percent of the fleet's ex-vessel revenue. The more shallow gear used to harvest swordfish is the fishing practice that impacts sea turtles, and thus gear modifications to protect turtles and seabirds would likely lower swordfish catches. Net benefit to the Nation could possibly increase because of the high existence value of the protected marine turtles and birds. Hawaiian longliners would not be able to circumvent their protected species mitigation regulations by fishing out of west coast ports, and west coast businesses expecting revenues from serving those vessels may be disappointed. If subsequent analyses prove that swordfish longlining in the fishing grounds of the west coast-based fleet results in less impact on turtles and other protected species (or that these interactions can be avoided), its successful development could lead to increased economic benefits to the fishery and the Nation. If subsequent analyses prove that swordfish longlining in the fishing grounds in the eastern North Pacific action area has potential for the same or greater impact on protected species, the fishery may not be able to operate unless ways to avoid jeopardy to protected species can be developed.

Impact on Essential Fish Habitat

EFH would not be affected.

Monitoring and Data Needs

Data needs other than for enforcement and catch monitoring would not be directly affected; VMS would be an efficient, but expensive means of enforcement; high rates of observer coverage would be necessary to monitoring takes of seabirds and infrequently occurring protected species and compliance with mitigation procedures. Data and analyses will be needed to compare the dynamics of the two fleets (Hawaii-based and California-based), their respective fishing grounds, and similarities and differences in risks to protected species by the two fleets, especially from the west coast fleet perspective and for the area east of 140°W longitude.

Consistency with the Western Pacific FMP

This option addresses the current inconsistency concerning mitigation procedures used aboard vessels for protected species; however, future protected species mitigation measures may differ. There may be regulatory inconsistencies based on areal or other differences in species complexes and encounter rates, which would

warrant a different set of mitigation measures, but these would not be inconsistent with providing required protection to protected species.

User Conflicts

Implementation of this option would reduce potential conflicts between western Pacific and eastern Pacific longline fishers who now abide by two separate rules but who have the capability of fishing the same areas. Competition in west coast ports would continue to increase as long as Hawaii longliners are able to relocate here to escape the stringent western Pacific regulations. Also, west-coast based fishermen, who now target swordfish, oppose being forced to comply with western Pacific species protection rules developed for another jurisdictional area where they do not fish.

Safety at Sea Issues

Safety at sea could be affected if mitigation procedures for protected species involve risk to fishers.

Relation to Objectives of this HMS FMP

FMP objectives for promoting inter-regional management and compliance with protected species laws would be met, and a solution providing for both high seas longlining and protected species would promote diverse commercial fisheries.

Consistency with International Obligations

There would be consistency with national and international obligations on protecting vulnerable or endangered species, including NPOA-Seabirds regarding seabird takes in longline fisheries.

Option 3-Allow Fishing Only under an EFP

This option would allow only a certain number of longline vessels based in west coast ports to fish on the high seas and only under specific measures to assess the impacts of the fishery.

Analysis

A description of the longline fishery can be found in Part A, Section 2.2.5. Most of the vessels participating in the fishery have relocated from Hawaii. This option would allow a limited number of vessels to conduct a fishery, but only under an EFP with specific restrictions to ensure a thorough analysis of longline fishing in the eastern Pacific. This is a more measured approach to addressing the issues of longline fishing than under Options 1 and 2, which require judgements to be made on the restrictions that should apply to longline fishing. Options 1 and 2 put no restrictions on the number of vessels, but the gear and the conduct of the fishery is controlled. Allowing a fishery only under an EFP would have a minimum impact on longline vessels if permits were issued based on historical participation. The majority of the vessels fishing from west coast ports are vessels that have temporarily separated the Hawaii permit from the vessel and are not required to adhere to central and western Pacific regulations. To continue fishing, these vessels would have to regain a permitted status. No vessels would be prohibited from fishing by this option, and the impact on endangered and threatened species would be minimized.

1.4.2.6 Longline Fishery Management in the EEZ

Option 1-Allow Longlining as an Alternative to Drift Gillnet Fishing (Industry Proposal)

Authorize a limited entry pelagic longline fishery for tunas and swordfish within the EEZ, with effort and area restrictions, to evaluate longline gear as an alternative to drift gillnet gear to reduce bycatch, or bycatch mortality, and determine if a longline fishery is an economically viable substitute for drift gillnet gear (Should

the Council choose this option, further details on the limited entry portion would be addressed in a plan amendment after implementing regulations are adopted).

- Limit initial longline fishing effort to a maximum of 10 drift gillnet permitted vessels (10 vessels to be determined through Plan amendment/limited entry process), and restrict the use of drift gillnet by those vessels (can use either longline or drift gillnet, but not both, during a one-year period);
- Prohibit fishing with longline north of Pt. Conception within 25 miles of shore and, south of Pt. Conception, east of a line from Pt. Conception to the western tip of San Miguel Is., to the northwest tip of San Nicholas Is., to the intersection of longitude 118°00'00" W with the southern boundary of the U.S. EEZ (Figure 1);
- Institute monitoring and reporting requirements to document longline effort, harvest, bycatch, and bycatch mortality levels;
- Evaluate the performance of the longline fishery as part of the SAFE process, and adjust longline effort up or down, or enact other restrictions or regulations as appropriate through framework rule-making procedures.

History and Background of Option Development

Longlining is currently not allowed within the U.S. West Coast EEZ (except by special permit beyond 25 miles off Oregon), although it is conducted in areas just beyond the EEZ. High-seas longline fisheries for tunas and swordfish have been conducted in the eastern north Pacific by Japanese vessels since the 1950s, Korea and Taiwan vessels since the 1960s, Mexico vessels since at least 1961, and the U.S. (Hawaii- and California-based vessels) since 1991 (Holts and Sosa-Nishizaki 1998). (See Chapter 2 in FMP Framework document for historical background and management of these fisheries.)

This option refers to a specific proposal to longline for tunas (particularly bluefin and bigeye tunas), swordfish, and other marketable pelagic fishes within the EEZ, with restrictions designed to keep total drift gillnet (CA/OR) fleet size unchanged. As of 2000, 126 valid drift gillnet permits remain. This proposal would eliminate an additional 10 permits from this pool of potential drift gillnet effort. The proposed fishery would be exploratory to determine the more regular locations of bluefin and other deep tunas, and investigate the feasibility of fishing for them in the outer EEZ by a method with an anticipated lower bycatch or bycatch mortality and marine mammal take than by drift gillnet. Only permitted CA/OR drift gillnet fishers would be considered for possible gear switch to longline, and only one type of gear (whether longline or drift gillnet) is to be used over any given one-year period. Also, to mitigate conflicts with sport fishers, especially over striped marlin, longlining would be prohibited in the major essential habitat areas of marlin and inshore areas important to sport fishers.

The gear-switching concept (drift gillnet to longline) partly stemmed from past discussions on how to reduce marine mammal take. In 1996, the Pacific Offshore Cetacean Take Reduction Team (POCTRT) identified conversion of swordfish drift gillnet gear to longline gear as a strategy to reduce the incidental take of marine mammals in the drift gillnet fishery. This strategy was not pursued in the Take Reduction Plan because the drift gillnet fishery was managed by California, not under a federal FMP.

In May 2000 this issue was revisited by the POCTRT. The Team stated support for the exploration of more selective gears for use by the Drift gillnet fishery that demonstrated a reduction of bycatch. On June 29, 2000, a proposal presented to the HMS Advisory Subpanel referenced the POCTRT's support for exploration of longline as an alternative to reduce bycatch in the drift gillnet fishery.

In an October 23, 2000, NOAA/NMFS memo,[1] NMFS considered whether converting drift gillnet vessels to longline gear would reduce the number of sea turtle entanglements. It reasoned that because state laws prohibited longline fishing within the EEZ, only larger vessels would be able to fish beyond it, which would have a significant impact on the fishery, effectively the same as closing it down. Because this was thought to be

[1] For Administrative Record for the 101(a)(5)(E) permit-CA/OR drift gillnet fishery section 7 consultation.

inconsistent with the intended purpose of the action, which is to allow the lawful incidental take of listed marine mammals during the course of fishing operations, NMFS did not pursue this option further. It expected that vessels might switch to longline gear on their own if they thought it was economically viable, but pointed out that longline gear was also known to incidentally capture sea turtles.

On July 17, 2000, a complete discussion of this concept, as well as related issues, was presented to the HMS Plan Development Team in a proposal authored by fishermen. Plan Development Team agenda item H-5 reads: "Evaluate longline gear as an alternative gear type to drift gillnet fishing to be used in the west coast EEZ."

During the development of this plan, and in the course of evaluating various longline options, the Council has received a considerable number of comments expressing opposition to longlining within the U.S. West Coast EEZ from the recreational fishing and environmental communities. Approximately 92% of 3,182 letters to the PFMC have alleged that longline, as an option for an alternative gear to Drift gillnet, would damage shark, swordfish, seabass, seabird, and sea turtle stocks. The industry contends that the original and primary intent of this option (i.e., to evaluate reduction in bycatch, or bycatch mortality between longline and Drift gillnet gears), has become clouded during the drafting of earlier versions of this draft FMP because it has been intermingled with discussions about longline as a general gear type, and alternative proposals calling for research protocols.

Analysis

Species Impacts, General

Little is known of the dynamics of deepwater tuna resources and associated species in the area of the California Current in the more offshore portions of the EEZ where the fishery is proposed. There has been no history of deep-longlining for tunas in this oceanographic region. Waters within the U.S. West Coast EEZ, especially the outer waters of this zone, are cooler and less saline than more inshore waters, and also cooler and less saline than more oceanic waters beyond the EEZ. The broad California Current, which carries colder, fresher water equatorward along the coast, dominates the EEZ. It is broader in the north and narrower in the south, extending approximately to the outer EEZ boundary south 40°N latitude, although its position and intensity can shift seasonally and from year to year with shifts in the Subarctic or California Front. Shoreward it mixes with plumes of cold, more saline upwelled water in the north, or warm countercurrent and gyre water of the Southern California Bight in the south. Seaward, the Current is bounded by the more oceanic waters of the Transition Zone, the Subarctic Front at the Zone's southern boundary, and to the south and west, waters of the North Pacific Central Water Mass (Saur 1980; Lynn 1986; see also EFH Chap. 4 Figure 1). Off Southern California, the California Current serves as a cold water barrier between the warmer, more tropical waters of the Southern California Bight inshore of the Santa Rosa-Cortes Ridge, and the warmer oceanic waters to the west beyond the outer EEZ boundary (Hickey, 1998; Lynn and Simpson 1990; Lynn et al. 1982, Norton 1999). Thus species taken by longline operations beyond the EEZ boundary, or in former longline operations within the EEZ but further inshore (e.g., the blue shark-mako shark experimental fishery, 1988-91) may not be representative of catches and species interactions that may occur in the proposed fishery. Additionally, much of the data on pelagic longlining are based on the high seas fishery that primarily targets swordfish (fishing gear in more shallow depths and at night), or inshore longlining that has targeted sharks.

Nonetheless, certain approximations can be made based on what is known of various longline operations in areas adjacent to the proposed fishing area, how catches compare with operations further westward and to the south, and what is currently known about the distributions of target, incidental and protected species. Some inferences may also be drawn from fisheries in other cold, eastern boundary currents, such as swordfish longline fishery in the Humboldt Current off Chile (Widner and Serrano 1997). To better assess potential species composition and bycatch and protected species interactions, we examined various sources of information on central and eastern Pacific high seas longlining, and past experimental and research longlining operations within and outside of the EEZ. This included 1994-2000 data from the Hawaii-based and California-based high seas longline fishery, including observer and logbook information from vessels fishing east and

west of 135°W (Tables 1, 2, 3). The Management Team has also ranked and compared target, incidental, bycatch and protected species for these longline vessels (1994 through 2000) with those taken by the drift gill net fishery during the period 1997-1999 (Table 4). This was done to compare the likely differences between what has been taken in the drift net fishery to what is likely to be taken with longline in the proposed fishing area, using the most comparable data available.

Impact on Target/Market Species

Catches of longline vessels fishing in areas adjacent to the Pacific coast EEZ indicate that broadbill swordfish, albacore, bigeye tuna, bluefin tuna, yellowfin tuna, opah, escolar, shortfin mako, thresher shark and dorado could be potential market species for this fishery (although dorado is probably less likely to be taken in the cooler offshore waters, and especially in deeper water). One longline fisherman targeting swordfish also supplied information on five trips by his vessel while targeting primarily swordfish near the West Coast EEZ boundary (pers. comm., P. Dupuy, commercial fisherman). His data showed the following overall catches by numerical percent—swordfish, 50.8 percent; bigeye tuna, 43 percent; yellowfin tuna, 2 percent; bluefin tuna 1.3 percent; mako shark 2.7 percent. Limited data are also available for the area just south of the CA/OR/WA EEZ off Mexico. One early exploratory swordfish longline trip that fished along the 1,000 fm curve off central Baja California yielded 33 swordfish, 1,500 blue sharks, 83 sharks of five species, a few dorado, and one striped marlin (Kato 1969, total number of hooks set = 4,208). Shark species that would possibly enter the catch in this area by this method would be shortfin mako, silky shark (*Carcharhinus falciformis*), Galapagos shark (*C. galapagensis)*, silvertip shark (*C.albimarginatus*), oceanic whitetip shark (*C. longimanus*), common thresher shark, pelagic thresher shark, and scalloped hammerhead (*Sphyrna lewini) (*S. Kato, pers. commun. Larkspur CA, 7/12/2001*)*.

While these longline catches adjacent to the EEZ give some indication of catch composition, species and relative proportions may change as methods are developed to more selectively fish for the deepwater tunas. Adult-sized bluefin tuna (>50kg) do occur irregularly in surface waters near the islands and offshore banks off southern California, especially during fall and winter (Foreman and Ishizuka 1990) and may occur more regularly at depth in offshore waters. The drift net fishery also lands small bluefin incidentally. Bigeye tuna have been regularly taken by Japanese longliners fishing near the outer boundary of the U.S. West Coast EEZ (Uosaki and Bayliff 1999) and by California- and Hawaii-based longliners fishing east of 135EW longitude. Escolar, *Lepidocybium flavobrunneum*, which was among the top eight species taken by observed high seas longline vessels fishing east of 135°W longitude (Table 4), has become increasingly in demand for the restaurant trade and is expected to provide additional value to incidental landings. This tuna-like species is a large mesopelagic predator that often migrates to the surface at night (Ambrose 1996b).

Inside the EEZ, limited longline catch information is available for the Southern California Bight, recognizing that these waters are generally much warmer and the physical oceanographic structure different from offshore in the California Current proper (Lynn and Simpson 1990). Data are available from a former experimental longline fishery for mako and blue sharks, which took place from 1988-1991. This fishery was discontinued because 1) it could not develop a viable market for blue shark, 2) concern over the predominance of juvenile mako sharks and incidental catches of sea turtles and marine mammals, and 3) potential for capture of striped marlin, even though none had been observed in the catch (O'Brien and Sunada 1994). It was also conducted with cable longline, which is thought to produce weak galvanic electric currents that attract sharks by altering the surrounding electric field (Hueter and Gilbert 1990). Monofilament line used in tuna longlining lacks this property. In this fishery, blue sharks made up 62 percent of the total catch, shortfin mako sharks 29 percent, and pelagic stingrays (*Dasyatis violacea*) 9%. The rest of the catch (less than 1 percent in aggregate) consisted of California sea lions, one green sea turtle (*Chelonia mydas*), giant seabass (*Stereolepis gigas*), common thresher shark, ocean sunfish, hammerhead shark (*Sphyrna* spp.), Pacific mackerel, and finescale triggerfish (*Balistes polylepis*) (Table 5). During one observed year (1988), 52 percent of the blue sharks released were judged in "good" condition and likely to survive; in another year (1989) observers estimated 88 percent of blues returned to the water were in "good" condition, the increase in survival attributed to use of de-hooking devices (O'Brien and Sunada 1994).

Limited catch information is available from scientific research cruises conducted by state and federal scientists. In September 1968, a swordfish research longline cruise was conducted near San Clemente, Santa Barbara, and Santa Catalina Islands within the Southern California Bight (USFWS 1968[2]). This represented a small effort (total hooks set=1,236), but yielded a catch of 2 broadbill, 2 mako sharks, and an extraordinary catch of 553 blue sharks (equal to a hook rate of 447/1,000 hooks). Catch composition and catch rates are also available for NMFS shark research vessel surveys, which have taken place intermittently between 1993 and 2000 within the Southern California Bight (Table 5). These research vessel surveys targeted mako shark in 1994-1997, thresher shark in 1998-1999, and both species in 2000. The purpose of the surveys is to develop a fishery-independent index of abundance for juvenile pelagic sharks (especially shortfin mako) that could be linked to the former 1988-1991 mako-blue shark longline fishery. Sampling stations around the offshore islands and banks were chosen based on known areas of former high mako shark catches. In 1998 and in 1999, sampling switched to inshore stations to target common thresher shark for telemetry and satellite tagging experiments. In 2000, sampling protocol was modified and broadened to survey relative abundance of both shortfin mako and common thresher. Over the seven year period, the catch has consisted of mostly blue shark (66 percent), shortfin mako (22 percent), pelagic stingray (9 percent), and common thresher shark (3 percent), with the remaining species making up less than 1 percent of the catch (Table 6). No turtles were reported entangled on any of these research cruises; however, a total of one Brown Pelican and two California sea lions have been entangled (released alive) on NMFS shark cruises between 1994 and 2000 (S. Smith and D. Ramon, NMFS/SWFSC, La Jolla, CA, pers. commun. 7/01).

Impact on most highly migratory tuna stocks by 10 vessels in this area is not expected to be significant in stock-wide terms. Nonetheless, fishing mortalities would increase for bluefin and other tunas depending upon the degree to which fishing is successful, and if the size of the initial fleet of ten expands. Currently, U.S. West Coast vessels, mainly purse seines, already land approximately 12 percent of the Pacific-wide northern bluefin catch (FMP, Ch. 3 Table ___).

Of the tunas, least is known of Pacific northern bluefin tuna, and its spawning ground (in the western Pacific) is also much more localized than that of other tunas. Effect of Pacific-wide exploitation on this species is not clearly understood because vital rate estimates (e.g., mortality rates) are imprecise, and there are no catch rate series that clearly follow abundance. Also, It is still unclear how long bluefin tuna reside in the eastern Pacific before or after spawning in the Western Pacific, or from where the very large adult bluefin that erratically appear in the West Coast EEZ (Bayliff 1994) originate. Much needs to be learned about residency times and movements within the U.S. West Coast EEZ. According to recent NRIFSF archival tagging data (Itoh et al. 1999), the journey from the western to the eastern Pacific is known to take as little as 55 days, after which time tagged fish have been known to remain off the coasts of California and Baja California for up to 2 years before returning to the western Pacific. Thus bluefin have the potential of remaining within the EEZ for much longer than previously thought. And very large adults, which used to be far more common in our EEZ (e.g., Collins 1892; Bayliff 1994), represent valuable reproductive potential for the population, so any intense exploitation of these individuals might represent a significant loss to the stock. Also, dynamics of bigeye tuna within the U.S. West Coast EEZ and exchange between the central and western Pacific is not well known. So although the anticipated catch relative to other segments of the Pacific-wide fishery is expected to be minimal, based on present knowledge of this species in the region, it is difficult to determine the relative impact of this fishery.

Swordfish would also be taken, although regulations concerning the targeting of swordfish will also have to be reconciled with restrictions placed on U.S. fisheries in adjacent areas of the Pacific (e.g., Federal Register Vol. 66, no 113, June 12, 2001, p. 31561-31565). While overall swordfish mortality within the EEZ should decrease with replacement of gillnet with longline effort (because longlines are generally less efficient at taking swordfish), total swordfish mortality might increase if the fishing season is expanded considerably beyond the effective drift gillnet season (Aug 15 - Jan 31). If good catches of swordfish can be made year-round, increased fishing time and effort might more than compensate for lowered fishing power of the gear. But year-round fishing is unlikely since swordfish are generally only available within the EEZ September through December.

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[2] USFWS. 1968. Cruise Report, AVR Miss Behavior, MB-19, September 23-September 28, 1968, Bur. Comm. Fish., Fishery-Oceanogr. Ctr., La Jolla, CA (now NMFS/SWFSC, La Jolla, CA).

Impacts on shark species are expected to vary, depending on locations and times of year fished, and possibly fishing depth. Although catch rates of common thresher are expected to be comparatively less than by drift net, springtime-reproducing common thresher and shortfin mako sharks might become vulnerable to the longline gear. Mature adults of the common thresher, now recovering from its previous reduction to below B_{MSY}, are most abundant in May or earlier (Hanan et al. 1993) off California, and July through mid-October off Oregon and Washington (Stick and Hrehra 1988). Switching to low catch areas further offshore, or modifying bait configuration or hook types might reduce takes of these sharks. But the potential for increased mortality on reproductively valuable adults above what currently exists, still remains, especially if fishing takes place in areas and seasons when and where adult thresher shark occur. Adopting existing drift gillnet area/season closures should help protect these adults (see Secs. __ and ___ on drift gillnet area and season closures and shark conservation options). Impacts on the much less productive shortfin mako shark is difficult to predict at this time given the lack of information on the habitat of adults and sub adults in the outer EEZ. Present gillnet operations catch predominately juvenile mako on their nursery grounds, but offshore deep longlining may tap into reserves of reproductive adults, which are more valuable to the population in terms of long-term ability to sustain or even rebound from increased fishing mortality. Removals of adult females, which have survived the gauntlet of fishing and other sources of mortality, have more impact on shark stocks that mature late in life than removals of the more numerous immatures (many of which will die of natural causes during the extended juvenile phase typical of late-maturing sharks). Mako shark have comprised a major portion of incidental catch and bycatch in the swordfish longline fishery off Chile in the comparably cool Humboldt Current area (Widner and Serrano 1997). Also, deep longlining may result in increased catches of the deep-living bigeye thresher shark, a species commonly caught by longline fishermen on the high seas (Kato et al. 1967) and one with very low productivity (Smith et al. in press); however, potential take levels are impossible to predict given the available data. See *Impact on Fish Bycatch* below for discussion on blue shark.

Potential Impact on Marine Mammals

Gear switching from drift net to longline will likely result in a significant reduction in cetacean and pinniped takes (especially mortalities from those takes) due to the nature of the gear and, to some extent, the offshore fishing location (e.g., where pinnipeds are less likely to venture). In the Atlantic swordfish fishery, observer and vessel logbook data indicated that driftnet gear results in a significantly higher rate of take of protected marine mammals relative to other gear such as pelagic longline (63 FR 55998, October 20, 1998). Nonetheless, certain cetaceans still have a take potential, even though mortality from such interactions is expected to be low, especially for large cetaceans. These cetaceans interact either through depredation (e.g., toothed whales) or by entanglement (e.g., baleen whales). Species include the sperm whale (*Physeter macrocephalus*), Short-finned pilot whale (*Globicephala macrorhynchus*), Northern right whale dolphin (*Lissodelphis borealis*), Risso's dolphin (*Grampus griseus*), false killer whale (*Pseudorca crassidens*), bottlenose dolphin (*Tursiops truncatus*) and humpback whale (*Magaptera novaeangliae*), which have been known to interact with central and eastern Pacific longline fisheries and occur in the West Coast EEZ (WPRFMC Pelagic Fisheries FMP; CDFG data on experimental shark fishery; NOAA 2000; Forney et al. 2000; P. Kleiber, NMFS, Honolulu Laboratory, Hawaii, pers. commun. 7/20/01). Sperm whales are known to be attracted to longline operations in Alaska and have been involved in documented longline entanglements (probably due to depredation attempts by the whales), although there have been no reported injuries or mortalities (NOAA 2000). Observers in the Hawaii longline fishery during the period 1994-1997 (approx. 4-5% coverage) reported takes of 4 Risso's dolphin, 1 Bottlenose dolphin, 1 short-finned pilot whale and 1 false killer whale, of which all were injuries except for one pilot whale mortality (P. Kleiber, NMFS, Honolulu Laboratory, Hawaii, unpub. data, 7/20/01). Humpback whales (CA/OR/WA-Mexico stock) also occur within the EEZ, spending winter and spring off coastal Central America and the Pacific Coast of Mexico, then migrating to the coast of California and north to southern British Columbia in summer and fall. One humpback of the Central North Pacific stock was observed entangled and expected to die due to interaction with a Hawaii longliner in 1991 (due to the low level of observer coverage during that year, a mortality estimate was not calculated). Northern right whale dolphin (*Lissodelphis borealis*) and Risso's dolphin (*Grampus griseus*) may be potentially taken in the more offshore fishery as well. These are primarily temperate water species occurring primarily in shelf and slope waters offshore the three states, tending to occur off California in cold water months and shifting northward into Oregon and Washington waters as water

temperature increase in spring and summer. The range of Risso's dolphin, however extends into the tropics. Fin whale (*Balaenoptera physalus*) interactions with longlines have not been documented and are not expected, but this species has been observed year-round off central and southern California, with peak numbers in summer and fall, and in summer off Oregon (NOAA 2000). There is also a possibility of entanglement of common dolphin (*Delphinus delphis)* and the offshore stock of bottlenose dolphin (*Tursiops truncatus*), which have a more offshore distribution in the California Current (Smith, et al. 1986). The short-finned pilot whale (CA/OR/WA stock) appears to be returning to the EEZ after a virtual disappearance after the 1982-83 El Niño, but its occurrence is still rare (Forney et al. 2000) and thus is highly unlikely to interact with the proposed fishery. False killer whales are also among the least likely to be encountered within the proposed fishing area because of their preference for more tropical waters.

Potential Impact on Sea Turtles

There is serious concern about the potential take of turtles, even though projected effort, at least initially, is intended to be low (10 vessels). In particular, there is concern over the potential take of leatherback sea turtles in the proposed area, even though takes with longline gear would be less likely to result in mortality compared with driftnet gear (P. Dutton, NMFS/SWFSC La Jolla, CA pers. commun. 7/18/01). Takes of this species have been reported by California-based longliners and observers on the high seas, and the average annual take rate estimated for the CA/OR drift net fishery for the period 1990-2000 is high at 13 (NOAA 2000). It is presumed that the same area and time closures that now apply to the drift gillnet fishery to protect leatherbacks would be enforced for any proposed longline fishery within the EEZ. NMFS would engage in a Section 7 consultation (formal or informal) on the potential effects of fishing with longline gear in the proposed action area to ensure that the activity is not likely to jeopardize the continued existence of leatherback turtles or any other endangered or threatened species. A fishery of this type would require management measures that would provide for data collection and monitoring to properly assess levels of turtle and other bycatch levels and assure compliance with regulations, using at least the same or greater level of observer coverage as now exists in the drift gillnet fishery (> ~20 percent).

Information on past longline turtle takes is available from the Hawaii-based and California-based high seas fisheries, but data from the latter fishery may be more applicable, especially for vessels fishing east of 135°EW longitude. In skipper logbooks, from August 1995 through 1999, California-based longline fishing vessels reported 35 hookings of leatherbacks (2 injured, 33 released alive), 21 loggerhead (released alive), 19 olive ridley (released alive) and 12 green sea turtles (released alive) (M. Vojkovich, CDFG). Hooking rates are provided in Table 4. There is limited observer data that suggest lower rates of take in the outer EEZ compared to the high seas longline fishery to the west or to the drift gillnet fishery. The observed leatherback hooking rate of six high-seas longline vessels fishing east of 135°W longitude (1994-1999) was half the rate these vessels experienced west of that longitude (Table 3) (fishing took place primarily off central California between 35° and 40°N latitude). This difference should be interpreted with caution, however, because of the imprecision of rates that are low, and, in this case, representative of only 6 trips. The low encounter rate of this species makes it difficult to assess the true impact based on such small sample sizes. In the recent Drift Gillnet/Turtle Biological Opinion (NOAA 2000) the annual take rate for leatherback turtles estimated for the California-based high seas swordfish longline fishery has been estimated at 8 (mortality 1.3) (NOAA 2000, Table 17) compared to an annual take rate for the CA/OR drift gill net fishery (1990-2000) of 13 (maximum 27 in 1995) with a mortality rate of 8 (maximum 17 in 1995).

Leatherback turtles occur Pacific-wide from 71°N latitude to 42°S latitude in the Pacific, foraging widely in temperate waters, exploiting convergence zones and upwelling areas in the open ocean, along continental margins and archipelagic waters (NOAA 2000). In the EEZ they are most abundant from Point Conception to central Oregon in summer and fall. They appear to be associated with warmer, clear oceanic waters and may enter the EEZ following warm water intrusions during relaxation of upwelling events, especially in the fall. Based on drift gillnet observer data from July 1990 through January 2000, 78 percent of leatherback entanglements occurred between Point Conception north to 45°N latitude and west to 129°W longitude between 15 August through 31 October. In addition, the highest densities of sightings on the U.S. West Coast have been in and around Monterey Bay, with a peak in sightings in August, decreasing significantly in

September and October (NOAA 2000, citing NMFS and USFWS 1998 and Starbird et al. 1993). Preliminary data indicate that leatherbacks that inhabit our EEZ waters originate from nesting groups located in the Western Pacific south of the equator in Indonesia or in the eastern Pacific along the Americas (e.g., Mexico, Costa Rica), with the majority from the Western Pacific (NOAA 2000; Peter Dutton, SWFSC/NMFS La Jolla, CA 7/01, pers. commun.).

Loggerhead, olive ridley and green sea turtles may be the least affected, considering prevailing water temperatures most of the year in the proposed fishing area and the distribution in tropical and warm temperate waters of these turtle species. Loggerheads reportedly move along the Transition Zone chlorophyll fronts in the Central Pacific characterized by 17°C SST and 20°C SST isotherms. These convergent fronts are key habitats for the species that are thought to concentrate on buoyant food organisms such as jellyfish and pelagic invertebrates (Polovina et al. 2000). Recent work by Polovina (pers. commun. NMFS, Honolulu, HI 7/30/01) indicates that elimination of shallow swordfish sets substantially reduces incidental takes of loggerheads, because they are largely found in the top 100 m, while deep sets for tunas are set below 200 m. Additionally, the ocean area west of the Santa Rosa-Cortes Ridge off southern California and areas to the north are generally much cooler than the Southern California Bight (Lynn and Simpson 1990; Lynn et al. 1982, Norton 1999), and thus presumably less likely to contain the more tropical of the pelagic and epipelagic species of fishes and turtles. The risk to these turtles will increase, however, during warm-water El Niño regime years. Green sea turtles were sighted off southern California during the 1997-1998 El Niño event (D. Hyrenbach, pers. commun, July 24, 2001).

Potential Impact on Seabirds

Seabirds, particularly albatrosses, are another concern. Albatrosses, especially younger and more inexperienced birds, are highly vulnerable to longline fisheries (Cousins and Cooper 2000). Any incidental catch of albatrosses by an EEZ longline fishery would be an increase over the level of take now in the drift gillnet fishery (which is zero; the total observed take of seabirds for 1990-1999 was: 16 Northern Fulmar and 4 'unidentified seabird' takes, NMFS Observer data). Preventative measures, such as use of blue-dyed baits, weighting of longlines, using tori lines, and strategic timing of offal discharges and set times have been shown to be effective at mitigating seabird interactions, and these measures would need to be adopted in combination with adequate observer coverage. Whether current mitigation technology will be sufficient to reduce or eliminate any potential seabird mortalities is not clear because of lack of information on fishing times, areas, strategies, and albatross encounter rates in the proposed fishing area. Some data and biological information is available, however, with which to make certain inferences.

Three North Pacific albatross species occur within the West Coast EEZ: Black-footed (*Phoebastria nigripes*), Laysan (*P. immutabilis*), and Short-tailed (*P. albatrus*) albatrossses. All three are taken by longline fisheries operating within subtropical and subarctic waters of the North Pacific and Bering Sea (Gales 1997). Although the federally endangered Short-tailed Albatross occurs within our region, it remains a rare visitor (Roberson 2000). The most abundant albatross off the west coast of Canada and the United States is the Black-footed albatross, which ranges throughout the North Pacific between 20° and 58°N latitude (Sanger 1974, Tickell 2000). This species forages more actively during the daytime, and night time foraging activity is influenced by the phase of the moon (Hyrenbach and Dotson, in press). Preliminary observer data indicate a high take rate of this species in a small number of high seas longline vessels fishing east of 135°W longitude, although the sample size is small (Table 3). The mean Black-footed Albatross bycatch rate for these vessels (which also fished west of 135°W longitude), was 0.17 albatross/1,000 hooks overall, with a rate of 0 .25/1,000 hooks east of 135°W longitude and a rate of 0.10/1,000 hooks west of 135°W. While an additional 33 trips need to be observed to bring the coefficient of variation of these estimates down to 10 percent with the observed variance, (A. Coan, NMFS/SWFSC La Jolla, CA, pers. commun., 6/01), they do give an indication of actual counts at the species level made on these observed trips. Although the Black-footed albatross is the most abundant albatross within our region, its population is smaller than that of the other regularly occurring but less common albatross in our region, the Laysan Albatross. In the primary breeding grounds in Hawaii, there are only about 59,622 nesting Blackfoot pairs, versus 558,378 nesting pairs of Laysan Albatross (Gales 1997). Neither is listed as endangered but both are protected under the Migratory Bird treaty Act (16 U.S.C. 703 et. seq.).

Furthermore, the Black-footed is considered threatened under IUCN criteria (Cousins and Cooper 2000). It is estimated that between 1994 and 1999, an average of 1,175 Laysan albatrosses and 1,388 Black-footed Albatrosses were killed in the Hawaii longline fishery each year (WPRFMC 2001)

Albatross catches reported in skipper logbooks are also available for all California-based swordfish longline vessels that fished on the high seas during the period August 15, 1995, through December 31,1999, (M. Vojkovich, CDFG, 7/11/2000). These longliners reported a catch of 100 albatross spp. caught, of which 73 percent were dead, 22 percent were released alive, and 5 percent released injured. These birds were the leading protected species taken, with a catch rate of 0.14 birds per 1,000 hooks (Table 4). If proposed fishing is primarily conducted during the day for tunas, interactions with these birds will be higher than it would be for night time fishing for swordfish, although hooking rates for albatrosses are reportedly lowest for fishers that target tuna exclusively, compared to swordfish or a mix of tuna-swordfish (USFWS 2000).

The Black-footed Albatross is abundant in the California Current summer, fall and winter but can be found in the EEZ year round (Tickell 2000). It is particularly susceptible to longline fisheries operating within the EEZ because it 1) occurs within the EEZ during all seasons (Briggs et al. 1987, Hyrenbach pers. comm. 7/24/01 La Jolla, CA), 2) is intensely attracted to vessels off southern California (Hyrenbach 2001b), and 3) appears to rely on fishery discards intensively (Gould et al. 1997). It is also known to concentrate off central California on the warm and clear side of upwelling plumes, where at least some tunas (e.g., albacore) aggregate to forage (Laurs et al. 1977, 1984; Briggs et al. 1987). Results of surveys conducted by the California Cooperative Oceanic Fisheries Investigations (CalCOFI) cruises off southern California between 1987-1998 suggest that black-foots are consistently more numerous in pelagic waters (depth >2000 m or 1093 fm) than within-slope regions (depth < 2000 m), with a small peak in abundance in spring (March - April). In early seabird distributional studies, Grinnel and Miller (1944) found them to be especially common along the edge of the continental shelf. Briggs et al. (1987) also described Black-footed Albatross concentrations along the edge of the continental shelf off the California coast north of Point Conception. Additionally, there is mounting evidence that Black-footed albatrosses aggregate at sea mounts and offshore banks of California (Haney et al. 1995). However, in spite of these coarse bathymetric and water mass preferences, multi-year studies of Black-footed Albatross distributions off California have failed to detect persistent habitat associations, suggesting that these birds exploit a broad range of oceanographic conditions (Allen 1994). Breeding birds begin returning to the Hawaiian Island chain after August. However, even during the breeding season, when the birds are generally more concentrated near their breeding colonies, they still travel considerable distances during the chick-rearing period (March-July), including to within the West Coast EEZ (Fernandez et al. 2001, Hyrenbach 2001). Recent satellite telemetry studies have revealed that breeding Black-footed Albatrosses (March-June) concentrate their foraging activities over the continental shelf of North America (central California north to Washington state) and along the Subtropical Frontal Zone (Fernandez et al. 2001, Hyrenbach 2001a). During the post-breeding dispersal, Black-footed Albatrosses forage along the southeastern portion of the broad Transition Zone, where the southern flowing California Current mixes with warmer and saltier subtropical waters to the south and west (Hyrenbach and Dotson 2000). According to Sanger (1974) and others, these birds appear to be drawn to upwelling zones within the U.S. West Coast EEZ, and the birds appear to move northward along the CA/OR/WA coast as the upwelling season progresses (i.e., being most abundant off Baja in April and May, off southern and Central California in May and June, northern California in June and July, and off Oregon in August and June).

The Laysan Albatross occurs within the EEZ during winter-spring (inshore domain, depth <2,000 m or 1,093 fm) and spring-fall (offshore domain, depth > 2,000 m) (D. Hyrenbach, pers. comm. 7/24/01). In recent years, Laysan Albatross sightings have increased off southern California, particularly within the onshore domain. Sightings were considered common in spring and winter during 1995-1998, likely in response to the establishment and expansion of breeding colonies off Baja California, Mexico (Jehl and Everett 1985, Howell and Webb 1992, Gallo-Reynoso and Figueroa-Carranza 1996).

The endangered Short-tailed Albatross has also been sighted rarely off the Pacific coasts of the United States and Mexico in recent history. It is nonetheless endangered, has historically occupied U.S. West Coast EEZ waters, and will likely return to its former range as its population recovers (and may have already begun to do

so). In spite of recent favorable recruitment at the only extant colony in Tori Shima, Japan, the world population is estimated at less than 1,000 birds (Gales 1997). Of the 23 sightings of this species within the CA/OR/WA EEZ since 1947, 74 percent have been made in the last two decades (1983-2000) with 88 percent occurring from August through January (Roberson 2000 web site). Six Short-tailed Albatrosses have been killed by the Alaska bottom longline fleet and it is possible that interactions could occur within the U.S. West Coast EEZ, as has been postulated for the Hawaii-based longline fishery, where reportedly two individuals visit the Northwestern Hawaiian Islands each year (WPRFMC 2001).

A possible indirect impact of longlining includes ingestion by albatrosses of lost/discarded lightsticks and dicarded plastic items. These have been linked with chick mortality in the Hawaiian breeding colonies (Cousins and Cooper 2000).

Impact on Fish Bycatch

Blue shark will probably remain the principal bycatch species, and a catch rate of greater than 15-20 per 1,000 hooks is expected. Survivability is generally thought to be higher with hooking versus net entanglement, and with proper de-hooking procedures mortality may be significantly reduced from that currently experienced in drift gillnet fishery. The Pacific-wide stock of blue shark, even under the current level of fishing in the Pacific, appears to be underexploited according to a recent joint stock assessment by NMFS and the National Research Institute of Far Seas Fisheries (DOC 2001).

There is also potential for a relatively large albacore bycatch (e.g., Table 4). Distance from port, market price relative to other species, and limited hold space may influence potential longline fishers to discard albacore and other fish species (which they might otherwise land if fishing further inshore with drift gillnet). Information is insufficient to evaluate the possible impact of these factors at this time; we can only infer that discard rates may be comparable to those given in Tables 1, 2, and 4. If the fishing comes to target deep-swimming tunas, this fish species complex and relative proportions may change. For example, longlines currently set to target swordfish tend to catch species of the epipelagic zone, whereas longlines set for deep swimming tunas such as bigeye, may catch more mesopelagic species such as bigeye thresher shark. Daytime fishing for tunas may reduce catches of diel vertical migrating fishes that spend the daytime at extreme depths. Fish species taken by drift gill net that may be taken in significantly less numbers by longline gear would be skipjack tuna, bullet mackerel, mola mola, pelagic thresher and possibly common thresher shark. Fish species not taken by driftnet gear (or in very low numbers) that may experience increased mortality from longline gear include longnose lancetfish (*Alepsaurus ferox*, a large pelagic to bathypelagic predator, Ambrose 1996a) and pelagic stingray (*Dasyatis violacea*), a common component of longline fisheries worldwide. All are widely distributed species, and the impact of ten-vessel limited entry fishery may be minor compared to the Pacific-wide take. But insufficient information exists on the combined impact of Pacific-wide longline operations and stock structure and biology of these little-known species to assess the effects of this additional source of mortality.

There is great concern from the recreational fishing community over the potential bycatch and accompanying local depletion of striped marlin as a result of allowing a longline fishery of this type within the EEZ. There is previous evidence that directed Japanese longlining for billfish in Mexico off Baja California reduced the catch rate of striped marlin by anglers in Mexico (Squire and Au 1990). The recreational fishing community has expressed concern that since relatively few striped marlin are taken in the U.S. West Coast EEZ, that any take of marlin by commercial fleets will reduce the likelihood of capture by sport anglers. Anglers are also concerned by a historical decline in catches and average size of striped marlin in the recreational fishery in the Southern California Bight (FMP Chapter 2, Figs 2-5, 2-6). It is not clear if these indicators are signs of stock decline or regional depletion, since striped marlin occurrence in the EEZ is largely driven by warm-water intrusions from the south, and the recreational CPUE indicates no trend (FMP Chapter 2, Fig 2-7; Chapter 3, p. __). Most recently, there has also been a regime shift since 1998 from warm El Niño to cooler La Niña conditions, which tend to be less favorable for marlin locally. Analysis of the decrease in average angler-caught fish size over time suggests that the available stock has not yet been subjected to a mortality level above MSY (Ch. 3 p. __ Marlin section, D. W. Au, SWFSC/NMFS, pers. commun. 8/1/01). Nonetheless, declining catches together with steady CPUE suggest that fishing efficiency has increased or fishing effort has declined, and the

latter scenario, though possible, seems unlikely. Interpretation of these data are hampered by lack of information on trends in angler effort, although annual membership rolls in at least one southern California marlin angling club suggest little if any downward trend in membership since 1980 (R. Nelson, pers. commun. 8/1/01, Balboa Angling Club membership records). Commercial exploitation of marlin on a Pacific-wide scale is thought to have decreased over the past 25 years due partially to re-targeting for deep-water tunas and a reduction in the numbers of hooks set by Japanese longliners (M. Hinton, IATTC, June 2001, pers. commun.). With this lowered effort, the striped marlin stock could be rebuilding, a possibility that will be examined when analyses of all the available data are completed (M. Hinton, IATTC, June 2001, pers.commun.). The status of striped marlin is to be addressed in a stock assessment of striped marlin due to be completed in 2001 by the IATTC. As mentioned above, this species is taken in low numbers by the drift gill net fishery, and would also likely be taken in low numbers by longline gear, as suggested by the preliminary observer and skipper logbook data for the area east of 135°W (Tables 1, 2, 3, and 4) and preference of this species for warm water. If those that are taken are released alive, reports of their survival are encouraging; some specimens can survive over 12 hours on hooks (Berkeley and Edwards 1988). The proposed fishing would take place mostly in cooler waters, largely outside the essential habitat of striped marlin within the EEZ (i.e., generally west of the Santa Rosa-Cortes Ridge). Striped marlin tracked off southern California and Hawaii have been found to spend the majority of swimming time in the highest water temperature available in the upper mixed layer and never descend into water more than 8°C colder than the temperature of this mixed layer. Off California, this mixed upper layer in which tracked marlin spent most of the time was 20 to 21°C; that off Hawaii was generally between 25.1° and 27°C (Holts and Bedford 1990; Brill et al. 1993). More tracking and tagging data are needed to determine the utilization of striped marlin in the outer EEZ to conclusively determine their habitat use in this area, and especially if marlin traverse the cool water zone during migration to and from the warmer waters of the central Pacific and the southern California Bight.

Longline Gear Efficiency Versus Driftnet Gear

Murphy (1960), in his paper on fishing gear efficiency, pointed out that baited longlines are less efficient than gill nets because they lose fishing power over time. Unless the net fills up with unwanted species or becomes badly tangled on each contact with a fish, gill nets tend not to lose efficiency in any way analogous to the loss of baited hooks from bait loss and from fish being caught during longline sets. Thus fish bycatch should decrease in comparison to the existing drift gillnet fishery, with the above exceptions noted. However, deepwater tuna longlining could also bring its own suite of incidental takes at levels that only trial can determine. As mentioned, striped marlin may be taken (although probably in low numbers), and longlines do take turtles and albatrosses that have protected status. And while generally less efficient than other gears, longlines are comparatively more efficient at catching deep tunas. The extent of this efficiency within our EEZ cannot be determined at the present time, however.

Monitoring and Data Needs

Monitoring and reporting requirements would have to be at least commensurate with that of the current drift gillnet fishery, and would probably increase to provide adequate tracking of the fishery. Details of these requirements would be finalized after the consultation process is completed with NMFS and the U.S. Fish and Wildlife Service. It is anticipated that much more comprehensive information on target, bycatch and incidental catch (e.g., size information) would be needed to document and monitor the impact of the fishery. Because of the small size of the exploratory fleet (only 10 vessels), mandatory observer coverage would probably have to be increased above 20 percent to possibly 100 percent in order to reliably monitor possible interactions of the less frequently taken bycatch and protected species. For example, while 20 percent coverage may be adequate for monitoring turtle interactions in a fleet of 150 vessels, a considerably higher level will be needed for a fleet of only 10 vessels, if the interactions are equally rare. Also, 100 percent observer coverage would be required to monitor mitigation devices and practices. Additional dockside and possibly at-sea monitoring may be needed to enforce gear switching restrictions. Data and other information on the fishery would be summarized and reviewed each year in the annual HMS SAFE report.

Legal Considerations

Authorization of this fishery would supercede all existing state laws regarding longlining in the action area. California currently does not allow longlining, but it does allow longlined fish to be landed. Vessels and fishermen are required to be properly licensed, maintain and submit logbooks, and comply with pre-landing notification procedures. Longline gear is not legal off Washington, but Oregon has provisions for developmental longline fisheries for swordfish and for blue shark outside 25 miles. Because the drift-net - longline conversion fishery would be 1) limited to CA drift gillnet permit holders, and 2) initially be limited to 10 vessels, it qualifies as a limited entry fishery. It would thus require a plan amendment, including an analysis of such a fishery and criteria for entry, which must go through standard review and approval processes before adoption and implementation. Protocols for adjusting longline effort up or down, or for enacting other restrictions or regulations as determined in the management cycle review, would be established through framework procedures and enacted in a timely manner. Proposed fishing area south of Point Conception suggests that areas near the islands would be open to fishing, whereas current drift gillnet regulations prohibit fishing within 1 nm of the islands; this issue and other more precise area/season closure issues would need to be resolved.

Management Costs: Enforcement, Data Processing and Administration

If approved, there would be new, but presently unknown management and data acquisition costs, including costs for increase in observer coverage for this segment of the fishery above that of the existing drift gillnet fishery; costs to cover development, design and implementation of new observer sampling procedures and training; costs for skipper workshop and training to implement bycatch mitigation measures; costs to track and evaluate the new fishery; and costs involving increased enforcement/surveillance.

Economic Impacts

The gain in producer surplus from the fishery could be substantial to the industry and support industries, as fresh tuna is a most valuable commodity. There would also be a gain in consumer surplus to consumers of fresh fish. Fresh bluefin tuna is highly prized for grilling and for sashimi in the U.S. and internationally. There is also a growing demand for fresh bigeye in the 20-50 pound size range for grilling in upscale U.S. mainland restaurants (HDBEDT 2001) and a continuing demand for bigeye sashimi in Japan. U.S. consumers might gain little if the fish are primarily exported to the Japanese market, but currently there appears to be a healthy and quite adequate market and demand along the West coast, particularly in the Los Angeles area, which represents one of the largest markets in the U.S. for fresh tuna. While the raw tuna product (for sashimi and sushi) has had a traditionally high market in Japan, this market is now rapidly growing in the U.S. Also in the U.S., tuna and swordfish, even in the frozen form, have brought a high retail value averaging between $7.00 and $9.00 per pound in the California market for the past three years. Other incidentally caught species, such as mako shark, opah and escolar would provide additional value to the catch. The longline fishing method, whereby trauma to the fish is minimized, results in a good product appearance, texture and flavor, with a corresponding increase in consumer appeal. With its strong Pacific Rim culinary influence, the West Coast has an especially high and growing demand for fresh tuna and other HMS fish. Local markets, restaurants, and supporting industries would also benefit from the accompanying gain in producer surplus.

The proposed fishery, especially if it expands beyond 10 vessels and catches of recreational species increase significantly, may reduce the availability of HMS stocks in southern California to the recreational fishery. This would have an economic impact on the recreational HMS fishery, and possibly competing commercial fisheries for HMS. Increased fishing mortality on bluefin tuna resulting from longlining and purse seining combined may contribute to local depletion, if these fishery segments are exploiting the same components of the stock, or if the longline fishery intercepts the 'front line' of these stocks as they move into the EEZ. If this occurs, there would be a loss in consumer surplus to recreational anglers due to reduced catch rates and reduced trips and opportunities. Should local depletion of bluefin tuna or marlin occur, there would also be a loss in producer surplus to industries supporting recreational angling (tackle, fuel, boating, CPFV industry, etc) if the probability of capture and recreational trips and participation subsequently decrease. It is recognized, however, that the

drift net fishery already catches recreational HMS incidentally, so any impact from this replacement fishery would be the result of mortality considerably above what is currently taken.

Community Impacts

Benefits to local communities (as well as to the states) in terms of increased economic activity - employment, income and spending in the harvesting, processing and distribution sectors - could be large if the fishery is successful in producing high value, fresh tunas. This may more than offset any loss in economic activity from a concurrent contraction in the drift gillnet fishery. Depending on the range of the proposed fishery, this economic activity could be more widespread along the west coast. With a transition of current drift gillnet fishers into the proposed longline fishery, there is not expected to be any significant changes in the socio-cultural structure of HMS communities. To the extent that the proposed longline fishery reduces availability of HMS to recreational fisheries, there could be a decline in recreational fishing activity and a corresponding decline in economic activity within supporting industries. The impact on recreational fishing would also depend on the availability of substitute recreational fishing opportunities within the affected communities.

Impact on Essential Fish Habitat

Essential Fish Habitat, as designated for management unit species in this FMP should not be affected unless significant longline gear remnants are lost/discarded at sea, which is not expected. Lost/discarded lightsticks and plastic items entering the habitat may impact turtles and birds that might ingest them.

Consistency with the Western Pacific FMP

At the outset, the fishery would generally have to be made consistent with the western Pacific FMP with respect to mitigation of protected species in vessel longline operations, keeping in mind that distributions and likelihood of interactions with certain species may be different in the action area because of its different oceanographic regime. As its bycatch and species interactions are determined, alterations in these practices may become necessary that may diverge from those of the WPRFMC and become more region-specific.

If this option is chosen, it will make tuna longlining opportunities consistent in both regions. Presently, Hawaii-based fishermen can longline for tunas within their EEZ under the Western Pacific Council's Pelagics FMP, whereas west coast-based fishermen are presently governed by state laws and cannot longline for tunas within the EEZ.

User Conflicts

Sport fishers especially would be distressed if such a fishery develops. The recreational fishing community is a strong, active and highly vocal stakeholder in the HMS fisheries within the EEZ. They are concerned that any longline fishery, even though small-scale, would have significant impacts on recreational species through the targeting, incidental catch or bycatch of these species in such longline operations. They are also concerned about the potential impact of increased bluefin tuna purse seining off Mexico and the U.S. combined with new effort in the proposed longline fishery. Some of this concern stems from a general distrust of this type of gear because of real and perceived impacts of past and current longline operations off the Atlantic and Gulf Coasts, off Baja California, Mexico, in the central Pacific, and in the southern California Bight. A major concern is with striped marlin, as mentioned above, but also bluefin tuna, pelagic sharks (thresher and shortfin mako) and other species that have occurred in the observed catch of the former mako-blue shark cable longline fishery (i.e., black sea bass). These target, incidental and bycatch issues are addressed above.

The commercial industry contends that the recreational hook and line - commercial longline controversy is fundamentally an allocation and not a gear issue, and should be evaluated as such. They make the point that both sectors are essentially fishing the same basic unit of gear (hook and line), although the longliner deploys multiple units and may deploy them differently than the recreational angler. The industry points out that the drift gillnet fishery is in decline through increasing regulation to mitigate protected species interactions, and that this

proposal offers a solution to switch to a cleaner fishery for a highly marketable product. They feel that in not being able to longline for tuna and swordfish within their own U.S. EEZ, they are at a competitive disadvantage with foreign fleets and with Hawaii-based tuna longliners who are allowed to fish for tuna both on the high seas and within their respective EEZs. The proposed fishing area was chosen to minimize user and gear conflicts, especially with recreational anglers. There is a possibility of gear interaction between longliners and drift gill netters, especially north of Point Conception in areas and times of year when the two gears may overlap. But this seems unlikely since the drift gillnet industry proposed this option, and its members have the capability of avoiding each other's operations. Gear conflicts with the harpoon fishery are unlikely because of the offshore nature of the proposed fishery.

The environmental community is also concerned about the permitting of such a fishery with its potential for bycatch and protected species interactions and possible detrimental effects on certain targeted species (e.g., bluefin tuna and sharks). There are concerns about the lack of in-place vessel performance standards, effective mitigation procedures, adequate monitoring and enforcement, as well as the potential for expansion of the fishery.

Safety as Sea Issues

Safety at sea could be an issue if vessels switched to longlining in the winter-spring period and far offshore to avoid user conflicts. But in general, the method is considered less dangerous in offshore waters than gillnetting. Longline vessels tend to be more stable in rougher offshore waters than comparably sized drift gillnet vessels, which become top-heavy when heavy nets are piled high on deck in between sets and during transit.

Relation to Objectives of this HMS FMP

This option is not in conflict with FMP objectives; it attempts to reduce overall bycatch and protected species takes by reducing driftnet effort, and to minimize the effects of conservation regulations on fishing communities by providing a fishing alternative for driftnet fishers, as per National Standard 8 of Magnuson-Stevens Act. If successful, this fishery could provide a new source and a stable supply of high-quality, locally caught fresh tuna to the public (mgt goal #2) while providing a new commercial fishing opportunity for HMS in the region's ports (mgt goal #4), and minimizing bycatch and discard mortalities (mgt goal #9) and certain protected species interactions (mgt goal #17). Much hinges on the potential take of other species that are vulnerable, such as albatrosses and sea turtles. Any mortality of albatrosses would represent an increase (rather than a reduction) over what is currently taken in the present drift gill net fishery, which is inconsistent with the intent of the U.S. National Plan of Action for Reducing the Incidental Mortality of Seabirds in Longline Fisheries. Short-tailed Albatross distribution, abundance and rate of increase in the U.S. West Coast EEZ needs to be reassessed to determine whether the proposed fishery is likely to adversely affect this endangered species.

Consistency with International Obligations

If this option is adopted, it is expected that the Council would abide by quotas established by the Inter-American Tropical Tuna Commission and effectively apply recommendations of other international bodies to domestic HMS fisheries on the West Coast as appropriate. It is possible that, through this fishery, new insights might be provided on bluefin tuna dynamics and behavior of this species off the Pacific States, which might alter how this tuna is managed at the international level.

Option 2 - Allow Longlining After Research Fishing to Determine Acceptability (Ocean Wildlife Campaign Research Proposal)

Impose an indefinite moratorium on pelagic longlining within the West Coast U.S. EEZ with the potential for re-evaluation by the Council following completion of a bycatch reduction research program carried out under a qualified exempted fishing permit. The intent would be to: 1) explicitly prohibit the use of pelagic longlines within the West Coast US EEZ until a bycatch reduction research program is completed and a determination

made as to whether or not longline gear should be allowed as a legal gear within the EEZ in the West Coast - based HMS FMP. 2) To establish a bycatch reduction research program with clearly defined goals and objectives that will guide the exempted fishing permit (EFP) evaluation process. The research priorities and evaluation criteria should be developed through a transparent process involving all interested stakeholders (NMFS, Plan Team, SSC, conservation community, and recreational and commercial fishermen) and include publication in the Federal Register. Following completion of the research program protocol, NMFS would only permit requests meeting all protocol criteria.

Background of Option

Specifically, the research program would test the effectiveness of various methods to reduce bycatch and bycatch mortality of fish and protected species through changes in gear design (i.e., bait type, gangion length and material, and hook type) and deployment practices (i.e., depths, areas, times of operation, and length of sets/soak times). The program would have a protocol with clearly defined bycatch reduction goals and a timetable for conducting the program and reporting results to the Council. The research program would also include, at a minimum, (a) 100% observer coverage, (b) the number or participating vessels (expected to be very small), (c) definitions of "target catch" and "bycatch" (e.g., juveniles of the target species, non-target species, prohibited, and protected species) upon which the selectivity of the longlines are to be evaluated, and (d) regular reporting of bycatch rates, so that the study can be terminated should bycatch rates during the research program be unacceptably high.

The effectiveness of the methods tested would be evaluated by the Council, in consultation with relevant advisory bodies, NMFS, and public interest groups at the completion of the research program, and a determination made by the Council as to whether or not longline gear can be fished with negligible impacts on bycatch species (as defined in the protocol). If negative, a determination would then be made as to specific restrictions on longline fishing needed to achieve the same goal throughout the fishery. The evaluation by the Council would be based upon the ability of the gear to meet stringent conservation/performance standards that would be clearly identified in the research protocol in advance of the research and evaluation process.

In addition, EFPs would not be issued to any vessel for the purpose of conducting exploratory longline fishing (or a combination of research and exploratory fishing). The intent is to prevent the expansion of Pacific HMS fisheries, in particular pelagic longline fisheries, until more complete data are available regarding the biological status of the impacted species as well as the level and impact of the bycatch.

Expected results of Action: The available information, based upon the use of longline gear in HMS fisheries elsewhere, indicates that longline gear in the Pacific region (west coast U.S. EEZ) would likely result in high levels of bycatch, especially blue sharks and interactions with protected species. The indefinite moratorium would prevent increasing bycatch and bycatch mortality, while the research program whether conducted by NMFS or under an EFP, would provide the necessary data on target and incidental catch, as well as potential techniques to mitigate bycatch. This information would provide the basis for future management.

Issues

- Longlining in EEZ is prohibited until there is experimental evidence that the gear used would have negligible impact upon bycatch and protected species. The high standard gives maximum protection to those species, and the moratorium, until lifted, obviates management costs.
- Fishers, not the public, bear the burden of developing non-harmful fishing gear and methods; however, the high negligible-impact standard would discourage innovation.
- Council must decide on lifting the prohibition on the basis of gear experiments not necessarily reflecting how a real fishery would operate.

Analysis

This option would not allow longlining in the EEZ until there is research evidence that such fishing would have negligible impact on bycatch and protected species. It focuses on preventing possible harm from longlining at the outset before any fishing begins, by requiring proof, through experiment, that the gear will have a negligible impact on any bycatch species taken. It does not permit any exploratory fishing or directed fishing of any kind during a given experiment. While potential impacts and benefits cannot be fully evaluated until the experimental design details are established, the following provides general comments on possible effects of this option.

Impact on Fish Bycatch and Protected Species

This option gives maximum protection to any species likely to be taken. Fishers desiring to introduce longlining in the EEZ would have to show evidence from the experiments that (a) techniques are significantly improved (best shown with comparisons from where bycatch rates are relatively high), and (b) that there is likelihood of negligible impact (best shown where bycatch rates are suitably low). The high standard and restrictions on fishing makes it unlikely fishers would be motivated to invest in these experiments, or to reduce bycatch rates even further from whatever minimum rates they are able to meet. Nonetheless, it is possible that certain fishers may be willing to attempt such experiments, and if so, any gear improvements they devise, would be valuable for furthering bycatch reduction in longline fisheries in general. The Council and other advisory bodies, agencies, and public interest groups would have to decide on the likelihood of negligible impact from the gear (not fishery) experiments, and from experience in other fisheries.

Management Costs–Enforcement, Data Processing and Administration

As a preventive stance, this option does not affect management costs, but costs would be incurred for any subsequent Council review and analyses of data generated from any potential EFP research experiment.

Impact on Target or Incidental Fish Species

This option is not expected to affect mortality rates on target or incidental species, since it is not a fishing experiment but rather a gear experiment and presumably will be conducted on a very small scale. Also, potential impacts cannot be fully evaluated until program details are established.

Economic Impacts

By imposing an indefinite moratorium on this type of fishery, with high performance standards for its repeal, participation by the industry is not likely. Thus potential increases in economic benefits for small fishery-related businesses or to the consumer (for new and continuing supplies of fresh HMS fish) would also be unlikely. Actual implementation of the moratorium part of this option will not have any impact because it essentially represents the status quo, but any bycatch-reducing findings would have a positive effect. Discovering new and more effective bycatch-reducing methods could result in a more enhanced and marketable "bycatch-safe" product, as well as increased existence values stemming from the enhanced protection of bycatch and protected species.

Community Impacts

Effects on local communities would probably change little, at least in the short term, since presently there is no longlining in the EEZ. However, in the longer term, the drift gillnet fishery could be phased out, and local economies could suffer without its replacement, such as by a longline fishery; demand for local seafood would be met by imports.

Impact on Essential Fish Habitat

EFH would not be affected.

Monitoring and Data Needs

The only new data needs would be that for the gear experiments, however, needs cannot be fully evaluated until program details are established.

Consistency with the Western Pacific FMP

This option, which represents a moratorium on longlining within the West Coast EEZ, would be inconsistent with that of the WPFMP, which allows pelagic longlining in its EEZ, with restrictions.

User Conflicts

Conflicts among different user groups should change little, as fishers are used to the status quo that essentially prohibits longlining in the EEZ, and which this option strengthens.

Safety as Sea Issues

Safety at sea issues would not be affected, unless research under this option recommends mitigation procedures for protected species that endanger fishers.

Relation to Objectives of this HMS FMP

This option would promote the FMP objectives of ensuring consistency with protected species legislation, but not that of promoting long term supplies of quality local fish for consumers and for diverse commercial fisheries.

Consistency with International Obligations

This option would support the precautionary approach to resource management, and limit fishing effort as called for in FAO's IPOA to reduce fishing capacity; it may, however, weaken U.S. influence in international longline issues if it weakens the U.S. industry.

Legal Considerations

There are no legal considerations to conduct this experimental fishery.

Option 3 - Allow Longlining After EFP Fishing to Determine Appropriate Measures (Team Preferred Option)

Disallow longlining within the west coast U.S. EEZ (including the existing but inactive Oregon fishery), with a potential for re-evaluation by the Council following completion of a tuna-swordfish-bycatch experiment to determine if longline gear can be fished in ways that produce bycatch rates and protected species interaction levels significantly less than by drift gillnets. This option does not pre-judge longline gear to be harmful as does the previous Option 8, but instead considers the possibility that longlining and protected species responsibilities can be compatible, and therefore that an evaluation under real fishing conditions is needed. The study, carried out under a qualified exempted fishing permit (EFP), would also determine if longline fishing for tunas/swordfish in the outer EEZ (or beyond) can be a sustainable and economically viable alternative to drift gillnets for west coast drift gillnet fishery permittees, while having acceptable levels of bycatch and protected species interactions.

The EFP process (which can require an annual renewal) would allow an experiment to be conducted in and beyond the EEZ for a specified period of time and under specified conditions. The focus would be on fishing for deep-swimming adult tunas and swordfish, and how these species can be caught with the least impact on associated, non-target species. The biology, fishery potential, and effects of fishing, including effects on any protected or vulnerable species incidentally caught, are to be studied. Procedures for reducing the bycatch and mortalities to incidental and protected species will be an integral part of the study. This work would be conducted in the presumed habitat of bluefin and other deep tunas: north of Pt. Conception in waters greater than 25 miles off shore; south of Pt. Conception in waters west of the Santa Rosa - Cortez Ridge (the California Current oceanographic regime). Chartered longline vessels would be used, initially allowing those vessels to find and catch deep tunas for a data baseline, with the scientific sampling and gear experiments to be adapted to the fishing as it develops, as it can be modified, and as is practical. An example of one type of EFP experimental fishery-research experiment is provided in Appendix A.

Intent and protocols would be similar to Option 8 as proposed by the OWC, but differing in the following points: 1) Fishing for targeted species is an integral component of the study to more realistically determine associated bycatch rates in areas and depths most likely to be fished and to better estimate fishery impacts on bycatch/ protected species. 2) This option does not have the bycatch/protected species reduction goal of "negligible impact," but rather has the goal of reducing these rates to at least below allowable driftnet rates (and, to the greatest extent practicable, below those rates); it also would establish "trigger" bycatch levels so the experiment could be terminated should observed bycatch rates be unacceptably high. 3) The minimum acceptable bycatch rate for continuing the experiment to its duration is bycatch/protected species take rates "significantly less than drift gillnet rates." The acceptability of the rates demonstrated by the experiment, in view of authorizing any future fishery, would be determined by the Council/NMFS/relevant advisory bodies, and through the federal regulatory and FMP amendment process, at the termination of the experiment.

Issues

- Longlining in EEZ would be prohibited until there is experimental evidence that the gear used would have impact not harmful to bycatch and protected species (as opposed to negligible impact). This lower standard gives less protection to those species, but is also more inducive for fishery and gear improvements.
- Public would share costs of developing a fishery able to produce sustainable yields for consumers without harmful effects on bycatch and protected species.
- Council can decide on lifting the prohibition on the basis of gear experiments and fishery data obtained under conditions of real fishing for targeted species.

Analysis

Impact on Target Species, Fish Bycatch and Protected Species

This option, for determining if "clean" longline fishing for large pelagics in the EEZ is possible, focuses on reduction of overall bycatch and protected species take rates, with the intent of allowing a fishery if its take rates are not harmful to those species (as opposed to having negligible impact). Specifically, it provides for an EFP experiment to determine if longlining for large pelagics is practical in terms of both targeted catches and acceptably low bycatch rates. As in Option 8, there is some risk of harm to bycatch and protected species once the experimental fishing begins, so similar take-rate trigger criteria will be developed so that the experiment can be terminated quickly should unacceptable levels occur. Since a prime objective is to assist fisheries in reducing bycatch and protected species takes to acceptable levels, the experiments in bycatch reduction will be conducted within the context of actual fishing for targeted species. This will (a) help in finding bycatch-reducing methods that are practical and relevant to actual fishing, and (b) provide to the Council and relevant advisory bodies/agencies realistic fishery data from which they can directly judge the costs, benefits, and possible harm from such fishing. By its nature, this option would encourage fishers to participate, cooperate, and innovate. It is meant to encourage the possibility of a sustainable, "clean" fishery in the long term, which could be profitable regionally and serve as an example for longline fisheries elsewhere in the world.

This option recognizes that if longlining in the California Current can be conducted without harming bycatch, protected, and recreational species, a valuable additional source of high-quality fresh fish would become available at net benefit to the Nation. New scientific insights based on data could lead to better knowledge of the species and improved international management of the targeted tunas. It further recognizes that conservation of resources exploited by international fleets on the high seas may well depend economically and politically on maintaining healthy domestic fisheries that are held to the standards of the Magnuson-Stevens and protected species legislation.

Longline fishing in the EEZ would target principally deep-swimming adult bluefin and bigeye tunas and secondarily swordfish. These species are also targets of recreational anglers. Higher densities of deepwater tunas are expected in the California Current than in warmer oceanic waters beyond the EEZ, as indicated by logbook data from 276 longline trips out of California and 33 trips out of Hawaii (See Table 1, catch rate data, A. Coan, SWFSC, La Jolla). These data indicate the temperate/subtropical bluefin and bigeye tunas are more available east, rather than west, of 135° W. It is already known, too, that giant bluefin tuna sometimes occur at the inner edge of the California Current, near islands and banks of the Southern California Bight (Foreman and Ishizuka 1990). The data indicate that catches of juvenile shortfin mako and adult and juvenile common thresher sharks may decrease in the California Current, as they do with distance from shore in the drift gillnet fishery. But this may not be the case for the more oceanic blue shark. (See Option 7 Impact on Fish Bycatch analysis for discussion on blue shark).

Bycatch of striped marlin is a possibility, but capture of marlin would be minimized, since the experimental fishing would be primarily at depth in the cool waters of the California Current (see also discussion in the Fish Bycatch section of analysis of Option 7). Logbook data also indicate that tropical/subtropical striped marlin tend to be more abundant west of 135°W, well outside the California Current. This is consistent with the fact that this marlin occurs seasonally in the SCB within tropical waters moving northward on the inshore coastal side of the Current.

There is, nevertheless, real potential for the taking of albatrosses and turtles in daytime longlining for tunas in the California Current, and the EFP experiment must carefully investigate this hazard and its mitigation. From their habit of scavenging and feeding at the surface, albatrosses are frequently caught on baited longline hooks as they are deployed. A small sample representing data from 6 observed longline trips originating from Hawaii and California, that fished both east and west of 135°W (Table 3; 1994-2000 data, A. Coan, SWFSC, La Jolla) had seabird catch rates much higher east of 135°W than in the central waters to the west (0.25 vs 0.10 albatross/1,000 hooks for 15 albatross). Black-footed Albatross are present year round off the west coast, but more so during winter-spring. They are more abundant in the California Current outside the Southern California Bight, as subtropic-subarctic transition waters are important in their feeding (Hyrenbach 2001, Sanger 1974) (See also Seabird Impacts discussion in analysis of Option 7). On the other hand, the same data indicated slightly lower catch rates of leatherback and loggerhead turtles east of 135°W (0.05 vs. 0.10 turtles/1,000 hooks for 11 turtles), so it is possible that measures to protect turtles from longline gear can be less stringent for the California Current than for the central Pacific (as in the WPFMP).

Management Costs–Enforcement, Data Processing and Administration

As this option is an experiment to examine the feasibility of a fishery, there is no anticipated fishery management costs expected; however, administrative costs would be incurred in reviewing ongoing progress, accompanying data analyses, and final results of this experiment.

Economic Impacts

With this option there are socioeconomic implications: small fisheries and related businesses would be encouraged and supported; consumers could benefit from new fish products, if the study opens the opportunity for a longline fishery; there could be national benefits: to the economy, as large tunas have high consumer value, and also to scientific and practical knowledge; it could encourage investment and help vitalize domestic fisheries.

Community Impacts

Localized fishery-associated communities would benefit if viable and safe fisheries develop.

Impact on Essential Fish Habitat

Here is no expected impact to EFH from the conduct of this longline/bycatch fishing experiment.

Monitoring and Data Needs

This experiment would require a high level of data collection to monitor species taken and to conduct experiments. Presumably all vessels would carry observers or scientific technicians to gather data from the experiment.

Consistency with the Western Pacific FMP

WPFMP consistency would not be issues until a longline fishery is actually approved, and if so, effects would be similar to those discussed in analysis of the industry-proposed Option 7.

User Conflicts

Conflicts between commercial fishers and sports and conservationist groups could increase if this option is viewed as an opening for longlining in the EEZ, rather than as an experimental study.

Safety as Sea Issues

Safety at sea could become a consideration if this study recommends mitigation procedures for protected species that endanger fishers.

Relation to Objectives of this HMS FMP

This option supports the FMP objectives of providing long term supplies of quality local fish (mgt goal #2), providing for diverse fisheries (mgt goal #4), acquiring scientific information (mgt goal #11), and complying with federal protected species Acts (mgt goal #17).

Consistency with International Obligations

This option is consistent with international management in that management and conservation must work within the context of existing fisheries.

Legal considerations

None.

1.5 Coastal Purse Seine Fishery Area Closures

This section addresses two options for the conduct of the purse seine fishery for bluefin, which is almost exclusively in waters off California. If small purse seine gear is adopted in Part A of the FMP, then a fishery for bluefin could be conducted in the EEZ. However, two options below would implement area closures to limit fishing in certain areas.

1.5.1 Background

Nearly all of the northern bluefin and west coast tropical tuna catches are made by small purse seiners (less than or equal to 400 short tons carrying capacity) fishing relatively close to shore off California (Table ?). These vessels primarily harvest coastal pelagic species -- northern anchovy, Pacific mackerel, Pacific sardine and market squid -- but target northern bluefin and other tunas when these species enter the Pacific coast EEZ, generally from May through October. Purse seiners also opportunistically harvest albacore tuna

Currently, purse seine is a legal gear in California and Oregon. There are inland waters closed to purse seine gear in California, but these closures would not be affected by the regulatory options described below. There are no restrictions on the configuration or deployment of purse seine gear for the harvest of northern bluefin tuna and other tunas in waters off California and Oregon. Purse seine is not a legal gear in Washington and cannot be used by Washington licensed fishers. Major reasons why purse seine is not a legal gear in Washington are concerns about potential salmon bycatch, bycatch or incidental catch of sharks, and interactions with the albacore surface hook-and-line fishery. Washington has made a purse seine exemption in the case of its trial sardine fishery, which operates under specific regulatory requirements.

1.5.2 Options

The following two options control the use of purse seine gear off Oregon and Washington to minimize impacts on non target species.

Option 1-Close the EEZ to HMS coastal purse seine fishing off Washington

Option 2-Close the area within the EEZ north of 44° N latitude (Florence, Oregon) to purse seine fishing to address bycatch an protected species concerns

Analysis

The two closures would alleviate concerns over salmon and shark bycatch, incidental catch by purse seiners, and adverse impacts on other fisheries. Such a closure would eliminate the opportunity that currently exists for non-Washingtonian fishers to use purse seines in the EEZ off Washington and would shift the management burden, and associated costs, from the state to the Federal government.

Option ? would expand the allowable area of the fishery into waters off Washington. Because northern bluefin tuna rarely range that far north except during periods of elevated water temperature, this would likely only result in an increase in purse seine fishing activity for northern bluefin tuna during El Nino-like conditions (see FMP, Appendix A, sections 2.3.1 and 2.3.8). Although it is difficult to know, there could be a significant incidental catch of sharks and albacore in a purse seine fishery targeting northern bluefin tuna off Washington and Oregon. However, purse seine gear offers the possibility to reduce incidental harvest. The Incidental catch (or bycatch) in the sardine fishery gives some indication of this.

Not adopting any of the closures would provide an alternative fishing opportunity for Washington fishers, and would extend opportunities for Oregon fishermnen, particularly for those participating in the sardine fishery. However, assuming significant start-up costs versus the expected returns, this may not be economically feasible. Net national benefits (NNB) would increase if a fishery off Washington were economically feasible, but NNB could decrease if earnings of salmon trollers were disproportionately offset. Unless purse seine vessels already fishing northern bluefin tuna to the south are attracted by this potential, harvesting capacity would need to increase. There is unlikely to be any significant in shift in the northern bluefin tuna purse seine fishery activity from traditional areas. Gear and territorial conflicts could arise between tuna purse seine, albacore hook-and-line and the trial sardine purse seine fisheries off Washington if they should simultaneously fish on large mixed aggregations of bluefin tuna, albacore tuna and sardine.

Table 1. Pacific coast landings (all gears) of northern bluefin tuna (mt), 1990-99.

Year	Washington	Oregon	California
1990	0	0	925
1991	0	0	104
1992	0	0	1,087
1993	0	0	559
1994	0	0	916
1995	0	0	714
1996	0	0	4,687
1997	0	1	2,250
1998	0	3	1,946
1999	12	6	161

1.6 Recreational Catch and Release Program

Background

Amendment 1 to the Atlantic Billfish Fishery Management Plan established a recreational catch-and-release fishery management program. The following factors supported the establishment of a catch-and-release program in the Atlantic recreational billfish fishery: (1) the exclusive recreational nature of the Atlantic billfish fishery, (2) the already existing high rate of release of live fish in the recreational fishery, (3) the high rate (likely in excess of 90 percent) of survival of recreationally caught-and-released fish and (4) the high economic benefit of each fish caught. Authors of the plan believed that establishing a catch-and-release fishery in this situation would further the already existing catch-and-release ethic of recreational billfish fishermen.

The drafters noted a 1997 ICCAT recommendation to promote the voluntary release of Atlantic blue and white marlin. In addition, they looked at National Standard Guideline 50 CFR 600.350(c), which states: "[a] catch and release fishery management program is one in which the retention of a particular species is prohibited." They pointed out this definition is a guideline and is only an example of management measures that may be used to establish a recreational catch-and-release program. In their conclusion establishing the Atlantic catch-and-release billfish program the drafters stated "The establishment of a catch-and-release fishery management program for recreational Atlantic billfish fishery is a final action because it meets the objectives of the FMP amendment as well as National Standard 9 and the 1997 ICCAT recommendation."

The recreational fishery that releases fish in southern California meets the same criteria used to establish the catch-and release program in the Atlantic. It is almost exclusively a recreational fishery, has an already high rate of live releases, has a high rate of survival and produces high economic benefit for each fish caught. Since there is wide-spread support for a catch-and-release program which allows the angler the option to land a fish, this plan should adopt one. In this manner, bycatch would be reduced.

Analysis

This is a status quo option; therefore, Initiating a voluntary recreational catch-and-release fishery for striped marlin would have no effect on management costs. NMFS currently monitors the sport catch through a volunteer reporting program and that would continue. It would be difficult to determine the effect of this fishery on other management unit species and incidentally taken species associated with marlin fishing. The current NMFS reporting program does not collect this information but could in the future.

Formalization of the existing practice of catch-and-release marlin fishing would result in reduced fishing mortality as anglers become educated on proper release techniques. Also, with a volunteer program, fish that succumb while being caught could be retained, thus avoiding the bycatch issue.

Striped marlin taken under a volunteer catch-and-release program would have positive socio-economic impacts by "recycling" fish since they could be caught multiple times. Not only can the fish live to fight another day, but anglers benefit from not having to quit fishing after releasing one fish. They could catch multiple marlin in one day. Local communities would also benefit if angler effort increased as a result of initiating a volunteer catch-and-release program.

There would be no impact on interactions with protected species because there currently are none documented. By definition, a voluntary catch-and-release striped marlin fishery would eliminate striped marlin bycatch. A volunteer catch-and-release program would have no impact on EFH. It could effect the data needs of the plan if more information is needed about HMS taken in association with the fishery.

A catch-and-release fishery would be consistent with Western Pacific Council efforts to reduce bycatch and bycatch mortality. Bycatch would be reduced by definition and mortality through greater angler awareness. This fishery would have no effect on resolving user conflicts nor would it affect safety of life at sea.

Finally, a volunteer catch-and-release striped marlin program would meet the management objectives of the plan and comply with international conventions to minimize bycatch and bycatch mortality.

1.7 Prohibition on Sale of Striped Marlin

Striped marlin are the principle billfish species landed by recreational anglers on the west coast. While they may be taken as far north as Oregon, the practical range of the fishery is confined to southern California. Catches vary between 180 and 1,100 marlin per year with the recent average around 250 fish per year. While many were killed by recreational anglers in past, the current trend in the fishery is to release most of the fish alive. California has prohibited the sale of striped marlin since the 1930's in an effort to preserve the sport fishery. Both the states of Oregon and Washington allow the sale of marlin since no sport fishery exists.

1.7.1 Background

The California recreational fishery for tuna, striped marlin and swordfish developed about the turn of the century. These large pelagics are prized by the recreational community although catches tuna and swordfish are insignificant compared to the commercial catch. Swordfish and striped marlin were listed as a game fish in 1931 and required a sport-fishing license issued by the CDFG. The California State legislature banned the use of harpoons to take striped marlin in 1935 and further curtailed the sale and import of striped marlin in 1937 thus preserving that southern California fishery entirely for recreational anglers. Most striped marlin fishing is from privately owned boats based in local southern California marinas.

The rod-and-reel season for striped marlin and swordfish can begin as early as May and continue through November, although most fish are taken from July to October. Fishing locations are primarily in the Southern California Bight from Santa Barbara, south and into Mexico. Many will fish the productive waters around the Coronado Islands (which are outside of the U.S. EEZ) for tuna, marlin, dorado and coastal pelagic species. A few private boat owners travel as far as Magdalena Bay and Cabo San Lucas, Baja California Sur in the fall and winter.

Fishing records from three Southern California sport fishing clubs (Balboa Angling Club, San Diego Marlin Club and the Tuna Club of Avalon) provide catches and size of catch for striped marlin and swordfish taken by their members. Reported catches of striped marlin exceed 38,900 fish and ranged from 273 fish per year in the 1990's to 761 fish per year during the 1980's. The period between 1955 and 1965 had some of the highest catches in a single season, but the 1980s had more consistent catches. Total annual recreational striped marlin catch (kept and released - from three clubs) has declined from a peak of approximately 1,100

in 1963 to a low of about 180 in 2000. No year in the last decade saw a catch in excess of 400 fish. Nine or ten years in the decade of the 1980's yielded catches in excess of 400 fish. The time series of catches shows an apparently significant decline from a peak of about 1,100 fish/year in 1963 to a low of about 180 in 2000.

The only estimates of recreational fishing effort for marlin and swordfish come from the SWFSC's Billfish Angler Survey. That survey requests catch and fishing effort data from individual anglers for billfish and swordfish in the Pacific Ocean. Effort in southern California is primarily directed at striped marlin, and at all billfish in Mexico. The Billfish Angler Survey began in 1969 and now provides a 31-year time series of angler catch rates in key locations throughout the Pacific. The current 1999 mean catch rate of 0.47 is equal to the prior five-year average of 0.47 (1994 to 1998). The highest reported catch rate (0.57) occurred during the first years of this survey (1969 to 1971). The lowest catch rates averaged 0.34 during the mid-1970's. The survey cannot separate effort directed specifically at swordfish from that directed to striped marlin.

Analysis of trends in the Mexican striped marlin fishery provide some indication of the effect of intense longlining on local stocks. Although recent trend analysis is lacking previous work has shown commercial longline fisheries operating off the coast of Baja California, Sur negatively impacted angler catch rates. The effect of joint-venture longline fisheries operating near Baja California in the 1970s resulted in declining angler catch rates for striped marlin. Mexico enforced its EEZ in 1976 and restricted foreign longlines from fishing in its EEZ for two years. During that time, the angler catch rate for billfish in that area increased by almost 60%. A period of limited longlining that began in 1982 again was correlated with a decline in angler catch rates. Mexico canceled all longline permits to fish billfish and tuna within its EEZ in 1990.

Observer data from drift gillnet vessels operating off southern and central California show the take of striped marlin has averaged about 30 fish per year. Because of a state prohibition, none of these fish were landed. Longline vessels fishing outside the EEZ and east of 135° W longitude, targeting swordfish and tunas, have reported the take of striped marlin on their logbooks (0.024 fish per 1,000 hooks). Limited NMFS observer data for the same fishery showed the catch rate to be almost double at 0.047 striped marlin per thousand hooks. The discard rate from logbook data was 80% while observes data showed 50% of the fish were discarded. Vessels fishing in this area and landing fish in Hawaii could retain marlin for sale. Catches of striped marlin in other commercial HMS fisheries are extremely rare.

1.7.2 Options

1.7.2.1 Prohibit the Landing or Sale of Marlin in West Coast Ports

Under this option, fishers landing in west coast ports would be prohibited from landing or selling marlin. Marlin taken incidental to any commercial fishing operation would be included.

Analysis

This option would continue the long standing practice of reserving marlin for recreational anglers in California and expand the prohibition to the states of Oregon and Washington. It would have no effect on management costs since it is status quo for California and no sport or commercial fisheries exist for marlin in the two northern states. NMFS currently monitors the sport catch through a volunteer reporting program and that would continue. It would be difficult to determine the effect of this fishery on other management unit species and incidentally taken species associated with marlin fishing. The current NMFS reporting program does not collect this information.

Continuation of the sport take only policy would preserve the economic status-quo since there would be no changes in fishing practices by either sport or commercial fishers. Community impacts would also remain the same.

Interactions with protected species would remain at very low levels because of the nature of the fishery; it is a directed hook-and-line fishery that is very selective for the species sought. Likewise, bycatch is not a problem since other species taken in association with marlin fishing (tuna and dorado) are usually retained. It would have no effect on EFH nor would it effect the data needs of the plan since NMFS is already collecting the data.

This option would be inconsistent with the Western Pacific Management Council in that they allow the sale of marlin. The inconsistency is culturally driven and probably cannot be resolved. Implementation of this option would continue to reduce user conflicts by not allowing direct competition for marlin between sport and commercial fishers.

Safety of life at sea would not be effected since there would be no changes in fishing practices. Maintaining the status-quo would meet the objectives of the plan by preserving an existing sport fishery and not further impacting commercial fisheries. It would meet international obligations to reduce bycatch and bycatch mortality since incidentally take species would be retained and most marlin released would be alive.

1.7.2.2 Allow the Landing or Sale of Marlin in West Coast Ports

Under this option, fishers landing in west coast ports would be allowed to land or sell marlin. Marlin taken incidental to any commercial fishing operation would be included.

Analysis

This option would discontinue the long standing practice of reserving marlin for recreational anglers in California by allowing their landing and sale. It would affect management costs to the extent it would be necessary to include marlin in the commercial data base, something currently not tracked since California allows no commercial take and no fishery exist for marlin in the two northern states. Existing logbook and observer programs would facilitate determining the effect of a commercial fishery on other management unit species and incidentally taken species, of which marlin would be one species since there is no existing directed commercial fishery. Allowing commercial take of marlin would have unknown socio-economic impact. It would probably negatively effect the sport fishery because, at best, there would be a perception of increased competition for fish, and assumed lower catch rates resulting in fewer trips. There would be some positive impacts on commercial fishers as fish with value could be landed. Community impacts would probably mirror the socio-economic impacts.

Allow commercial fishers to keep marlin would not change interaction rate with protected species since allowing the landing of an incidentally taken species is not expected to increase effort. Likewise, bycatch should not increase since there is no anticipate increase in effort. It would have no effect on EFH nor would it effect the data needs of the plan since NMFS is already collecting the data through logbooks and observer programs.

This option would be consistent with the Western Pacific Management Council in that they allow the sale of marlin. Implementation of this option could lead to increased user conflicts if commercial and recreational fishers occupy the same areas while fishing.

Safety of life at sea would not be effected since there would be no changes in fishing practices. Fish now discarded could be landed. Allowing the sale of marlin would meet one objective of the by reducing bycatch, marlin could now be landed. It would meet international obligations to reduce bycatch and bycatch mortality since incidentally take species would be retained.

Existing California Commercial Regulations - Fish and Game Code Sections

8393 (a) Except where subdivision (b) has been complied with, marlin meat, whether fresh, smoked, canned, or preserved by any means, shall not be bought or sold, or possessed or transported for the purpose of sale.
(b) Notwithstanding the provisions of subdivision (a) of this section, black marlin (Makaira Indica) may be imported into this state for the purpose of processing (manufacturing) a product commonly known as fish cakes for human consumption. All such black marlin (Makaira Indica) imported into this state must be in an identifiable condition and accompanied by a bill of lading, showing the name of the consignor, the consignee, and the weight or number of fish shipped. A copy of the bill of lading must be delivered to the nearest office of the Department of Fish and Game either prior to or no later than two days after receipt of the fish. No such marlin (*Makaira indica*) imported into California may leave the premises of the original consignee unless written permission is received from the Department of Fish and Game, or unless processed into the form of the product commonly known as fish cakes.

8582 (a) The Legislature finds and declares that the intent of this article is not to permit or encourage the taking of marlin for commercial purposes.
(b) It shall be a misdemeanor for any person operating under a permit pursuant to this article to sell or possess for sale or personal use any marlin. In the event a marlin is taken incidentally in a drift gill net, the permittee shall notify the department immediately that the fish is on the boat. No marlin may be removed from the boat except for delivery to the department.

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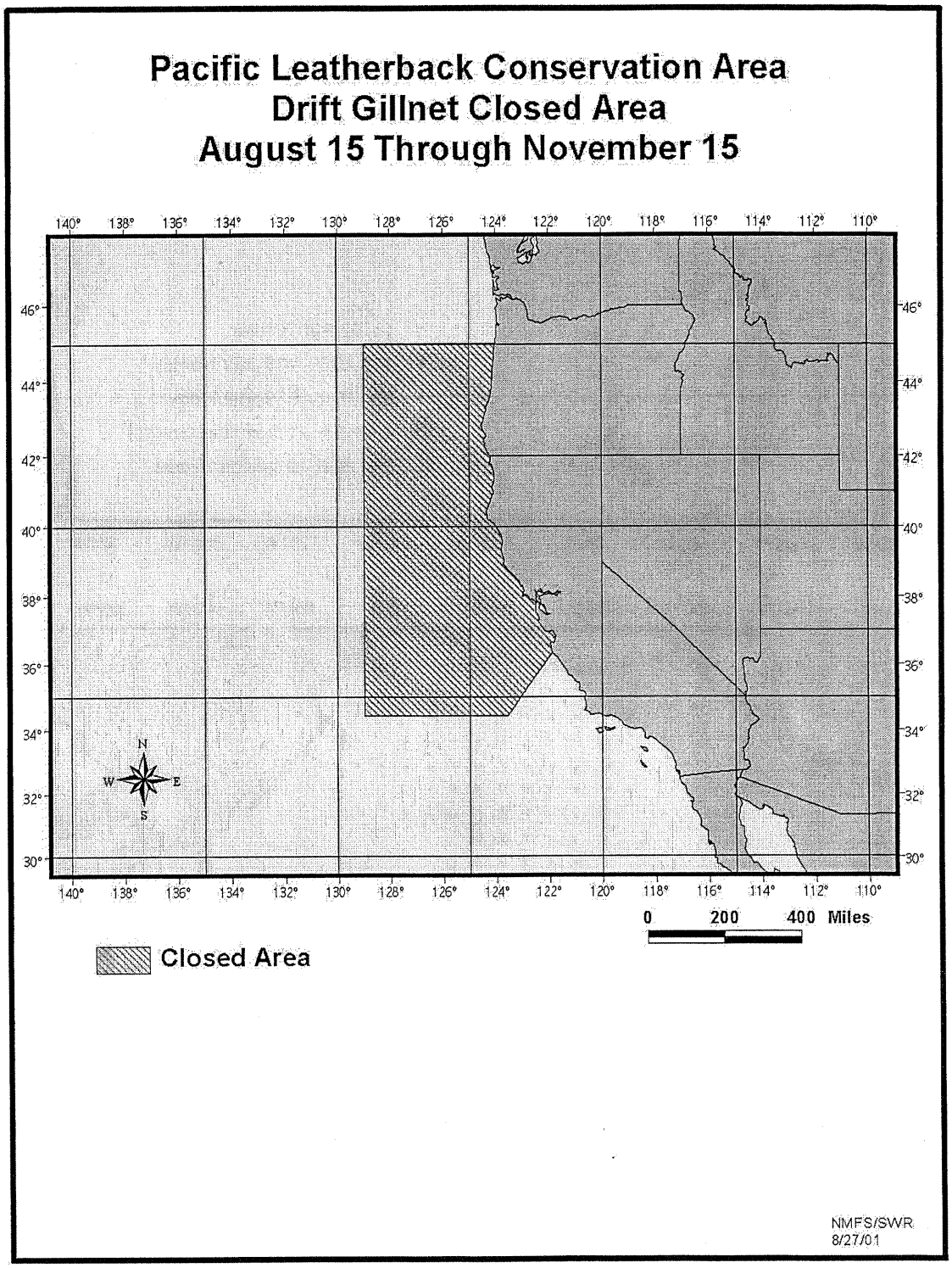
Figure A


Pacific Leatherback Conservation Area
Drift Gillnet Closed Area
August 15 Through November 15
140° 138° 136° 134° 132° 130° 128° 126° 124° 122° 120° 118° 116° 114° 112° 110°
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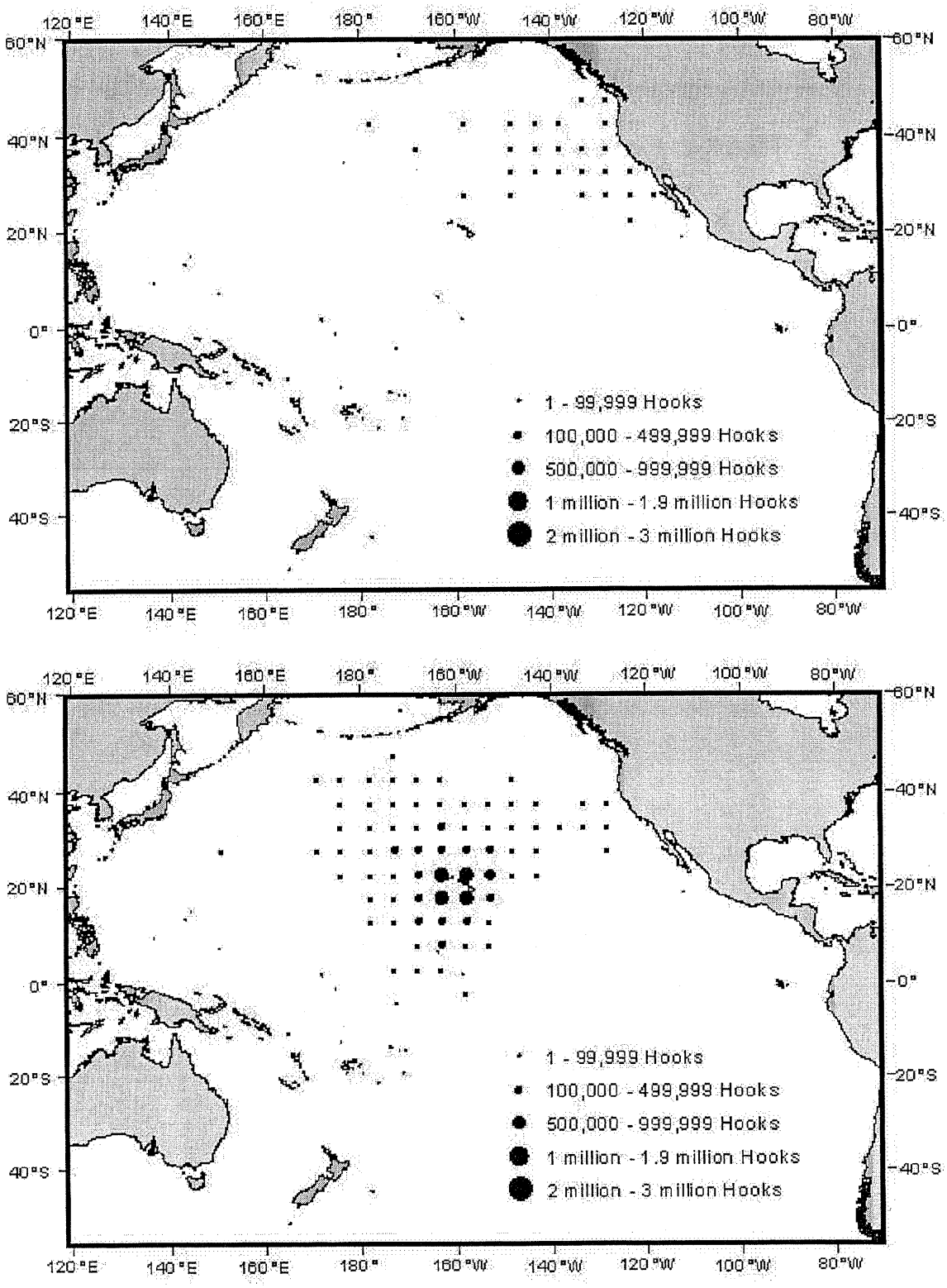

Figure 1. Distribution of California-based high seas longline effort (above) and Hawaii-based high seas longline effort (below), 1994-2000. (A. Coan, SWFSC/NMFS, La Jolla. California-based effort is from California logbook data.

Figure 2 Proposed Longline Fishing Area

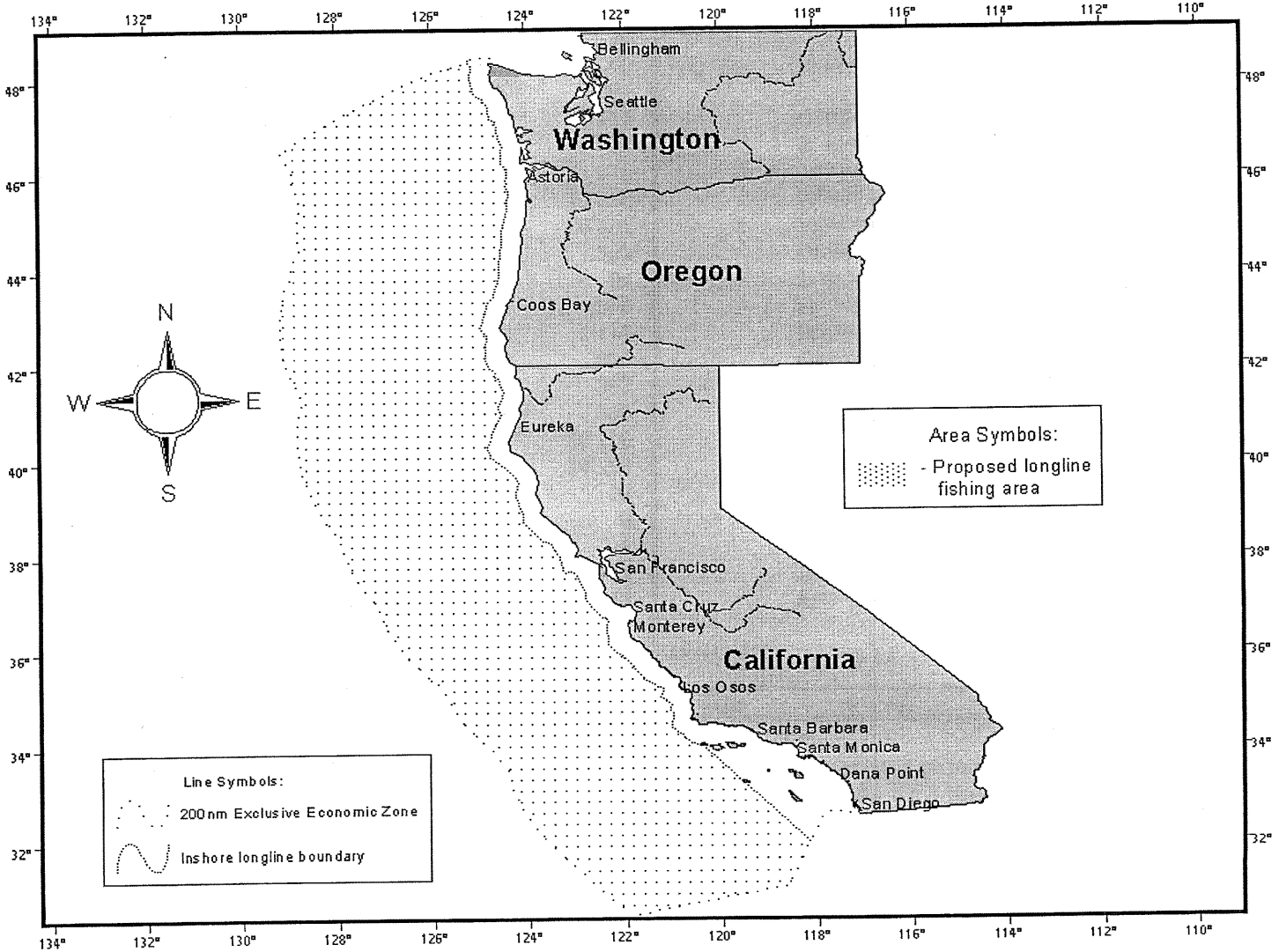

Table 1. Catches, discards and catch per thousand hooks (CPE) for all high seas logbook data where a trip fished east of 135°W longitude. Position is based on begin set position. Catch and discards are in number of fish. Data represent 33 Hawaii trips and 276 California Trips.

Area	Species	Catch	CPE	Discards	Total
East of 135°		2,520,255	Hooks:		
	Blue Marlin	0	0.005	12	12
	Striped Marlin	12	0.024	49	61
	Black Marlin	2	0.008	17	19
	Sailfish	0	0.002	5	5
	Spearfish	44	0.023	14	58
	Swordfish	32,867	13.780	1,862	34,729
	Blue Shark	406	10.614	26,344	26,750
	Mako Shark	421	0.393	569	990
	Thresher Shark	50	0.116	243	293
	Other Shark	12	0.341	848	860
	Mahimahi	5,693	2.824	1,423	7,116
	Moonfish	240	0.123	69	309
	Wahoo	42	0.021	12	54
	Other Pelagic	31	0.112	252	283
	Albacore	4,809	3.713	4,548	9,357
	Bigeye Tuna	10,163	4.229	495	10,658
	Yellowfin Tuna	490	0.242	120	610
	Other Tuna	18	0.010	6	24
	N. Bluefin Tuna	2,131	0.861	40	2,171
	Oilfish	321	0.270	360	681
	Pomfret	32	0.016	8	40
	Skipjack Tuna	7	0.012	24	31

Area	Species	Catch	CPE	Discards	Total
West of 135°		830,170	Hooks		
	Blue Marlin	56	0.078	9	65
	Striped Marlin	121	0.181	29	150
	Black Marlin	3	0.007	3	6
	Sailfish	1	0.007	5	6
	Spearfish	107	0.143	12	119
	Swordfish	7,908	10.027	416	8,324
	Blue Shark	169	7.709	6,231	6,400
	Mako Shark	65	0.210	109	174
	Thresher Shark	2	0.037	29	31
	Other Shark	1	0.231	191	192
	Mahimahi	1,814	2.780	494	2,308
	Moonfish	72	0.099	10	82
	Wahoo	114	0.143	5	119
	Other Pelagic	17	0.136	96	113
	Albacore	1,659	3.910	1,587	3,246
	Bigeye Tuna	1,849	2.339	93	1,942
	Yellowfin Tuna	254	0.432	105	359
	N. Bluefin Tuna	53	0.064	0	53
	Oilfish	31	0.219	151	182
	Pomfret	38	0.049	3	41
	Skipjack Tuna	45	0.069	12	57

Table 2. Summary of observer data for high-seas longline vessels that fished 1994 through 2000 both east and west of 135W longitude. CPUE is catch per 1,000 hooks, CPS is catch per set where catch is in number of fish. Data represent 6 trips, 100 sets and 86,045 hooks.

Species	WEST OF 135W				EAST OF 135W				ALL AREAS			
	Catch	Discards	CPUE	CPS	Catch	Discards	CPUE	CPS	Catch	Discards	CPUE	CPS
Albacore	337	208	7.986	6.878	513	422	11.700	10.059	850	630	9.879	8.500
Bigeye Thresher Shark	0	0	0.000	0.000	5	2	0.114	0.098	5	2	0.058	0.050
Bigeye Tuna	35	1	0.829	0.714	129	15	2.942	2.529	164	16	1.906	1.640
Blue Shark	702	702	16.636	14.327	861	861	19.636	16.882	1563	1563	18.165	15.630
Bluefin Tuna	8	1	0.190	0.163	15	1	0.342	0.294	23	2	0.267	0.230
Cartilaginous Fishes	3	3	0.071	0.061	1	1	0.023	0.020	4	4	0.046	0.040
Cookie Cutter Shark	1	1	0.024	0.020	1	1	0.023	0.020	2	2	0.023	0.020
Crestfish	0	0	0.000	0.000	1	1	0.023	0.020	1	1	0.012	0.010
Escolar	15	12	0.355	0.306	20	14	0.456	0.392	35	26	0.407	0.350
Fish, Unidentified	4	4	0.095	0.082	9	9	0.205	0.176	13	13	0.151	0.130
Indo-Pacific Blue Marline	0	0	0.000	0.000	1	1	0.023	0.020	1	1	0.012	0.010
Longfin Mako	1	0	0.024	0.020	0	0	0.000	0.000	1	0	0.012	0.010
Louvar	0	0	0.000	0.000	1	0	0.023	0.020	1	0	0.012	0.010
Mahimahi	22	3	0.521	0.449	17	1	0.388	0.333	39	4	0.453	0.390
Northern Lancetfish	11	11	0.261	0.224	28	28	0.639	0.549	39	39	0.453	0.390
Ocean Sunfish (Common Mola)	15	15	0.355	0.306	8	7	0.182	0.157	23	22	0.267	0.230
Oilfish	3	2	0.071	0.061	9	9	0.205	0.176	12	11	0.139	0.120
Opah (Moonfish)	1	0	0.024	0.020	7	4	0.160	0.137	8	4	0.093	0.080
Pacific Pomfret	2	0	0.047	0.041	2	0	0.046	0.039	4	0	0.046	0.040
Pelagics Stingray	26	26	0.616	0.531	11	11	0.251	0.216	37	37	0.430	0.370
Rainbow Runner	1	0	0.024	0.020	0	0	0.000	0.000	1	0	0.012	0.010
Remora	10	10	0.237	0.204	10	10	0.228	0.196	20	20	0.232	0.200
Shortbill Spearfish	1	0	0.024	0.020	1	1	0.023	0.020	2	1	0.023	0.020
Shortfin Mako (Mackerel Shark)	14	11	0.332	0.286	17	16	0.388	0.333	31	27	0.360	0.310
Sickle (Bigscale) Pomfret	2	1	0.047	0.041	0	0	0.000	0.000	2	1	0.023	0.020
Skipjack Tuna	2	1	0.047	0.041	1	0	0.023	0.020	3	1	0.035	0.030
Snake Mackerel	6	6	0.142	0.122	2	2	0.046	0.039	8	8	0.093	0.080
Striped Marlin	2	0	0.047	0.041	2	2	0.046	0.039	4	2	0.046	0.040
Swordfish, Broadbill	524	44	12.418	10.694	770	46	17.561	15.098	1294	90	15.039	12.940
Tuna and Mackerels	0	0	0.000	0.000	3	3	0.068	0.059	3	3	0.035	0.030
Wahoo	1	0	0.024	0.020	0	0	0.000	0.000	1	0	0.012	0.010
Yellowfin Tuna	3	1	0.071	0.061	5	3	0.114	0.098	8	4	0.093	0.080

Table 3. Summary of selected observer data for high-seas longline vessels that fished 1994 through 2000 both east and west of 135W longitude.

Trips	Sets	Hooks	Catch				CPUE (number/1000 hooks)			
			Albatross	Leatherback	Loggerhead	Striped Marlin	Albatross	Leatherback	Loggerhead	Striped Marlin
Entire area: 6	100	86,045	15	6	5	4	0.174	0.070	0.058	0.046
East of 135W: 6	51	43,847	11	2	2	2	0.251	0.046	0.046	0.046
West of 135W: 5	49	42,198	4	4	3	2	0.095	0.095	0.095	0.047

Table 4. Comparative Species Ranking. Taken in the High Seas Longline Fishery and the CA/OR Drift Gill Net Fishery in the EEZ (1997-1999), based on Longline Observer, Longline Logbook, and Drift Net Observer Data*, Including Catches of Vessels That Fished East of 135 W Longitude. Protected Species Ranked Separately. (Data are preliminary, unedited, not treated for bias and require more detailed analysis before extrapolation.)

High Seas LL Observed Catch Rates (East 135W) N= 43,847 hooks, 1994-2000	**High Seas LL Logbook Reported Catch Rates (East 135W) CA/HI -based vessels** N=2,520,255 Hooks, 1994-2000	**High Seas LL Logbook Reported Catch Rates ALL AREAS- California-Based vessels** N= 7,071,745 hooks-Aug 1995-Dec 1999	**DGN Observed Catch/Interactions (~20% observer Coverage1997,1998, 1999)**
Fishes: *CPUE > 0.30/1000 hooks* 1 Blue Shark 2 Broadbill Swordfish 3 Albacore 4 Bigeye tuna 5 Northern Lancetfish 6 Escolar 7 Shortfin mako shark 7 Dorado (Mahimahi) 8 Bluefin tuna *CPUE <= 0.30 and > .05/1000 hooks* 9 Pelagic stingray 10 Remora 11 Oilfish 11 Fish, Unid. 12 Mola Mola 13 Opah (Moonfish) 14 Bigeye thresher shark 14 yellowfin tuna 15 Tunas and mackerels, undet. *CPUE < .05/1000 hooks:* 16 Pacific pomfret 16 snake mackerel 16 Striped marlin 17 Cartilaginous fishes, undet. 17 Cookie cutter shark 17 Crestfish 17 Blue marlin 17 Louvar 17 Shortbill Spearfish 17 Skipjack tuna **Protected species (includes releases):** 1 Black-footed albatross CPUE=.25 2 Leatherback Turtle CPUE=.05 2 Loggerhead Turtle CPUE=.05	**Fishes:** *CPUE > 0.30/1000 hooks* 1 Broadbill Swordfish 2 Blue Shark 3 Bigeye tuna 4 Albacore 5 Dorado (mahimahi) 6 Northern Bluefin Tuna 7 Shortfin mako shark 8 Other Shark *CPUE<= 0.30 and >.05/1000 hooks* 9 Oilfish 10 Yellowfin tuna 11 Moonfish *CPUE < .05/1000 hooks* 12 Thresher shark, undet. 13 Other pelagic fishes 14 Striped marlin 15 Wahoo 15 Spearfish 16 Pacific pomfret 17 Skipjack tuna 18 Black Marlin 18 Other tuna **Protected species (includes releases):** 1 Albatross (CPUE = 0.022) 2 Leatherback turtle (CPUE= 0.012) 3 Olive Ridley turtle (CPUE= 0.007) 4 Loggerhead turtle (CPUE= 0.005) 5 Green turtle (CPUE= 0.004) 6 Other turtle (CPUE< 0.001) 6 Seal (CPUE<0.001)	**Fishes:** *CPUE > 0.30/1000 hooks* 1 Broadbill swordfish 2 Blue shark 3 Albacore tuna 4 Bigeye tuna 5 Dorado (mahimahi) *CPUE<= 0.30 and >.05/1000 hooks* 6 Bluefin tuna 7 Mako shark 8 Yellowfin tuna 9 Other fishes, undet. *CPUE < .05/1000 hooks* 10 Thresher shark, undet. 11 Opah 12 Oilfish 13 Other shark, undet. 14 Wahoo 15 Striped marlin 16 Sailfish 17 Blue marlin 18 Spearfish **Protected species (includes releases):** 1 Albatross, unspecified (CPUE=0.141) 2 Leatherback turtle (CPUE=0.005) 3 Loggerhead turtle (CPUE=0.003) 4 Olive ridley turtle (CPUE=0.003) 5 Green turtle (CPUE=0.002) 6 Turtle, other (CPUE=0.001) 7 Bird, other (CPUE=0.001) 8 Monk seal (CPUE=<0.001) 8 Sea lion (CPUE= <0.001)	**Fishes** *Numbers >1000:* 1 Mola mola 2 Blue shark 3 Albacore 4 Swordfish 5 Skipjack tuna 6 Bullet mackerel 7 Bluefin tuna 8 Mako shark 9 Opah 10 Common thresher shark *Numbers<200:* 11 Louvar 12 Yellowfin tuna 13 Bigeye thresher *Numbers <100*: 14 Striped marlin 15 Pelagic thresher shark 16 Blue marlin 17 Bigeye tuna 18 Dorado (Mahimahi) **Protected species (includes releases):**** *5.0 to 25 per yr* 1 Common dolphin (short-beaked and long) 2 California Sea Lion 3 Elephant seal *1.0 to 3.0 per year* 4 Northern Right Whale Dolphin 5 Leatherback Sea Turtle 6 Dall's Porpoise 6 Loggerhead Sea Turtle *0.3 to 1.0 per year:* 7 Risso's Dolphin 7 Pacific White-sided dolphin 8 Grey Whale *Less that 0.3 per yr:* 9 Short-finned Pilot Whale 9 Fin Whale 9 Minke Whale 9 Humpback whale 9 Sperm Whale 9 Olive Ridley Turtle

Data Obtained from NMFS longline observer, longline logbook, and drift gill net observer data; M. Vojkovich, Calif. Dep. Fish and Game (7/11/00); and from Cameron, G. and K.M. Forney. (1999; 2000) cetacean mortality papers presented to the International Whaling Comm.

See also NOAA (2000) for expanded take rates 1990-2000.

Table 5. Observer catch data from Southern California experimental cable drift longline fishery for mako and blue shark, 1988 and 1989*. Includes releases. CPUE=catch or take/1000 hooks. Data based on O'Brien and Sunada (1994), and pers. commun., J.

	Number 1988	Number 1989	Total	CPUE
Fishes:				
Blue shark	1,900	1,320	3,220	82.14
Shortfin mako shark	883	610	1,493	38.08
Pelagic sting ray	265	194	459	11.71
Mola mola	1	2	3	0.07
Hammerhead shark	2	0	2	0.05
Pacific mackerel	2	0	2	0.05
Finescale triggerfish	1	0	1	0.03
Giant seabass	1	0	1	0.03
Common thresher shark	1	0	1	0.03
Protected species:				
California sea lion	3	2	5	0.13
Green sea turtle	2	0	2	0.05

Observer coverage approx 19%; no program in 1990-91. Total No. observed hooks set in 1988-89 = 39200

Table 6. NMFS/SWFSC Longline Shark Survey Catch Tally Summaries: Southern California Bight 1994-2000 *

Year	N. Hooks	SFMako	CThreshShrk	BlShark	PelRay	SoupShrk	SpDogfish	DskyShrk	Unid.Shrk	BatRay	Yllowtail	Pmack	BSndBass	Mola	WSeaBass	Opah	Dorado	Unkn
1994	3,637	146	1	119	117							7						
1995	5,633	162	1	263	28													
1996	6,212	206	0	695	73									1				
1997	5,529	108	0	195	45				1					1			3	1
1998	1,872	40	27	12	8			1					1					
1999	606	40	28	17	8		1		1									
2000	7,596	51	34	1,003	26	2				1	1	2	13	1	2	1		1
Totals	31,085	753	91	2,304	305	2	1	1	2	1	1	9	14	3	2	1	3	2
CPUE		24.20	2.33	74.12	9.81	0.06	0.03	0.03	0.06	0.03	0.03	0.29	0.45	0.10	0.06	0.0	0.10	0.06

* Sampling protocol and target species not uniform over time (see text). Source: D. Prescott, NMFS, Southwest Fisheries Science Center, La Jolla, CA 7/16/2001

CPUE = Catch per 1,000 hooks

(For B Regulatory Document)

DRAFT
APPENDIX A

EXAMPLE OF AN EXEMPTED FISHING PERMIT WITH EXPERIMENTAL DESIGN

U.S. West Coast Highly Migratory Species Plan Development Team
Pacific Fishery Management Council

Example of Exempted Fishing Permit with Experimental Design

Title: Exempted Longline Experimental Fishery and Research Experiment.

Objectives

1. To determine if longline gear can be fished in ways that would produce bycatch rates (fish and protected species) significantly less than by drift gill netting, and to investigate gear or practices most effective in minimizing these interactions to the greatest extent possible.

2. To determine if longline fishing for tuna in the outer EEZ (or beyond) can be a sustainable and economically viable alternative to drift gillnetting (DGN) for West Coast DGN fishery permittees, while having acceptable levels of bycatch and protected species interactions.

3. To determine the movements of deep-swimming tunas (esp. bluefin tuna) off California and their stock relationships.

Method: Exempted research-exploratory fishing utilizing 4-6 commercial vessels, 100% observer coverage, area restrictions, and with time line and design as illustrated in Figure 1 flow chart and described below.

Justification

1. A multi-year, well-documented scientific study is needed to determine definitively if a small, low-bycatch longline fishery for tunas is possible within the California Current, or whether a permanent prohibition of the gear is warranted.
2. Small-scale fisheries that can produce high quality, fresh fish with low bycatch should be promoted.
3. New bycatch-reducing methods may have application to other fisheries in the U.S. and beyond.
4. Migrations, movements and preferred habitat of adult bluefin tuna and bigeye tuna are poorly understood; experiment should concurrently yield important information on their distribution in the West Coast EEZ.

Phase 1 (1st year; exploratory fishing): Determine general areas and seasons for commercial concentrations of tunas. During this exploratory phase, observers will collect baseline data on bycatch rates (marine mammals, protected/prohibited /vulnerable species per boat-day) in the fishing areas. If bycatch and protected species interaction rates are less than an previously agreed upon trigger level, NMFS/Pacific Council can agree to Phase 2.

Phase 2 (2nd year; establish strata catch rates): Establish areal and season sampling strata based on the Phase 1 baseline information on tuna and bycatch species' distribution. In each stratum, vessels would test catch rates of tunas and bycatch species according to different mitigation procedures (e.g. by season, depth of hooks, time of setting, soak duration, hook, bait type, etc.). Each season, each vessel in each stratum would devote every 5th set to a different mitigation procedure (while eliminating the obviously unworkable procedures). Fishing effort in each stratum would be proportional to tuna density, thus the fishermen would be working in high tuna catch areas. If results are promising, NMFS/Pacific Council can agree to Phase 3.

Phase 3 (3rd year; optimize a fishing strategy): Determine an optimum subset of strata that is practical with respect to catch rates and bycatch reduction to demonstrate the most optimum levels of tuna catch and acceptable bycatch, as determined from Phase 2. Estimate the overall yield potential and bycatch reduction benefits (extrapolating, based upon the chosen strata and their extent off California, and tuna movements). If results are promising, NMFS/Pacific Council could consider allowing such a fishery with suitable controls.

FIGURE 1. EXAMPLE of an EXEMPTED FISHING PERMIT WITH EXPERIMENTAL DESIGN